# Trenholm State Community College (TSCC)

## Executive Park Building E Renovations

2511 Fairlane Drive, Montgomery, AL 36116

SEAY SEAY & LITCHFIELD

ARCHITECTURE

SS&L Job No. 25206
ACCS Job No. 2026108 TSCC

| Architect | Roofing Consultant | Civil | Structural | Electrical | Mechanical / Plumbing |
|---|---|---|---|---|---|
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October 16, 2026
Bid Documents

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# FACILITIES DIVISION

**ACCS FORM 5-AA**

# ADVERTISEMENT FOR PREQUALIFICATION & BIDS

| | | | |
|---|---|---|---|
| **COLLEGE:** | **Trenholm State Community College** | **ACCS PROJECT#:** | 2026108 |
| **ADDRESS:** | 2511 Fairlane Drive<br>Montgomery, AL 36116 | **ACCS PROJECT NAME:** | TSCC Executive Park Building E Renovations |
| **SHORT DESCRIPTION OF THE SCOPE OF THE WORK:** | | | |
| Demolition and fit-out renovation to include interior walls, finishes, lighting fixtures, mechanical systems, plumbing systems, new elevator cab and finishes, landscaping, and new construction of a 760 square foot maintenance office. | | | |

**Requirements for Pre-qualification:** All interested General Contractors shall contact the Architect at osmith@sslarch.com to receive the criteria and the pre-qualification application for this project.

**Pre-qualification application forms** should be emailed to: osmith@sslarch.com
Forms will be received until 5:00 pm CST, 10/13/2026 .

**A Mandatory Pre-Bid Conference** for all pre-qualified contractors will be held at:
Trenholm State Community College, Building E Multipurpose Room E-120, 3920 Troy Hwy, Montgomery , AL 36116. on 10/29/2026 at 10:00 am CST.

Bid Documents may be obtained from the Architect (Engineer) upon deposit of $ per set, which will be refunded in full on the first sets issued to each general contract bidder submitting a bonafide bid, upon return of documents in good condition within ten days of bid date. Other sets for general contractors, and sets for subcontractors and dealers, may be obtained with the same deposit, which will be refunded as above, less cost of printing, reproduction, handling, and distribution.

Drawings and specifications may be examined at : www.sslarch.com via Newforma Info Exchange

Only general contractors who have been approved to bid pursuant to prequalification procedures and criteria established by the Owner will be eligible to bid for the Project.

Sealed proposals will be received by the Alabama Community College System at:
Trenholm State Community College, Building E Multipurpose Room E-120, 3920 Troy Hwy, Montgomery , AL 36116.
until 2:00 pm CST, 11/12/2026 at which time and place they will be publicly opened and read.

A cashier's check or bid bond payable to Alabama Community College System in an amount not less than five (5) percent of the amount of the bid, but in no event more than $10,000, must accompany the bidder's proposal. Performance and Payment Bonds and evidence of insurance required in the bid documents will be required at the signing of the Contract.

Bids must be submitted on proposal forms furnished by the Architect (Engineer) or copies thereof. All bidders bidding in amounts exceeding that established by the State Licensing Board for General Contractors must be licensed under the provisions of Title 34, Chapter 8, Code of Alabama, 1975, and must show evidence of license before bidding or bid will not be received or considered by the Architect (Engineer); the bidder shall show such evidence by clearly displaying his or her current license number on the outside of the sealed envelope in which the proposal is delivered. The Owner reserves the right to reject any or all proposals and to waive technical errors if, in the Owner's judgement, the best interests of the Owner will thereby be promoted.

**ALABAMA COMMUNITY COLLEGE SYSTEM** **ARCHITECT/ENGINEER**

**NOTE:** For projects exceeding $100,000, this notice must be run once a week for three successive weeks in a newspaper of general circulation in the county or counties in which the project, or any part of the project, is to be performed. Proof of publication is required.

FACILITIES MANAGEMENT

ACCS FORM 5-C

# INSTRUCTIONS *to* BIDDERS

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1. Bid Documents
2. General Contractor's State Licensing Requirements
3. Qualifications of Bidders and Prequalification Procedures
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17. Award of Contract

**1 BID DOCUMENTS:**

The Bid Documents consist of the Advertisement for Bids, these Instructions to Bidders, any supplements to these Instructions to Bidders, the Proposal Form and the Accounting of Sales Tax, and the proposed Contract Documents. The proposed Contract Documents consist of the Construction Contract, the Performance Bond and Payment Bond, the Conditions of the Contract (General, Supplemental, and other Conditions), Drawings, Specifications and all addenda issued prior to execution of the Construction Contract. Bid Documents may be obtained or examined as set forth in the Advertisement for Bids.

**2 GENERAL CONTRACTOR'S STATE LICENSING REQUIREMENTS:**

When the amount bid for a contract exceeds $100,000, the bidder must be licensed by the State Licensing Board for General Contractors and must show the Architect evidence of license before bidding or the bid will not be received by the Architect or considered by the Awarding Authority. A bid exceeding the bid limit stipulated in the bidder's license, or which is for work outside of the type or types of work stipulated in the bidder's license, will not be considered. In case of a joint venture of two or more contractors, the amount of the bid shall be within the maximum bid limitation as set by the State Licensing Board for General Contractors of the combined limitations of the partners to the joint venture.

**3 QUALIFICATIONS *of* BIDDERS *and* PREQUALIFICATION PROCEDURES:**

**(a)** Any special qualifications required of general contractors, subcontractors, material suppliers, or fabricators are set forth in the Bid Documents.

**(B)** The Awarding Authority may have elected to prequalify bidders. Parties interested in bidding for this contract are directed to the Advertisement for Bids and Supplemental Instructions to Bidders to determine whether bidders must be prequalified and how they may obtain copies of the Awarding Authority's published prequalification procedures and criteria.

**(C)** Release of Bid Documents by the Architect to a prospective bidder will not constitute any determination by the Awarding Authority or Architect that the bidder has been found to be qualified, prequalified, or responsible.

**4 PREFERENCE *to* RESIDENT CONTRACTORS:**

(If this project is federally funded in whole or in part, this Article shall not apply.)

**(A)** In awarding the Contract, preference will be given to Alabama resident contractors and a nonresident bidder domiciled in a state having laws granting preference to local contractors shall be awarded the Contract only on the same basis as the nonresident bidder's state awards contracts to Alabama contractors bidding under similar circumstances.

**(B)** A nonresident bidder is a contractor which is neither organized and existing under the laws of the State of Alabama, nor maintains its principal place of business in the State of Alabama. A nonresident contractor which has maintained a permanent office within the State of Alabama for at least five continuous years shall not thereafter be deemed to be a non-resident contractor so long as the contractor continues to maintain a branch office within Alabama.

**5** **EXAMINATION of BID DOCUMENTS** *and the* **SITE** *of the* **WORK:**

Before submitting a bid for the Work, the bidders shall carefully examine the Bid Documents, visit the site, and satisfy themselves as to the nature and location of the Work, and the general and local conditions, including weather, the general character of the site or building, the character and extent of existing work within or adjacent to the site and any other work being performed thereon at the time of submission of their bids. They shall obtain full knowledge as to transportation, disposal, handling, and storage of materials, availability of water, electric power, and all other facilities in the area which will have a bearing on the performance of the Work for which they submit their bids. The submission of a bid shall constitute a representation by the bidder that the bidder has made such examination and visit and has judged for and satisfied himself or herself as to conditions to be encountered regarding the character, difficulties, quality, and quantities of work to be performed and the material and equipment to be furnished, and as to the contract requirements involved.

**6** **EXPLANATIONS** *and* **INTERPRETATIONS:**

**(A)** Should any bidder observe any ambiguity, discrepancy, omission, or error in the drawings and specifications, or in any other bid document, or be in doubt as to the intention and meaning of these documents, the bidder should immediately report such to the Architect and request clarification.

**(B)** Clarification will be made only by written Addenda sent to all prospective bidders. Neither the Architect nor the Awarding Authority will be responsible in any manner for verbal answers or instructions regarding intent or meaning of the Bid Documents.

**(C)** In the case of inconsistency between drawings and specifications or within either document, a bidder will be deemed to have included in its bid the better quality or greater quantity of the work involved unless the bidder asked for and obtained the Architect's written clarification of the requirements before submission of a bid.

**7** **SUBSTITUTIONS:**

**(A)** The identification of any product, material, system, item of equipment, or service in the Bid Documents by reference to a trade name, manufacturer's name, model number, etc. (hereinafter referred to as "source"), is intended to establish a required standard of performance, design, and quality and is not intended to limit competition unless the provisions of paragraph "d" below apply.

**(B)** When the Bid Documents identify only one or two sources, or three or more sources followed by "or approved equal" or similar wording, the bidder's proposal may be based on a source not identified but considered by the bidder to be equal to the standard of performance, design and quality as specified; however, such substitutions must ultimately be approved by the Architect. If the bidder elects to bid on a substitution without "Pre-bid Approval" as described below, then it will be understood that proof of compliance with specified requirements is the exclusive responsibility of the bidder.

**(C)** When the Bid Documents identify three or more sources and the list of sources is not followed by "or approved equal" or similar wording, the bidder's proposal shall be based upon one of the identified sources, unless the bidder obtains "Pre-bid Approval" of another source as described below. Under these conditions it will be expressly understood that no product, material, system, item of equipment, or service that is not

identified in the Bid Documents or granted "Pre-Bid Approval" will be incorporated into the Work unless such substitution is authorized and agreed upon through a Contract Change Order.

**(D)** If the Bid Documents identify only one source and expressly provide that it is an approved sole source for the product, material, system, item of equipment, or service, the bidder's proposal must be based upon the identified sole source.

**(E)** Procedures for "Pre-bid Approval". If it is desired that a product, material, system, piece of equipment, or service from a source different from those sources identified in the Bid Documents be approved as an acceptable source, application for the approval of such source must reach the hands of the Architect at least ten days prior to the date set for the opening of bids. At the Architect's discretion, this ten day provision may be waived. The application for approval of a proposed source must be accompanied by technical data which the applicant desires to submit in support of the application. The Architect will give consideration to reports from reputable independent testing laboratories, verified experience records showing the reputation of the proposed source with previous users, evidence of reputation of the source for prompt delivery, evidence of reputation of the source for efficiency in servicing its products, or any other pertinent written information. The application to the Architect for approval of a proposed source must be accompanied by a schedule setting forth in which respects the materials or equipment submitted for consideration differ from the materials or equipment designated in the Bid Documents. The burden of proof of the merit of the proposed substitution is upon the proposer. To be approved, a proposed source must also meet or exceed all express requirements of the Bid Documents. Approval, if granted, shall not be effective until published by the Architect in an addendum to the Bid Documents.

## 8 PREPARATION *and* DELIVERY *of* BIDS:

### (A) ACCS Form 5-E: Proposal Form:

**(1)** Bids must be submitted on the Proposal Form as contained in the Bid Documents; only one copy is required to be submitted. A completed ACCS Form 5-H: Accounting of Sales Tax must be submitted with the Proposal Form.

**(2)** All information requested of the bidder on the Proposal Form must be filled in. The form must be completed by typewriter or hand-printed in ink.

**(3)** Identification of Bidder: On the first page of the Proposal Form the bidder must be fully identified by completing the spaces provided for:

**a.** the legal name of the bidder,
**b.** the state under which laws the bidder's business is organized and existing,
**c.** the city (and state) in which the bidder has its principal offices,
**d.** the bidder's business organization, i.e., corporation, partnership, or individual (to be indicated by marking the applicable box and writing in the type of organization if it is not one of those listed), and
**e.** the partners or officers of the bidder's organization, if the bidder is other than an individual.

If the space provided on the Proposal Form is not adequate for this listing, the bidder may insert "See Attachment" in this space and provide the listing on an attachment to the Proposal Form.

**(4)** Where indicated by the format of the Proposal Form, the bidder must specify lump sum prices in both words and figures. In case of discrepancy between the prices shown in words and in figures, the words will govern.

**(5)** All bid items requested in the Proposal Form, including alternate bid prices and unit prices for separate items of the Work, must be bid. If a gross sum of bid items is requested in the Proposal Form, the gross sum shall be provided by the bidder.

**(6)** In the space provided in the Proposal Form under "Bidder's Alabama License", the bidder must insert his or her current general contractor's state license number, current bid limit, and type(s) of work for which bidder is licensed.

**(7)** The Proposal Form shall be properly signed by the bidder. If the bidder is:

**a.** **an individual,** that individual or his or her "authorized representative" must sign the Proposal Form;
**b.** **a partnership,** the Proposal Form must be signed by one of the partners or an "authorized representative" of the Partnership;
**c.** **a corporation,** the president, vice-president, secretary, or "authorized representative" of the corporation shall sign and affix the corporate seal to the Proposal Form.
As used in these Instructions to Bidders, "authorized representative" is defined as a person to whom the bidder has granted written authority to conduct business in the bidder's behalf by signing and/or modifying the bid. Such written authority shall be signed by the bidder (the individual proprietor, or a member of the Partnership, or an officer of the Corporation) and shall be attached to the Proposal Form.

**(8)** Interlineation, alterations or erasures on the Proposal Form must be initialed by the bidder or its "authorized representative".

**(B) ACCS Form 5-H: Accounting *of* Sales Tax**

A completed ACCS Form 5-H: Accounting of Sales Tax must be submitted with ACCS Form 5-E: Proposal Form. Submission of ACCS Form 5-H is required, it is not optional. A proposal shall be rendered non-responsive if an Accounting of Sales Tax is not provided.

**(C) Bid Guaranty**

**(1)** The Proposal Form must be accompanied by a cashier's check, drawn on an Alabama bank, or a Bid Bond, executed by a surety company duly authorized and qualified to make such bonds in the State of Alabama, payable to the Awarding Authority.

**(2)** If a Bid Bond is provided in lieu of a cashier's check, the bond shall be on the Bid Bond form as stipulated in the Bid Documents.

**(3)** The amount of the cashier's check or Bid Bond shall not be less than five percent of the contractor's bid, but is not required to be in an amount more than ten thousand dollars.

**(D) Delivery *of* Bids:**

**(1)** Bids will be received until the time set, and at the location designated, in the Advertisement for Bids unless notice is given of postponement. Any bid not received prior to the time set for opening bids will be rejected absent extenuating circumstances and such bids shall be rejected in all cases where received after other bids are opened.

**(2)** Each bid shall be placed, together with the bid guaranty, in a sealed envelope. On the outside of the envelope the bidder shall write in large letters "Proposal", below which the bidder shall identify the Project and the Work bid on, the name of the bidder, and the bidder's current general contractor's state license number.

**(3)** Bids may be delivered in person, or by mail if ample time is allowed for delivery. When sent by mail, the sealed envelope containing the bid, marked as indicated above, shall be enclosed in another envelope for mailing.

## 9 WITHDRAWAL *or* REVISION *of* BIDS:

**(A)** A bid may be withdrawn prior to the time set for opening of bids, provided a written request, executed by the bidder or the bidder's "authorized representative", is filed with the Architect prior to that time. The bid will then be returned to the bidder unopened.

**(B)** A bid which has been sealed in its delivery envelope may be revised by writing the change in price on the outside of the delivery envelope over the signature of the bidder or the bidder's "authorized representative". In revising the bid in this manner, the bidder must only write the amount of the change in price on the envelope **and must not reveal the bid price.**

**(C)** Written communications, signed by the bidder or its "authorized representative", to revise bids will be accepted if received by the Architect prior to the time set for opening bids. The Architect will record the instructed revision upon opening the bid. Such written communication may be by facsimile if so stipulated in Supplemental Instructions to Bidders. In revising the bid in this manner, the bidder must only write the amount of the change in price **and must not reveal the bid price.**

**(D)** Except as provided in Article 12 of these Instructions to Bidders, no bid shall be withdrawn, modified, or corrected after the time set for opening bids.

## 10 OPENING *of* BIDS:

**(A)** Bids will be opened and read publicly at the time and place indicated in the Advertisement for Bids. Bidders or their authorized representatives are invited to be present.

**(B)** A list of all proposed major subcontractors and suppliers will be submitted by Bidders to the Architect at a time subsequent to the receipt of bids as established by the Architect in the Bid Documents but in no event shall this time exceed twenty-four (24) hours after receipt of bids. If the list includes a fire alarm contractor and/or fire sprinkler contractor, Bidders will also submit a copy of the fire alarm contractor's and/or fire sprinkler contractor's permits from the State of Alabama Fire Marshal's Office.

**11** **INCOMPLETE *and* IRREGULAR BIDS:**
A bid that is not accompanied by data required by the Bid Documents, or a bid which is in any way incomplete, may be rejected. Any bid which contains any uninitialed alterations or erasures, or any bid which contains any additions, alternate bids, or conditions not called for, or any other irregularities of any kind, will be subject to rejection.

**12** **BID ERRORS:**
**(A) Errors and Discrepancies in the Proposal Form.** In case of error in the extension of prices in bids, the unit price will govern. In case of discrepancy between the prices shown in the figures and in words, the words will govern.

**(B) Mistakes within the Bid.** If the low bidder discovers a mistake in its bid, the low bidder may seek withdrawal of its bid without forfeiture of its bid guaranty under the following conditions:

**(1) Timely Notice:** The low bidder must notify the Awarding Authority and Architect in writing, within three working days after the opening of bids, that a mistake was made. This notice must be given within this time frame whether or not award has been made.

**(2) Substantial Mistake:** The mistake must be of such significance as to render the bid price substantially out of proportion to the other bid prices.

**(3) Type of Mistake:** The mistake must be due to calculation or clerical error, an inadvertent omission, or a typographical error which results in an erroneous sum. A mistake of law, judgment, or opinion shall not constitute a valid ground for withdrawal without forfeiture.

**(4) Documentary Evidence:** Clear and convincing documentary evidence of the mistake must be presented to the Awarding Authority and the Architect as soon as possible, but no later than three working days after the opening of bids.

The Awarding Authority's decision regarding a low bidder's request to withdraw its bid without penalty shall be made within 10 days after receipt of the bidder's evidence or by the next regular meeting of the Awarding Authority. Upon withdrawal of bid without penalty, the low bidder shall be prohibited from (1) doing work on the project as a subcontractor or in any other capacity and (2) bidding on the same project if it is re-bid.

**13** **DISQUALIFICATION *of* BIDDERS:**
Any bidder(s) may be disqualified from consideration for contract award for the following reasons:

**(A) Collusion.** Any agreement or collusion among bidders or prospective bidders in restraint of freedom of competition to bid at a fixed price or to refrain from bidding or otherwise shall render the bids void and shall cause the bidders or prospective bidders participating in such agreement or collusion to be disqualified from submitting further bids to the Awarding Authority on future lettings. (See § 39-2-6, Code of Alabama 1975, for possible criminal sanctions.)

**(B) Advance Disclosure.** Any disclosure in advance of the terms of a bid submitted in response to an Advertisement for Bids shall render the proceedings void and require re-advertisement and rebid.

**(C) Failure to Settle Other Contracts.** The Awarding Authority may reject a bid from a bidder who has not paid, or satisfactorily settled, all bills due for labor and material on other contracts in force at the time of letting.

## 14 CONSIDERATION *of* BIDS:

**(A)** After the bids are opened and read publicly, the bid prices will be compared and the results of this comparison will be available to the public. Until the final award of the contract, however, the Awarding Authority shall have the right to reject any or all bids, and it shall have the right to waive technical errors and irregularities if, in its judgment, the bidder will not have obtained a competitive advantage and the best interests of the Awarding Authority will be promoted.

**(B)** If the Bid Documents request bids for projects or parts of projects in combination or separately, the Bid Documents must include supplements to, these Instructions to Bidders setting forth applicable bid procedures. Award or awards will be made to the lowest responsible and responsive bidder or bidders in accordance with such bid procedures.

## 15 BID ALTERNATES:

**(A)** Bid Alternates: Additive alternate bids are preferred, and may be used in order to obtain prices for the addition of items not included in the base bid. The alternate bids shall be listed in the Proposal Form.

**(B)** Deductive Bid Alternates: Deductive alternate bids shall only be used with the prior approval of the Chief Facilities Officer.

**(C)** ACCS reserves the right to select or reject some, any, or all alternates in making the final determination of the lowest responsible and responsive bidder to whom the Construction Contract is awarded.

## 16 UNIT PRICES:

**(A) Work Bid on a Unit Price Basis.** Where all, or part(s), of the planned Work is bid on a unit price basis, both the unit prices and the extensions of the unit prices constitute a basis of determining the lowest responsible and responsive bidder. In cases of error in the extension of prices of bids, the unit price will govern. A bid may be rejected if any of the unit prices are obviously unbalanced or non-competitive. Each unit price is to include overhead, profit, and all other related costs.

**(B) Unit Prices for Application to Change Orders.** As a means of predetermining unit costs for changes in certain elements of the Work, the Bid Documents may require that the bidders furnish unit prices for those items in the Proposal Form. Unit prices for application to changes in the work are not a basis for determining the lowest bidder. Non-competitive unit prices proposed by the successful bidder may be rejected and competitive prices negotiated by the Awarding Authority prior to contract award. Unit prices for application to changes in the work are not effective unless specifically included and agreed upon in the Construction Contract. Each unit price is to include overhead, profit, and all other related costs.

## 17 AWARD *of* CONTRACT:

**(A)** The contract shall be awarded to the lowest responsible and responsive bidder unless the Awarding Authority finds that all the bids are unreasonable or that it is not in the best interest of the Awarding Authority to accept any of the bids. A responsible bidder is one who, among other qualities determined necessary for performance, is competent, experienced, and financially able to perform the contract. A responsive bidder is one who submits a bid that complies with the terms and conditions of the Advertisement for Bids and the Bid Documents. Minor irregularities in the bid shall not defeat responsiveness.

**(B)** A bidder to whom award is made will be notified by telegram, confirmed facsimile, or letter to the address shown on the Proposal Form at the earliest possible date. Unless other time frames are stipulated in Supplemental Instructions to Bidders, the maximum time frames allowed for each step of the process between the opening of bids and the issuance of an order to proceed with the work shall be as follows:

**(1)** Award of contract by Awarding Authority: 30 calendar days after the opening of bids

**(2)** Contractor's return of the fully executed contract, with bonds and evidence of insurance, to the Awarding Authority: 15 calendar days after the contract has been presented to the contractor for signature (from the Lead Design Professional)

**(3)** Awarding Authority's approval of the contractor's bonds and evidence of insurance and completion of contract execution: 20 calendar days after the contractor presents complete and acceptable documents to the Architect

**(4)** Notice To Proceed issued to the contractor along with distribution of the fully executed construction contract to all parties: 15 calendar days after final execution of contract by the Awarding Authority, by various State Agencies if required and by the Governor if his or her signature on the contract is required by law

The time frames stated above, or as otherwise specified in the Bid Documents, may be extended by written agreement between the parties. Failure by the Awarding Authority to comply with the time frames stated above or stipulated in Supplemental Instructions to Bidders, or agreed extensions thereof, shall be just cause for the withdrawal of the contractor's bid and contract without forfeiture of bid security.

Should the successful bidder or bidders to whom the contract is awarded fail to execute the Construction Contract and furnish acceptable Performance and Payment Bonds and satisfactory evidence of insurance within the specified period, the Awarding Authority shall retain from the bid guaranty, if it is a cashier's check, or recover from the principal or the sureties, if the guaranty is a bid bond, the difference between the amount of the contract as awarded and the amount of the bid of the next lowest responsible and responsive bidder, but not more than $10,000. If no other bids are received, the full amount of the bid guaranty shall be so retained or recovered as liquidated damages for such default. Any sums so retained or recovered shall be the property of the Awarding Authority.

All bid guaranties, except those of the three lowest bona fide bidders, will be returned immediately after bids have been checked, tabulated, and the relation of the bids established. The bid guaranties of the three lowest bidders will be returned as soon as the contract bonds and the contract of the successful bidder have been properly executed and approved. When the award is deferred for a period of time longer than 15 days after the opening of the bids, all bid guaranties, except those of the potentially successful bidders, shall be returned. If no award is made within the specified period, as it may by agreement be extended, all bids will be rejected, and all guaranties returned. If any potentially successful bidder agrees in writing to a stipulated extension in time for consideration of its bid and its bid was guaranteed with a cashier's check, the Awarding Authority may permit the potentially successful bidder to substitute a satisfactory bid bond for the cashier's check.

# END OF INSTRUCTIONS TO BIDDERS

# ADDITIONAL INSTRUCTIONS TO BIDDERS

These instructions are requirements in addition to the Instructions to Bidders ACCS form 5-C of The Contract Documents. Where conflicts occur between Instructions to Bidders and the Additional Instructions to Bidders the more stringent requirement shall govern.

## A.1 INTENT OF INSTRUCTION:

Instructions to Bidders are provided to amplify the Invitation/Advertisement, which is abbreviated, and to give other details which interested parties should know in order to prepare bids properly.

## A.2 EXAMINATION OF CONTRACT DOCUMENTS AND THE SITE:

Before submitting a proposal for the work, each bidder shall examine carefully the Contract Documents, visit the site, and satisfy himself as to the nature and location of the work, local conditions including weather, the character and extent of existing work within or adjacent to the site and any other work being performed thereon at the time of submission of bids. He shall obtain full knowledge as to all conditions and facilities in the area which will have a bearing on the performance of the work. The submission of a proposal shall be prima facie evidence that the bidder has made such examination and visit.

## A.3 EXPLANATIONS AND INTERPRETATIONS:

**A.3.1** Should a bidder observe any ambiguity, discrepancy, omission or error in the Drawings and Specifications, or in any other Contract Document, or be in doubt as to the intention and meaning thereof, he shall report such to the architect immediately and request clarification.

**A.3.2** Clarification will be made by Addendum sent to all prospective bidders or, if time does not permit announced at the place where, and before the time, bids are opened.

**A.3.3** Neither the Owner nor the Architect will be responsible in any manner for oral answers regarding intent or meaning of the Contract Documents, prior to the award of the Contract.

**A.3.4** Should conflict occur in or between Drawings and Specifications, a bidder will be judged to have estimated the more expensive way of doing the work involved unless he shall have asked for and obtained the written decision of the Architect before submission of his proposal.

## A.4 PREPARATION OF PROPOSAL:

**A.4.1** The Proposal shall be submitted on the Proposal Form furnished by the Architect or on copies of the form included in the Specifications. Addenda and Bulletins shall be acknowledged on the Bid Form.

**A.4.2** The Bidder shall specify, both in words and figures without interlineations, alterations or erasures, a lump sum price for each lump sum item and a unit price for each of the separate items for which a quantity is given in the Proposal Form. He shall show also the gross sum for which he will perform all of the estimated Work as required by the Contract Documents. In case of

discrepancy between the prices shown in figures and in words, the words will govern.

**A.4.3** Bidders are requested to bid on all Alternates or unit costs indicated. State alternate bids as additions or deductions to the Base Bid. Where an Alternate does not involve a change in price, insert the words "No Change". Bidders not desiring to bid a certain Alternate should so indicate by the words "No Bid". Bidders failing to bid an Alternate risk disqualification of their bid.

**A.4.4** The Proposal shall be signed properly by the Bidder. If the Bidder is an individual, his name and post office address must be shown; if a firm or partnership, the name and post office address of each member of the firm or partnership must be shown; if a corporation, the president, vice-president, or secretary shall sign and affix the corporate seal, or if the person signing the Proposal is an agent, the said agent must attach written authorization from the president, vice-president or secretary of the corporation. The Proposal must show the name of the corporation, the name of the state under the laws of which the corporation is chartered and the names, titles, and business addresses of the officers.

## A.5 DELIVERY OF PROPOSALS:

Preparation of (and Adjustments to) Bid: Enclose bid in a sealed envelope bearing the name of the work and of the bidder and the bidder's current Contractor's License Number. Prepare bid on form bound in Project Manual or copy thereof. Furnish **two original bid proposals (5-E)**, **two accounting of sales tax forms (5-H)**, **one disclosure statements,** **one original of bid bond** and **one copy of General Contractor's License Certificate** with Bid Proposals.

## A.6 QUESTIONS

Questions regarding the work should be directed to Olivia Smith of Seay, Seay & Litchfield, osmith@sslarch.com, unless noted otherwise.

## A.7 PROPOSAL GUARANTY

Bid Bond shall be on Standard ACCS bond form. The bid security shall insure that the Bidder will enter into a contract with the Awarding Authority, and will furnish the Specified Performance and Payment Bonds and evidence of insurance, within 15 days of the receipt of bids.

## A.8 LIST OF SUBCONTRACTORS

Within twenty-four (24) hours of the Bid, apparent low bidder shall submit to the Architect a list of major subcontractors and suppliers / manufacturers proposed for the Work. Failure to submit such list within the time designated may, at the Owners sole discretion, result in disqualification of the Bid. As a minimum, the list of major subcontractors shall include the trades noted below. This list may be emailed to the address noted above in paragraph A.6 or hand delivered to Seay, Seay & Litchfield at 1115 South Court Street, Montgomery, Alabama 36104.

- Demolition-Electrical
- Demolition-Mechanical
- Demolition-Plumbing

- Demolition-Hazardous Material Abatement

## A.9 SALES AND USE TAX

Please see bid Proposal Form 5-E and Attachment to 5-H, Accounting of Sales Tax.

## A.10 PREBID CONFERENCE

A pre-bid conference will be held at a time and date indicated in the invitation/advertisement, at which time conditions affecting the work will be discussed. Any contractual determinations made at this conference will be verified by addendum; only explanations so verified will be considered part of the contract terms or conditions.

## A.11 DISCLOSURE STATEMENT

Complete the disclosure statement (bound herein) as required by state law.

Original disclosure statement shall also be submitted with the executed contract.

## A.12 EXPLANATIONS AND INTERPRETATIONS (Articles 6b, 6c, and 7e)

**6b and 6c:** No request for clarification will be accepted by the Architect forty-eight hours prior to the bid time and date.

**7e:** See Specifications Section 01600, paragraph 3.01 for more product substitution requirements. No requests for substitutions will be accepted by the Architect within ninety-six (96) hours prior to the bid time and date.

## A.13 DISQUALIFICATION OF BIDDERS:

**A.13.1** Evidence that any bidder is interested, as a principal, in more than one Proposal for the Work will cause the rejection of any such Proposals.

**A.13.2** If there is reason for believing that collusion exists among the bidders, any or all Proposals may be rejected. Proposals in which prices obviously are unbalanced or unresponsive to the Invitation/Advertisement may be rejected.

## A.14 AWARD OF CONTRACT:

The Contract will be awarded to the lowest responsible bidder complying with the conditions of the Invitation/Advertisement unless the Owner finds that his bid is unreasonable or that it is not to the interest of the Owner to accept it.

**END**

# FACILITIES DIVISION

**ACCS FORM 5-E**

# PROPOSAL FORM

To: Alabama Community College System Date: _____

In compliance with the Advertisement for Bids and subject to all the conditions thereof, the undersigned

_____

hereby proposes to furnish all labor and materials and perform all work required for the construction of

**WORK:**
Demolition and fit-out renovation to include interior walls, finishes, lighting fixtures, mechanical systems, plumbing systems, new elevator cab and finishes, landscaping, and new construction of a 760 square foot maintenance office.

in accordance with Drawings and Specifications, dated 10/16/2026 , prepared by:

Seay, Seay & Litchfield Architects, P.C. , Architect/Engineer

The Bidder, which is organized and existing under the laws of the State of: _____,

having its principal offices in the City of: _____,

is: ◯ a Corporation ◯ a Partnership ◯ an Individual ◯ Other: _____

**LISTING OF PARTNERS OR OFFICERS:**

If Bidder is a Partnership, list all partners and their addresses; if Bidder is a Corporation, list the names, titles, and business addresses of its officers:

**BIDDER'S REPRESENTATION:** The Bidder declares that it has examined the site of the Work, having become fully informed regarding all pertinent conditions, and that it has examined the Drawings and Specifications (including all Addenda received) for the Work and the other Bid and Contract Documents relative thereto, and that it has satisfied itself relative to the Work to be performed.

**ADDENDA:** The Bidder acknowledges receipt of Addenda Nos._____ through _____inclusively.

**BASE BID:** For construction complete as shown and specified, the sum of:

_____ Dollars ($ )

**ALTERNATES:** If alternates as set forth in the Bid Documents are accepted, the following adjustments are to be made to the Base Bid:

| | | | |
|---|---|---|---|
| For Alternate No. 1 ( | <Keyword for Amount> | ) ◯ add | ◯ deduct $ |
| For Alternate No. 2 ( | <Keyword for Amount> | ) ◯ add | ◯ deduct $ |
| For Alternate No. 3 ( | <Keyword for Amount> | ) ◯ add | ◯ deduct $ |
| For Alternate No. 4 ( | <Keyword for Amount> | ) ◯ add | ◯ deduct $ |
| For Alternate No. 5 ( | <Keyword for Amount> | ) ◯ add | ◯ deduct $ |
| For Alternate No. 6 ( | <Keyword for Amount> | ) ◯ add | ◯ deduct $ |

**UNIT PRICES** - (Attach to this Proposal Form the unit prices, if any, on a separate sheet.)

**BID SECURITY:** The undersigned agrees to enter into a Construction Contract and furnish the prescribed Performance and Payment Bonds and evidence of insurance within fifteen calendar days, or such other period stated in the Bid Documents, after the contract forms have been presented for signature, provided such presentation is made within 30 calendar days after the opening of bids, or such other period stated in the Bid Documents. As security for this condition, the undersigned further agrees that the funds represented by the Bid Bond (or cashier's check) attached hereto may be called and paid into the account of the Awarding Authority as liquidated damages for failure to so comply.

Attached hereto is a (Mark the appropriate box and provide the applicable information):

- ☐ Bid Bond, executed by _____ as Surety,
- ☐ A cashier's check on the _____ Bank: _____,
  for the sum of: _____
  Dollars ($_____) made payable to the Awarding Authority.

**BIDDER'S ALABAMA LICENSE:**

State License for General Contracting: _____ / _____ / _____

**License Number** **Bid Limit** **Type(s) of Work**

**CERTIFICATIONS:** The undersigned certifies that he or she is authorized to execute contracts on behalf of the Bidder as legally named, that this proposal is submitted in good faith without fraud or collusion with any other bidder, that the information indicated in this document is true and complete, and that the bid is made in full accord with State law. Notice of acceptance may be sent to the undersigned at the address set forth below.

The Bidder also declares that a list of all proposed major subcontractors and suppliers will be submitted at a time subsequent to the receipt of bids as established by the Architect in the Bid Documents but in no event shall this time exceed twenty-four (24) hours after receipt of bids.

**Legal Name of Bidder:** _____

Mailing Address: _____

***By (Legal Signature):** _____

*Name & Title (Print):

Telephone Number:

Email Address:

**(SEAL)**

* If other than the individual proprietor, or an above named member of the Partnership, or the above named president, vice-president, or secretary of the Corporation, attach written authority to bind the Bidder. Any modification to a bid shall be over the initials of the person signing the bid, or of an authorized representative.

**TSCC EXECUTIVE PARK – BUILDING E RENOVATIONS**

**ATTACH THE UNIT PRICE AND ALLOWANCE SCHEDULES BELOW TO BID PROPOSAL FORM 5-E:**

**UNIT PRICES**: See Section 01 2100

| NO. | ITEM | QUANTITY IN BASE BID | UNIT PRICE | TOTAL |
|---|---|---|---|---|
| NO.1 | Removal of Unsuitable Soil and Replacement with Engineered Fill (Exterior Site Work) | 150 Cubic Yards | $_____/CY | $ |
| NO.2 | Tuckpointing of Masonry Walls | 200 Square Feet | $_____/SF | $ |
| NO.3 | Replacing missing or damaged brick and/or Removing, Cleaning, and Resetting Bricks | 50 Bricks | $_____/Brick | $ |
| NO.4 | Additional Tonnage of Steel Structural Components | 2 Ton | $_____/Ton | $ |
| NO.5 | Removal of Unsuitable Soil and Replacement with Engineered Fill (Interior Trenching) | 150 Cubic Yards | $_____/CY | $ |
| NO.6 | Floor Vapor Proofing | 500 Square Feet | $_____/SF | $ |
| NO.7 | Removal & Replacement of Exterior Metal Studs and Replacement with 16 Ga. Cold Formed Metal Framing | 250 Linear Feet | $_____/LF | $ |
| NO.8 | Fill Failures in Existing Asphalt Pavement | 1,250 Square Yards | $_____/SY | $ |
| NO.9 | Removal of Damaged or Deteriorated Metal Roof Decking and Replacement with New Metal Roof Decking | 9,000 Square Feet | $_____/SF | $ |
| NO.10 | Milling, 1.5” Asphalt Overlay + Striping | 250 Square Yards | $_____/SY | $ |
| NO.11 | Removal and Replacement of Concrete Curb and Gutter | 650 Linear Feet | $_____/LF | $ |
| | **TOTAL UNIT PRICE VALUE INCLUDED IN BASE BID** | | | **$** |

**ALLOWANCES**: See Section 01 2100

| NO. | ITEM | ALLOWANCE PRICE INCLUDED IN BASE BID |
|---|---|---|
| NO.1 | General Contingency | $250,000.00 |
| NO.2 | Landscape Underground Sprinkler System Contingency Allowance | $40,000.00 |
| NO.3 | Emergency Radio Responder System | $100,000.00 |
| NO.4 | Security System | $300,000.00 |
| | **TOTAL ALLOWANCE VALUE INCLUDED IN BASE BID** | $690,000.00 |

# FACILITIES DIVISION

**ACCS FORM 5-F**

# BID BOND

- *Do not staple this form; use clips.*

The **PRINCIPAL** (Bidder's Company Name and Address)
Name:
Address:

The **SURETY** (Company Name and Primary Place of Business)
Name:
Address:

The **OWNER**
Name: Alabama Community College System
Address: 135 S. Union Street, Montgomery, AL 36130

The **PROJECT** for which the Principal's Bid is submitted (Project name as it appears in the Bid Documents):

**KNOW ALL MEN BY THESE PRESENTS,** that we, the undersigned Principal and Surety, jointly and severally, hereby bind ourselves, our heirs, executors, administrators, successors, and assigns to the Owner in the **PENAL SUM of five percent (5%) of the amount of the Principal's bid, but in no event more than Ten-thousand Dollars ($10,000.00).**

**THE CONDITION OF THIS OBLIGATION** is that the Principal has submitted to the Owner the attached bid, which is incorporated herein by reference, for the Project identified above.

**NOW, THEREFORE,** if, within the terms of the Bid Documents, the Owner accepts the Principal's bid and the Principal thereafter either:

(a) executes and delivers a Construction Contract with the required Performance and Payment Bonds (each in the form contained in the Bid Documents and properly completed in accordance with the bid) and delivers evidence of insurance as prescribed in the Bid Documents, or

(b) fails to execute and deliver such Construction Contract with such Bonds and evidence of insurance, but pays the Owner the difference, not to exceed the Penal Sum of this Bond, between the amount of the Principal's Bid and the larger amount for which the Owner may award a Construction Contract for the same Work to another bidder, **then**, this obligation shall be null and void, otherwise it shall remain in full force and effect.

The Surety, for value received, hereby stipulates and agrees that the obligation of the Surety under this Bond shall not in any manner be impaired or affected by any extension of the time within which the Owner may accept the Principal's bid, and the Surety does hereby waive notice of any such extension.

**SIGNED AND SEALED** this -Day- day of -Month- -Year-

**PRINCIPAL:** _____ **ATTEST:**

**BY:** _____ _____
NAME AND TITLE

**SURETY:** _____ **ATTEST:**

**BY:** _____ _____
NAME AND TITLE

# FACILITIES DIVISION

**ACCS FORM 5-H**

*(Must be submitted with ACCS Form 5-E)*

# ACCOUNTING OF SALES TAX

## ATTACHMENT TO ACCS FROM 5-E: PROPOSAL FORM

| | | | |
|---|---|---|---|
| **TO:** | | **DATE:** | |
| **NAME OF PROJECT:** | | | |

**SALES TAX ACCOUNTING**

Pursuant to Act 2013-205, Section 1(g) the Contractor accounts for the sales tax NOT included in the bid proposal form as follows:

| | | | **ESTIMATED SALES TAX AMOUNT** |
|---|---|---|---|
| **BASE BID:** | | | Dollars $ |
| For Alternate No. 1 ( | <Keyword for Amount> | ) | ○ add ○ deduct $ |
| For Alternate No. 2 ( | <Keyword for Amount> | ) | ○ add ○ deduct $ |
| For Alternate No. 3 ( | <Keyword for Amount> | ) | ○ add ○ deduct $ |
| For Alternate No. 4 ( | <Keyword for Amount> | ) | ○ add ○ deduct $ |
| For Alternate No. 5 ( | <Keyword for Amount> | ) | ○ add ○ deduct $ |
| For Alternate No. 6 ( | <Keyword for Amount> | ) | ○ add ○ deduct $ |

**Failure to provide an accounting of sales tax shall render the bid non-responsive. Other than determining responsiveness, sales tax accounting shall not affect the bid pricing nor be considered in the determination of the lowest responsible and responsive bidder.**

**Legal Name of Bidder:**

Mailing Address:

***By (Legal Signature):** _____

*Name (Print):

*Title (Print):

*Telephone Number:

Email Address:

**(SEAL)**

**Note:** A completed ACCS Form 5-H: Accounting of Sales Tax must be submitted with ACCS Form 5-E: Proposal Form. A proposal shall be rendered non-responsive if an Accounting of Sales Tax is not provided.

# FACILITIES DIVISION

**ACCS FORM 5-J**

You may use your own form provided all requested information and signatures are on your form as well as the "I certify..." statement.
**- DO NOT USE COLORED PRINT OR SHADED TABLES -**

## CERTIFIED TABULATION OF BIDS

| | |
|---|---|
| **PROJECT:** | **AS TABULATED BELOW, BIDS WERE RECEIVED:** |
| **ACCS PROJECT#:** | **DATE:** **TIME:** |
| | **PLACE:** |

| CONTRACTOR | SURETY | BASE BID | BID ALT.#1 | BID ALT.#2 | REMARKS |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |
| | | | | | |

I certify that the above bids were advertised, were received sealed and were publicly opened and read aloud at the time and place indicated and that this is a true and correct tabulation of all bids received for this project.

_____
ARCHITECTURAL/ENGINEERING FIRM NAME

_____
NAME AND TITLE OF ARCHITECT/ENGINEER

Sworn and subscribed before me this 19th day of -Month- -Year- ?Y REPUBLIC
(SEAL)

BY: _____
SIGNATURE

VER: 07152024

# FACILITIES DIVISION

**ACCS FORM 5-J**

You may use your own form provided all requested information and signatures are on your form as well as the "I certify..." statement.
**- DO NOT USE COLORED PRINT OR SHADED TABLES -**

## CERTIFIED TABULATION OF BIDS

| | |
|---|---|
| **PROJECT:** | **AS TABULATED BELOW, BIDS WERE RECEIVED:** |
| **ACCS PROJECT#:** | **DATE:** **TIME:** |
| | **PLACE:** |

| CONTRACTOR | SURETY | BASE BID | BID ALT.#1 | BID ALT.#2 | REMARKS |
|---|---|---|---|---|---|
| | | | | | |
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| | | | | | |

I certify that the above bids were advertised, were received sealed and were publicly opened and read aloud at the time and place indicated and that this is a true and correct tabulation of all bids received for this project.

_____
ARCHITECTURAL/ENGINEERING FIRM NAME

_____
NAME AND TITLE OF ARCHITECT/ENGINEER

Sworn and subscribed before me this 19th day of -Month- -Year- ?Y REPUBLIC
(SEAL)

BY: _____
SIGNATURE

VER: 07152024

ST: EXC-01
11/25

ALABAMA DEPARTMENT OF REVENUE
SALES AND USE TAX DIVISION
P.O. Box 327710 • Montgomery, AL 36132-7710

Reset

# Application For
# Sales and Use Tax Certificate of Exemption

**FOR GOVERNMENT/STATUTORILY EXEMPT ENTITY CONSTRUCTION PROJECT**

This Certificate of Exemption will be limited to purchases which qualify for an exemption of sales and use taxes pursuant to Rule No. 810-6-3-.77

## PROJECT INFORMATION:

PROJECT NAME

PROJECT OWNER'S FEIN (EXEMPT ENTITY)

STREET ADDRESS OF PROJECT (CITY AND COUNTY INCLUDED) | CITY | ZIP | COUNTY

## APPLICANT'S INFORMATION:

RELATION: *(CHOOSE ONE)*

☐ Government Entity ☐ Statutorily Exempt Entity ☐ General Contractor ☐ Subcontractor

APPLICANT'S LEGAL NAME

FEIN

DBA

CONSUMER'S USE TAX ACCOUNT NUMBER

MAILING ADDRESS: STREET | CITY | STATE | ZIP | COUNTY

CONTACT PERSON

BUSINESS TELEPHONE NUMBER
( )

EMAIL ADDRESS

PROJECT START DATE

PROJECT END DATE

WILL THE APPLICANT HAVE ANY SUBCONTRACTORS ON THIS JOB?
☐ Yes ☐ No If yes, please attach list.

NAME OF PARTY TO THE CONTRACT

JOB DESCRIPTION

WILL ANY POLLUTION CONTROL EXEMPTION BE APPLICABLE?
☐ Yes ☐ No

ESTIMATED POLLUTION CONTROL COST
$

| TOTAL PROJECT BID AMOUNT (APPLICANT'S PORTION OF PROJECT) | LABOR COST (APPLICANT'S PORTION OF PROJECT) | MATERIAL COST (APPLICANT'S PORTION OF PROJECT) |
|---|---|---|
| $ | $ | $ |

## REVENUE DEPARTMENT USE ONLY

PENDING DOCUMENTATION / INFORMATION:

☐ GCL ☐ SBL ☐ Contract / NTP / LOI ☐ LOS ☐ Project Dates / Breakdown of Costs

Contact Dates: _____ Received Date: _____

_____ Forwarded for Denial: _____

| PROJECT NAME | PROJECT OWNER'S FEIN (EXEMPT ENTITY) |
|---|---|
| | |

FORM OF OWNERSHIP:

☐ Individual ☐ Partnership ☐ Corporation ☐ Multi member LLC ☐ Single member LLC ☐ Government Entity

If applicant is a corporation, a copy of the certified certificate of incorporation, amended certificate of incorporation, certificate of authority, or articles of incorporation should be attached. If the applicant is a limited liability company or a limited liability partnership, a copy of the certified articles of organization should be attached.

OWNERSHIP INFORMATION:

Corporations – give name, title, home address, and Social Security Number of each officer.

Partnerships – give name, home address, Social Security Number or FEIN of each partner.

Sole Proprietorships – give name, home address, Social Security Number of owner.

LLC – give name, home address, and Social Security Number or FEIN of each member.

LLP – give name, home address, and Social Security Number or FEIN of each partner.

NAME *(PLEASE PRINT)* _____ SIGNATURE _____

TITLE _____ DATE _____

**REVENUE DEPARTMENT USE ONLY**

PENDING OTHER:

☐ Government/Statutorily Exempt Entity ☐ General Contractor ☐ Not on LOS

Contact Dates: _____ Received Date: _____

_____ Forwarded for Denial: _____

Examiner's Remarks _____

Examiner _____ Date _____

# Instructions For Preparation of Form ST: EXC-01

## FOR GOVERNMENT/STATUTORILY EXEMPT ENTITY CONSTRUCTION PROJECT

NOTE: Exemption Certificates will be issued as of the project start date or the received date of the application. If, upon receipt of the application, the project has already commenced, the certificate will be issued as of the received date of the application. Any purchases made prior to the issuance of a certificate will not be exempt.

In order to expedite the processing of your application, please include the following documentation when submitting your application:

**Exempt Entity:**
1. Signed Application
2. Copy of Executed/Signed Contract, Letter of Intent, Notice of Award, and/or Notice to Proceed

**General Contractor:**
1. Signed Application
2. Copy of Executed/Signed Contract, Letter of Intent, Notice of Award, and/or Notice to Proceed
3. List of Subcontractors
4. Alabama Board of General Contractor's License
5. State/County Business License (usually obtained through county probate office)

**Subcontractor:**
1. Signed Application
2. Alabama Board of General Contractor's License
3. State/County Business License (usually obtained through county probate office)
4. List of Subcontractors (if any)

**General contractors and subcontractors:**
- Any additions and/or deletions to the list of subcontractors working on a project must be submitted to the Department within 30 days of occurrence.
- If an extension is needed for a project, please contact the Department of Revenue at the address, number, or email listed below. Extension requests should be submitted no more than 30 days after expiration date.
- Subcontractors Project Start Date should be the date they will begin working on the project and ordering materials

The application and required documentation may be mailed, faxed, or emailed to the following:

Fax: (334) 353-7867

Email: STContractorsExempt@revenue.alabama.gov

Mailing Address: ATTN: Contractor's Exemption
Alabama Department of Revenue
Sales & Use Tax Division
Room T655
PO Box 327710
Montgomery, AL 36132-7710

# FACILITIES DIVISION

**ACCS FORM 2-A**

# CONSTRUCTION CONTRACT

*•Do not staple this form and/or attachments; use clips. Print single-sided; do not submit double-side printed documents.*

| | |
|---|---|
| 1 **ACCS PROJECT#:** | |

2 This Construction Contract is entered into this **31st** day of **<month>** in the year of **<year>**
3 between the **OWNER**, the Alabama Community College System on behalf of:

**<Select Client>**

| | | | |
|---|---|---|---|
| Address: | | | |
| Email: | | Phone: | |

4 and the **CONTRACTOR,**

| | | | |
|---|---|---|---|
| Company Name: | | | |
| Address: | | | |
| Email: | | Phone: | |

5 for the **WORK** of the Project identified as:

6 The **CONTRACT DOCUMENTS** are dated and have been amended by
7 **ADDENDA:**

Review/Initial of Regional Facilities Director _____

8 The **ARCHITECT** is

| | | | |
|---|---|---|---|
| Firm Name: | | | |
| Address: | | | |
| Email: | | Phone: | |

9 The **CONTRACT SUM** is:

Dollars $

and is the sum of the Contractor's Base Bid for the Work and the following

10 **BID ALTERNATE PRICES**:

11 The **CONTRACT TIME** is ( ) calendar days

**THE OWNER AND THE CONTRACTOR AGREE AS FOLLOWS:** The Contract Documents, as defined in the General Conditions of the Contract (ACCS Form 2-B), are incorporated herein by reference. The Contractor shall perform the Work in accordance with the Contract Documents. The Owner will pay and the Contractor will accept as full compensation for such performance of the Work, the Contract Sum subject to additions and deductions (including liquidated damages) as provided in the Contract Documents. The Work shall commence on a date to be specified in a Notice to Proceed issued by the Chief Facilities Officer, ACCS Facilities Division, and shall then be substantially completed within the Contract Time.

12 **LIQUIDATED DAMAGES** for which the Contractor and its Surety (if any) shall be liable and may be required to pay the Owner in accordance with the Contract Documents shall be equal to six percent interest per annum on the total Contract Sum unless a dollar amount is stipulated in the following space, in which case liquidated damages shall be determined at:

Dollars ($ ) per calendar day

13 **SPECIAL PROVISIONS:** (Special Provisions may be inserted here, such as acceptance or rejection of unit prices. If Special Provisions are continued in an attachment, identify the attachment below).

14 **STATE GENERAL CONTRACTOR'S LICENSE:** The Contractor does hereby certify that Contractor is currently licensed by the Alabama State Licensing Board for General Contractors and that the certificate for such license bears the following:

| | | | |
|---|---|---|---|
| License No.: | | Expiration Date | |
| Bid Limit: | | Classifications | |

The Owner and Contractor have entered into this Construction Contract as of the date first written above and have executed this Construction Contract in sufficient counterparts to enable each contracting party to have an originally executed Construction Contract each of which shall, without proof or accounting for the other counterparts, be deemed an original thereof.

The Owner does hereby certify that this Construction Contract was let in accordance with the provisions of Title 39, Code of Alabama 1975, as amended, and all other applicable provisions of law, and that the terms and commitments of this Construction Contract do not constitute a debt of the State of Alabama in violation of Article 11, Section 213 of the Constitution of Alabama, 1901, as amended by Amendment No. 26.

15

## APPROVALS

### LOCAL COLLEGE OR TRADE SCHOOL

BY: _____

AS PRESIDENT OF

<Select Client>

## CONTRACTING PARTIES

_____

CONTRACTOR COMPANY

BY: _____

SIGNATURE

NAME: _____

TITLE: _____

### ALABAMA COMMUNITY COLLEGE SYSTEM (ACCS)

BY: _____ DATE: _____

CHIEF FACILITIES OFFICER

### ALABAMA COMMUNITY COLLEGE SYSTEM

(AS OWNER)

BY: _____

CHANCELLOR

ATTACHMENTS:

- ☐ Copy of Alabama General Contractor's License
- ☐ Proposal Form **(ACCS Form 5-E)**
- ☐ List of all proposed major subcontractors and suppliers
- ☐ Accounting of Sales Tax **(ACCS Form 5-H)**
- ☐ Bid Tabulation
- ☐ Schedule of Values
- ☐ Certificate of Liability Insurance
- ☐ **Performance Bond (ACCS Form 2-C)**
- ☐ **Payment Bond (ACCS Form 2-D)**
- ☐ State of Alabama Disclosure Statement
- ☐ E-Verify Memorandum of Understanding
- ☐ **W-9** (Request for Taxpayer Identification Number and Certificate)

Review/Initial of Regional Facilities Director _____

# FACILITIES DIVISION

**ACCS FORM 2-B**

# GENERAL CONDITIONS *of the* CONTRACT

## CONTENTS


1. Definitions
2. Intent and Interpretation of the Contract Documents
3. Contractor's Representation
4. Documents Furnished to Contractor
5. Ownership of Drawings
6. Supervision, Superintendent, & Employees
7. Review of Contract Documents and Field Conditions by Contractor
8. Surveys by Contractor
9. Submittals
10. Documents and Samples at the Site
11. "As-built" Documents
12. Progress Schedule
13. Materials, Equipment & Substitutions
14. Safety & Protection of Persons & Property
15. Hazardous Materials
16. Inspection of the Work
17. Correction of Work
18. Deductions for Uncorrected Work
19. Changes in the Work
20. Claims for Extra Cost or Extra Work
21. Differing Site Conditions
22. Claims for Damages
23. Delays
24. Resolution of Claims and Disputes
25. Owner's Right to Correct Work
26. Owner's Right to Stop or Suspend the Work
27. Owner's Right to Terminate Contract
28. Contractor's Right to Suspend or Terminate
29. Progress Payments
30. Certification & Approvals for Payments
31. Payments Withheld
32. Substantial Completion
33. Occupancy or Use Prior to Completion
34. Final Payment
35. Contractor's Warranty
36. Indemnification Agreement
37. Insurance
38. Performance and Payment Bonds
39. Assignment
40. Construction by Owner or Separate Contracts
41. Subcontracts
42. Architect's Status
43. Cash Allowances
44. Permits, Laws and Regulations
45. Royalties, Patents and Copyrights
46. Use of the Site
47. Cutting and Patching
48. In-progress and Final Cleanup
49. Liquidated Damages
50. Use of Foreign Material
51. Sign

## Article 1
# DEFINITIONS

Whenever the following terms, or pronouns in place of them, are used in the Contract Documents, the intent and meaning shall be interpreted as follows:

**A** **ACCS FACILITIES DIVISION:** The ACCS Facilities Division, which is responsible for oversight and management of all ACCS construction projects, pursuant to the policies and procedures adopted by the ACCS Board of Trustees.

**B** **ARCHITECT:** The Architect is the person or entity lawfully licensed to practice architecture in the State of Alabama, who is under contract with the Owner as the primary design professional for the Project and identified as the Architect in the Construction Contract. The term "Architect" means the Architect or the Architect's authorized representative. If the employment of the Architect is terminated, the Owner shall employ a new Architect whose status under the Contract Documents shall be that of the former Architect. If the primary design professional for the Project is a Professional Engineer, the term "Engineer" shall be substituted for the term "Architect" wherever it appears in this document.

**C** **CONTRACT:** The Contract is the embodiment of the Contract Documents. The Contract represents the entire and integrated agreement between the Owner and Contractor and supersedes any prior written or oral negotiations, representations or agreements that are not incorporated into the Contract Documents. The Contract may be amended only by a Contract Change Order or a Modification to the Construction Contract. The contractual relationship which the Contract creates between the Owner and the Contractor extends to no other persons or entities. The Contract consists of the following Contract Documents, including all additions, deletions, and modifications incorporated therein before the execution of the Construction Contract:

**(1)** Construction Contract
**(2)** Performance and Payment Bonds
**(3)** Conditions of the Contract (General, Supplemental, and other Conditions)
**(4)** Specifications
**(5)** Drawings
**(6)** Contract Change Orders
**(7)** Modifications to the Construction Contract (applicable to PSCA Projects)

**D** **CONTRACT SUM:** The Contract Sum is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents. The term "Contract Sum" means the Contract Sum stated in the Construction Contract as may have been increased or decreased by Change Order(s) in accordance with the Contract Documents.

**E** **CONTRACT TIME:** The Contract Time is the period of time in which the Contractor must achieve Substantial Completion of the Work. The date on which the Contract Time begins is specified in the written Notice To Proceed issued to the Contractor by the Owner. The Date of Substantial Completion is the date established in accordance with Article 32. The term "Contract Time" means the Contract Time stated in the Construction Contract as may have been extended by Change Order(s) in accordance with the Contract Documents. The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

**F** **CONTRACTOR:** The Contractor is the person or persons, firm, partnership, joint venture, association, corporation, cooperative, limited liability company, or other legal entity, identified as such in the Construction Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

**G** **DEFECTIVE WORK:** The term "Defective Work" shall apply to: **(1)** any product, material, system, equipment, or service, or its installation or performance, which does not conform to the requirements of the Contract Documents, **(2)** in-progress or completed Work the workmanship of which does not conform to the quality specified or, if not specified, to the quality produced by skilled workers performing work of a similar nature on similar projects in the state, **(3)** substitutions and deviations not properly submitted and approved or otherwise authorized, **(4)** temporary supports, structures, or construction which will not produce the results required by the Contract Documents, and **(5)** materials or equipment rendered unsuitable for incorporation into the Work due to improper storage or protection.

**H** **CHIEF FACILITIES OFFICER:** The Director of the ACCS Facilities Division.

**I** **DRAWINGS:** The Drawings are the portions of the Contract Documents showing graphically the design, location, layout, and dimensions of the Work, in the form of plans, elevations, sections, details, schedules, and diagrams.

**J** **NOTICE TO PROCEED:** A proceed order issued by the Owner, as applicable, fixing the date on which the Contractor shall begin the prosecution of the Work, which is also the date on which the Contract Time shall begin.

**K** **OWNER:** The Owner is the entity or entities identified as such in the Construction Contract and is referred to throughout the Contract Documents as if singular in number. The term "Owner" means the Owner or the Owner's authorized representative. The term "Owner" as used herein shall be synonymous with the term "Awarding Authority" as defined and used in Title 39 - Public Works, Code of Alabama, 1975, as amended.

**L** **THE PROJECT:** The Project is the total construction of which the Work required by these Contract Documents may be the entirety or only a part with other portions to be constructed by the Owner or separate contractors.

**M** **PROJECT MANUAL:** The Project Manual is the volume usually assembled for the Work which may include the Advertisement for Bids, Instructions to Bidders, sample forms, General Conditions of the Contract, Supplementary Conditions, and Specifications of the Work.

**N** **SPECIFICATIONS:** The Specifications are that portion of the Contract Documents which set forth in writing the standards of quality and performance of products, equipment, materials, systems, and services and workmanship required for acceptable performance of the Work.

**O** **SUBCONTRACTOR:** A Subcontractor is a person or entity who is undertaking the performance of any part of the Work by virtue of a contract with the Contractor. The term "Subcontractor" means a Subcontractor or its authorized representatives.

**P** **THE WORK:** The Work is the construction and services required by the Contract Documents and includes all labor, materials, supplies, equipment, and other items and services as are necessary to produce the required construction and to fulfill the Contractor's obligations under the Contract. The Work may constitute the entire Project or only a portion of it.

## Article 2
# INTENT *and* INTERPRETATION *of the* CONTRACT DOCUMENTS

### A INTENT
It is the intent of the Contract Documents that the Contractor shall properly execute and complete the Work described by the Contract Documents, and unless otherwise provided in the Contract, the Contractor shall provide all labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work, in full accordance with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

### B COMPLEMENTARY DOCUMENTS
The Contract Documents are complementary. If Work is required by one Contract Document, the Contractor shall perform the Work as if it were required by all of the Contract Documents. However, the Contractor shall be required to perform Work only to the extent that is consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

### C ORDER of PRECEDENCE
Should any discrepancy arise between the various elements of the Contract Documents, precedence shall be given to them in the following order unless to do so would contravene the apparent Intent of the Contract Documents stated in preceding Paragraph A:

**(1)** The Construction Contract.
**(2)** Addenda, with those of later date having precedence over those of earlier date.
**(3)** Supplementary Conditions (or other Conditions which modify the General Conditions of the Contract).
**(4)** General Conditions of the Contract.
**(5)** The Specifications.
**(6)** Details appearing on the Drawings; large scale details shall take precedence over smaller scale details.
**(7)** The Drawings; large scale drawings shall take precedence over smaller scale drawings.

### D ORGANIZATION
Except as may be specifically stated within the technical specifications, neither the organization of the Specifications into divisions, sections, or otherwise, nor any arrangement of the Drawings shall control how the Contractor subcontracts portions of the Work or assigns Work to any trade.

### E INTERPRETATION
**(1)** The Contract Documents shall be interpreted collectively, each part complementing the others and consistent with the Intent of the Contract Documents stated in preceding Paragraph A. Unless an item shown or described in the Contract Documents is specifically identified to be furnished or installed by the Owner or others or is identified as "Not In Contract" ("N.I.C."), the Contractor's obligation relative to that item shall be interpreted to include furnishing, assembling, installing, finishing, and/or connecting the item at the Contractor's expense to produce a product or system that is complete, appropriately tested, and in operative condition ready for use or subsequent construction or operation of the Owner or separate contractors. The omission of words or phases for brevity of the Contract Documents, the inadvertent omission of words or phrases, or obvious typographical or written errors shall not defeat such interpretation as long as it is reasonably inferable from the Contract Documents as a whole.

**(2)** Words or phrases used in the Contract Documents which have well-known technical or construction industry meanings are to be interpreted consistent with such recognized meanings unless otherwise indicated.

**(3)** Except as noted otherwise, references to standard specifications or publications of associations, bureaus, or organizations shall mean the latest edition of the referenced standard specification or publication as of the date of the Advertisement for Bids.

**(4)** In the case of inconsistency between Drawings and Specifications or within either document not clarified by addendum, the better quality or greater quantity of Work shall be provided in accordance with the Architect's interpretation.

**(5)** Any portions of the Contract Documents written in longhand must be initialed by all parties.

**(6)** Any doubt as to the meaning of the Contract Documents or any obscurity as to the wording of them, shall be promptly submitted in writing to the Architect for written interpretation, explanation, or clarification.

**F** **SEVERABILITY**

The partial or complete invalidity of any one or more provision of this Contract shall not affect the validity or continuing force and effect of any other provision.

## Article 3
## CONTRACTOR'S REPRESENTATION

By executing the Construction Contract the Contractor represents to the Owner:

**A** The Contractor has visited the site of the Work to become familiar with local conditions under which the Work is to be performed and to evaluate reasonably observable conditions as compared with requirements of the Contract Documents.

**B** The Contractor shall use its best skill and attention to perform the Work in an expeditious manner consistent with the Contract Documents.

**C** The Contractor is an independent contractor and in performance of the Contract remains and shall act as an independent contractor having no authority to represent or obligate the Owner in any manner unless authorized by the Owner in writing.

## Article 4
## DOCUMENTS FURNISHED *to* CONTRACTOR

Unless otherwise provided in the Contract Documents, one readable standard PDF set of Drawings and Project Manuals will be furnished to the Contractor by the Architect without charge. Other copies requested will be furnished at reproduction cost.

## Article 5
## OWNERSHIP *of* DRAWINGS

All original or duplicated Drawings, Specifications, and other documents prepared by the Architect, and furnished to the Contractor are the property of the Architect and are to be used solely for this Project and not to be used in any manner for other work. Upon completion of the Work, all copies of Drawings and Specifications, with the exception of the Contractor's record set, shall be returned or accounted for by the Contractor to the Architect, on request.

## Article 6
## SUPERVISION, SUPERINTENDENT, *and* EMPLOYEES

**A** **SUPERVISION and CONSTRUCTION METHODS**

**(1)** The term "Construction Methods" means the construction means, methods, techniques, sequences, and procedures utilized by the Contractor in performing the Work. The Contractor is solely responsible for supervising and coordinating the performance of the Work, including the selection of Construction Methods, unless the Contract Documents give other specific instructions concerning these matters.

**(2)** The Contractor is solely and completely responsible for job site safety, including the protection of persons and property in accordance with Article 14.

**(3)** The Contractor shall be responsible to the Owner for acts and omissions of not only the Contractor and its agents and employees, but all persons and entities, and their agents and employees, who are performing portions of the Work for or on behalf of the Contractor or any of its Subcontractors.

**(4)** The Contractor shall be responsible to inspect the in-progress and completed Work to verify its compliance with the Contract Documents and to insure that any element or portion of the Work upon which subsequent Work is to be applied or performed is in proper condition to receive the subsequent Work.

**B** **SUPERINTENDENT**

**(1)** The Contractor shall employ and maintain a competent level of supervision for the performance of the Work at the Project site, including a superintendent who shall:

**(a)** have full authority to receive instructions from the Architect or Owner and to act on those instructions &
**(b)** be present at the Project site at all times during which Work is being performed.

**(2)** Before beginning performance of the Work, the Contractor shall notify the Architect in writing of the name and qualifications of its proposed superintendent so that the Owner may review the individual's qualifications. If, for reasonable cause, the Owner refuses to approve the individual, or withdraws its approval after once giving it, the Contractor shall name a different superintendent for the Owner's review and approval. Any disapproved superintendent will not perform in that capacity thereafter at the Project site.

**C** **EMPLOYEES**

The Contractor shall permit only fit and skilled persons to perform the Work. The Contractor shall enforce safety procedures, strict discipline, and good order among persons performing the Work. The Contractor will remove from its employment on the Project any person who deliberately or persistently produces non-conforming Work or who fails or refuses to conform to reasonable rules of personal conduct contained in the Contract Documents or implemented by the Owner and delivered to the Contractor in writing during the course of the Work.

## Article 7
## REVIEW *of* CONTRACT DOCUMENTS *and* FIELD CONDITIONS *by* CONTRACTOR

**A** In order to facilitate assembly and installation of the Work in accordance with the Contract Documents, before starting each portion of the Work, the Contractor shall examine and compare the relevant Contract Documents, and compare them to relevant field measurements made by the Contractor and any conditions at the site affecting that portion of the Work.

**B** If the Contractor discovers any errors, omissions, or inconsistencies in the Contract Documents, the Contractor shall promptly report them to the Architect as a written request for information that includes a detailed statement identifying the specific Drawings or Specifications that are in need of clarification and the error, omission, or inconsistency discovered in them.

**(1)** The Contractor shall not be expected to act as a licensed design professional and ascertain whether the Contract Documents comply with applicable laws, statutes, ordinances, building codes, and rules and regulations, but the Contractor shall be obligated to promptly notify the Architect of any such noncompliance discovered by or made known to the Contractor. If the Contractor performs Work without fulfilling this notification obligation, the Contractor shall pay the resulting costs and damages that would have been avoided by such notification.

**(2)** The Contractor shall not be liable to the Owner for errors, omissions, or inconsistencies that may exist in the Contract Documents, or between the Contract Documents and conditions at the site, unless the Contractor knowingly fails to report a discovered error, omission, or inconsistency to the Architect, in which case the Contractor shall pay the resulting costs and damages that would have been avoided by such notification.

**C** If the Contractor considers the Architect's response to a request for information to constitute a change to the Contract Documents involving additional costs and/or time, the Contractor shall follow the procedures of Article 20, Claims for Extra Cost or Extra Work.

**D** If, with undue frequency, the Contractor requests information that is obtainable through reasonable examination and comparison of the Contract Documents, site conditions, and previous correspondence, interpretations, or clarifications, the Contractor shall be liable to the Owner for reasonable charges from the Architect for the additional services required to review, research, and respond to such requests for information.

## Article 8
## SURVEYS *by* CONTRACTORS

**A** The Contractor shall provide competent engineering services to assure accurate execution of the Work in accordance with the Contract Documents. The Contractor shall verify the figures given for the contours, approaches and locations shown on the Drawings before starting any Work and be responsible for the accuracy of the finished Work. Without extra cost to the Owner, the Contractor shall engage a licensed surveyor if necessary to verify boundary lines, keep within property lines, and shall be responsible for encroachments on rights or property of public or surrounding property owners.

**B** The Contractor shall establish all base lines for the location of the principal components of the Work and make all detail surveys necessary for construction, including grade stakes, batter boards and other working points, lines and elevations. If the Work involves alteration of or addition to existing structures or improvements, the Contractor shall locate and measure elements of the existing conditions as is necessary to facilitate accurate fabrication, assembly, and installation of new Work in the relationship, alignment, and/or connection to the existing structure or improvement as is shown in the Contract Documents.

## Article 9
## SUBMITTALS

**A** Where required by the Contract Documents, the Contractor shall submit shop drawings, product data, samples and other information (hereinafter referred to as Submittals) to the Architect for the purpose of demonstrating the way by which the Contractor proposes to conform to the requirements of the Contract Documents. Submittals which are not required by the Contract Documents may be returned by the Architect without action.

**B** The Contractor shall be responsible to the Owner for the accuracy of its Submittals and the conformity of its submitted information to the requirements of the Contract Documents. Each Submittal shall bear the Contractor's approval, evidencing that the Contractor has reviewed and found the information to be in compliance with the requirements of the Contract Documents. Submittals which are not marked as reviewed and approved by the Contractor may be returned by the Architect without action.

**C** The Contractor shall prepare and deliver its submittals to the Architect sufficiently in advance of construction requirements and in a sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors. In coordinating the Submittal process with its construction schedule, the Contractor shall allow sufficient time to permit adequate review by the Architect. Within twenty-four (24) hours of the Bid Opening, the Contractor's Schedule of Values must be submitted to the Architect from the apparent low bidder

**D** By approving a Submittal the Contractor represents not only that the element of Work presented in the Submittal complies with the requirements of the Contract Documents, but also that the Contractor has:

**(1)** found the layout and/or dimensions in the Submittal to be comparable with those in the Contract Documents and other relevant Submittals and has made field measurements as necessary to verify their accuracy, and

**(2)** determined that products, materials, systems, equipment and/or procedures presented in the Submittal are compatible with those presented, or being presented, in other relevant Submittals and with the Contractor's intended Construction Methods.

**E** The Contractor shall not fabricate or perform any portion of the Work for which the Contract Documents require Submittals until the respective Submittals have been approved by the Architect.

**F** In the case of a resubmission, the Contractor shall direct specific attention to all revisions in a Submittal. The Architect's approval of a resubmission shall not apply to any revisions that were not brought to the Architect's attention.

**G** If the Contract Documents specify that a Submittal is to be prepared and sealed by a registered architect or licensed engineer retained by the Contractor, all drawings, calculations, specifications, and certifications of the Submittal shall bear the Alabama seal of registration and signature of the registered/licensed design professional who prepared them or under whose supervision they were prepared. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of such a Submittal, provided that all performance and design criteria that such Submittal must satisfy are sufficiently specified in the Contract Documents. The Architect will review, approve or take other appropriate action on such a

Submittal only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance or design criteria specified in the Contract Documents.

**H** **DEVIATIONS**

**(1)** The Architect is authorized by the Owner to approve "minor" deviations from the requirements of the Contract Documents through the use of an Architect's Supplemental Instruction (ASI). These "minor" deviations, or ASIs, are defined as those which are in the interest of the Owner, do not materially alter the quality or performance of the finished Work, and do not affect the cost or time of performance of the Work. Deviations which are not "minor" may be authorized only by the Owner through the Change Order procedures of Article 19.

**(2)** Any deviation from the requirements of the Contract Documents contained in a Submittal shall be clearly identified as a "Deviation from Contract Requirements" (or by similar language) within the Submittal and, in a letter transmitting the Submittal to the Architect, the Contractor shall direct the Architect's attention to, and request specific approval of, the deviation. Otherwise, the Architect's approval of a Submittal does not constitute approval of deviations from the requirements of the Contract Documents contained in the Submittal.

**(3)** The Contractor shall bear all costs and expenses of any changes to the Work, changes to work performed by the Owner or separate contractors, or additional services by the Architect required to accommodate an approved deviation unless the Contractor has specifically informed the Architect in writing of the required changes and a Change Order has been issued authorizing the deviation and accounting for such resulting changes and costs.

**I** **ARCHITECT'S REVIEW** *and* **APPROVAL**

**(1)** The Architect will review the Contractor's Submittals for conformance with requirements of, and the design concept expressed in, the Contract Documents and will approve or take other appropriate action upon them. This review is not intended to verify the accuracy and completeness of details such as dimensions and quantities nor to substantiate installation instructions or performance of equipment or systems, all of which remain the responsibility of the Contractor. However, the Architect shall advise the Contractor of any errors or omissions which the Architect may detect during this review. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

**(2)** The Architect will review and respond to all Submittals with reasonable promptness to avoid delay in the Work or in the activities of the Owner, Contractor or separate contractors, while allowing sufficient time to permit adequate review.

**(3)** No corrections or changes to Submittals indicated by the Architect will be considered as authorizations to perform Extra Work. If the Contractor considers such correction or change of a Submittal to require Work which differs from the requirements of the Contract Documents, the Contractor shall promptly notify the Architect in writing in accordance with Article 20, Claims for Extra Cost or Extra Work.

**J** **CONFORMANCE** *with* **SUBMITTALS**

The Work shall be constructed in accordance with approved Submittals.

## Article 10
## DOCUMENTS *and* SAMPLES *at the* SITE

**A** **"CONFORMANCE DOCUMENTS" SET**

The Contractor will be provided a Conformance Documents issue set of Drawings and Project Manual that incorporates all addenda items and all accepted alternates. The Contractor shall maintain at the Project site, in good order, at least one set of the Conformance Documents Drawings and Project Manual.

The Contractor shall assure that all sets of the Drawings and Project Manuals being used by the Contractor, Subcontractors, and suppliers are "Conformance Documents" with the current information to insure that updated Contract Documents are used for performance of the Work.

**B** **RECORD SET**

One set of the Drawings and Project Manual described in Paragraph A shall be the Contractor's record set in which the Contractor shall record all field changes, corrections, selections, final locations, and other information as will be duplicated on the "As-built" documents required under Article 11. The Contractor shall record such "as-built" information in its record set as it becomes available through progress of the Work. The Contractor's performance of this requirement shall be subject to confirmation by the Architect at any time as a prerequisite to approval of Progress Payments.

**C** The documents and samples required by this Article to be maintained at the Project site shall be readily available to the Architect, Owner, AHJ or other reviewing entity, and their representatives.

## Article 11
## "AS-BUILT" DOCUMENTS

**A** Unless otherwise provided in the Contract Documents, the Contractor shall deliver two (2) sets or one reapable standard PDF set of "As-built" documents, as described herein, to the Architect for submission to the Owner upon completion of the Work. Each set of "As-built' documents shall consist of a copy of the Drawings and Project Manual, in like-new condition, into which the Contractor has neatly incorporated all Addenda, Change Orders, supplemental drawings, clarifications, field changes, corrections, selections, actual locations of underground utilities, and other information as required herein or specified elsewhere in the Contract Documents.

**B** The Contractor shall use the following methods for incorporating information into the "As-built" documents:

**(1) Drawings**

**(a)** To the greatest extent practicable, information shall be carefully drawn and lettered, in ink, on the Drawings in the form of sketches, details, plans, notes, and dimensions as required to provide a fully dimensioned record of the Work. When required for clarity, sketches, details, or partial plans shall be drawn on supplemental sheets and bound into the Drawings and referenced on the drawing being revised.

**(b)** Where a revised drawing has been furnished by the Architect, the drawing of latest date shall be bound into the Drawings in the place of the superseded drawing.

**(c)** Where a supplemental drawing has been furnished by the Architect, the supplemental drawing shall be bound into the Drawings in an appropriate location and referred to by notes added to the drawing being supplemented.

**(d)** Where the Architect has furnished details, partial plans, or lengthy notes of which it would be impractical for the Contractor to redraw or letter on a drawing, such information may be affixed to the appropriate drawing with transparent tape if space is available on the drawing.

**(e)** Any entry of information made in the Drawings that is the result of an Addendum or Change Order, shall identify the Addendum or Change Order from which it originated.

**(2) Project Manual**

**(a)** A copy of all Addenda and Change Orders, excluding drawings thereof, shall be bound in the front of the Project Manual.

**(b)** Where a document, form, or entire specification section is revised, the latest issue shall be bound into the Project Manual in the place of the superseded issue.

**(c)** Where information within a specification section is revised, the deleted or revised information shall be drawn through in ink and an adjacent note added identifying the Addendum or Change Order containing the revised information.

**C** Within ten days after the Date of Substantial Completion of the Work, or the last completed portion of the Work, the Contractor shall submit the "As-built" documents to the Architect for approval. If the Architect requires that any corrections be made, the documents will be returned in a reasonable time for correction and resubmission.

## Article 12
## PROGRESS SCHEDULE

(Not applicable if the Contract Time is 60 days or less.)

**A** The Contractor shall within fifteen days after the date of commencement stated in the Notice to Proceed, or such other time as may be provided in the Contract Documents, prepare and submit to the Architect for review and approval a practicable construction schedule informing the Architect and Owner of the order in which the Contractor plans to carry on the Work within the Contract Time. The Architect's review and approval of the Contractor's construction schedule shall be only for compliance with the specified format, Contract Time, and suitability for monitoring progress of the Work and shall not be construed as a representation that the Architect has analyzed the schedule to form opinions of sequences or durations of time represented in the schedule.

**B** In conjunction with the construction schedule a progress schedule shall be prepared using ACCS Form 6-H "Progress Schedule and Report", (contained in the Project Manual) or similar format of suitable scale and detail to indicate the percentage of Work scheduled to be completed at the end of each month. ACCS Form 6-H shall not be used as the construction schedule. At the end of each month the Contractor shall enter the actual percentage of completion on the construction schedule submit two copies to the Architect, and attach one copy to each copy of the monthly Application for Payment. The construction schedule shall be revised to reflect any agreed extensions of the Contract Time or as required by conditions of the Work.

C The Contractor's construction schedule shall be used by the Contractor, Architect, and Owner to determine the adequacy of the Contractor's progress. The Contractor shall be responsible for maintaining progress in accordance with the currently approved construction schedule and shall increase the number of shifts, and/or overtime operations, days of work, and/or the amount of construction plant and equipment as may be necessary to do so. If the Contractor's progress falls materially behind the currently approved construction schedule, it is expected that the Architect formally notify the Contractor to produce a recovery schedule to meet the construction deadlines. If the Contractor is not taking sufficient steps to regain schedule, the Architect may, with the Owner's concurrence, issue the Contractor a Notice to Cure pursuant to Article 27. In such a Notice to Cure the Architect may require the Contractor to submit such supplementary or revised construction schedules as may be deemed necessary to demonstrate the manner in which schedule will be regained.

## Article 13
## EQUIPMENT, MATERIALS, *and* SUBSTITUTIONS

A Every part of the Work shall be executed in a workmanlike manner in accordance with the Contract Documents and approved Submittals. All materials used in the Work shall be furnished in sufficient quantities to facilitate the proper and expeditious execution of the Work and shall be new except such materials as may be expressly provided or allowed in the Contract Documents to be otherwise.

B Whenever a product, material, system, item of equipment, or service is identified in the Contract Documents by reference to a trade name, manufacturer's name, model number, etc.(hereinafter referred to as "source"), and only one or two sources are listed, or three or more sources are listed and followed by "or approved equal" or similar wording, it is intended to establish a required standard of performance, design, and quality, and the Contractor may submit, for the Architect's approval, products, materials, systems, equipment, or services of other sources which the Contractor can prove to the Architect's satisfaction are equal to, or exceed, the standard of performance, design and quality specified, unless the provisions of Paragraph D below apply. Such proposed substitutions are not to be purchased or installed without the Architect's written approval of the substitution.

C If the Contract Documents identify three or more sources for a product, material, system, item of equipment or service to be used and the list of sources is not followed by "or approved equal" or similar wording, the Contractor may make substitution only after evaluation by the Architect and execution of an appropriate Contract Change Order.

D If the Contract Documents identify only one source and expressly provide that it is an approved sole source for the product, material, system, item of equipment, or service, the Contractor must furnish the identified sole source.

## Article 14
## SAFETY *and* PROTECTION *of* PERSONS *and* PROPERTY

A The Contractor shall be solely and completely responsible for conditions at the Project site, including safety of all persons (including employees) and property. The Contractor shall create, maintain, and supervise conditions and programs to facilitate and promote safe execution of the Work, and shall supervise the Work with the attention and skill required to assure its safe performance. Safety provisions shall conform to OSHA requirements and all other federal, state, county, and local laws, ordinances, codes, and regulations.

**B** Where any of these are in conflict, the more stringent requirement shall be followed. Nothing contained in this Contract shall be construed to mean that the Owner has employed the Architect nor has the Architect employed its consultants to administer, supervise, inspect, or take action regarding safety programs or conditions at the Project site.

The Contractor shall employ Construction Methods, safety precautions, and protective measures that will reasonably prevent damage, injury or loss to:

**(1)** workers and other persons on the Project site and in adjacent and other areas that may be affected by the Contractor's operations;

**(2)** the Work and materials and equipment to be incorporated into the Work and stored by the Contractor on or off the Project site; and

**(3)** other property on, or adjacent to, the Project site, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities, and other improvements not designated in the Contract Documents to be removed, relocated, or replaced.

**C** The Contractor shall be responsible for the prompt remedy of damage and loss to property, including the filing of appropriate insurance claims, caused in whole or in part by the fault or negligence of the Contractor, a Subcontractor, or anyone for whose acts they may be liable.

**D** The Contractor shall comply with and give notices required by applicable laws, ordinances, rules, regulations and lawful orders of public authorities bearing on safety and protection of persons or property, including without limitation notices to adjoining property owners of excavation or other construction activities that potentially could cause damage or injury to adjoining property or persons thereon.

**E** The Contractor shall erect and maintain barriers, danger signs, and any other reasonable safeguards and warnings against hazards as may be required for safety and protection during performance of the Contract and shall notify owners and users of adjacent sites and utilities of conditions that may exist or arise which may jeopardize their safety.

**F** If use or storage of explosives or other hazardous materials or equipment or unusual Construction Methods are necessary for execution of the Work, the Contractor shall exercise commensurate care and employ supervisors and workers properly qualified to perform such activity.

**G** The Contractor shall furnish a qualified safety representative at the Project site whose duties shall include the prevention of accidents. The safety representative shall be the Contractor's superintendent, unless the Contractor assigns this duty to another responsible member of its on-site staff and notifies the Owner and Architect in writing of such assignment.

**H** The Contractor shall not permit a load to be applied, or forces introduced, to any part of the construction or site that may cause damage to the construction or site or endanger safety of the construction, site, or persons on or near the site.

**I** The Contractor shall have the right to act as it deems appropriate in emergency situations jeopardizing life or property. The Contractor shall be entitled to equitable adjustment of the Contract Sum or Contract Time for its efforts expended for the sole benefit of the Owner in an emergency. Such adjustment shall be determined as provided in Articles 19 and 20.

**J** The duty of the Architect and the Architect's consultants to visit the Project site to conduct periodic inspections of the Work or for other purposes shall not give rise to a duty to review or approve the adequacy of the Contractor's safety program, safety supervisor, or any safety measure which Contractor takes or fails to take in, on, or near the Project site.

## Article 15
## HAZARDOUS MATERIALS

**A** A Hazardous Material is any substance or material identified as hazardous under any federal, state, or local law or regulation, or any other substance or material which may be considered hazardous or otherwise subject to statutory or regulatory requirements governing its handling, disposal, and/or clean-up. Existing Hazardous Materials are Hazardous Materials discovered at the Project site and not introduced to the Project site by the Contractor, a Subcontractor, or anyone for whose acts they may be liable.

**B** If, during the performance of the Work, the Contractor encounters a suspected Existing Hazardous Material, the Contractor shall immediately stop work in the affected area, take measures appropriate to the condition to keep people away from the suspected Existing Hazardous Material, and immediately notify the Architect and Owner of the condition in writing.

**C** The Owner shall obtain the services of an independent laboratory or professional consultant, appropriately licensed and qualified, to determine whether the suspected material is a Hazardous Material requiring abatement and, if so, to certify after its abatement that it has been rendered harmless. Any abatement of Existing Hazardous Materials will be the responsibility of the Owner. The Owner will advise the Contractor in writing of the persons or entities who will determine the nature of the suspected material and those who will, if necessary, perform the abatement. The Owner will not employ persons or entities to perform these services to whom the Contractor or Architect has reasonable objection.

**D** After certification by the Owner's independent laboratory or professional consultant that the material is harmless or has been rendered harmless, work in the affected area shall resume upon written agreement between the Owner and Contractor. If the material is found to be an Existing Hazardous Material and the Contractor incurs additional cost or delay due to the presence and abatement of the material, the Contract Sum and/or Contract Time shall be appropriately adjusted by a Contract Change Order pursuant to Article 19.

**E** The Owner shall not be responsible for Hazardous Materials introduced to the Project site by the Contractor, a Subcontractor, or anyone for whose acts they may be liable unless such Hazardous Materials were required by the Contract Documents.

## Article 16
## INSPECTION *of the* WORK

**A** **GENERAL**

**(1)** The Contractor is solely responsible for the Work's compliance with the Contract Documents; therefore, the Contractor shall be responsible to inspect in-progress and completed Work, and shall verify its compliance with the Contract Documents and that any element or portion of the Work upon which subsequent Work is to be applied or performed is in proper condition to receive the subsequent Work. Neither the presence nor absence of inspections by the Architect, Owner, AHJ, any public authority having

jurisdiction, or their representatives shall relieve the Contractor of responsibility to inspect the Work, for responsibility for Construction Methods and safety precautions and programs in connection with the Work, or from any other requirement of the Contract Documents.

**(2)** The Architect, Owner, AHJ, any public authority having jurisdiction, and their representatives shall have access at all times to the Work for inspection whenever it is in preparation or progress, and the Contractor shall provide proper facilities for such access and inspection. All materials, workmanship, processes of manufacture, and methods of construction, if not otherwise stipulated in the Contract Documents, shall be subject to inspection, examination, and test at any and all places where such manufacture and/or construction are being carried on. Such inspections will not unreasonably interfere with the Contractor's operations.

**(3)** The Architect will inspect the Work as a representative of the Owner. The Architect's inspections may be supplemented by inspections by an AHJ or other reviewing entity.

**(4)** The Contractor may be charged by the Owner for any extra cost of inspection incurred by the Owner or Architect on account of material and workmanship not being ready at the time of inspection set by the Contractor.

**(5)** It is the Contractor's responsibility to communicate to the Design Team the date and time of requested inspection(s). It is the Design Team's responsibility to coordinate the date and time of the requested inspection with the Contractor, AHJ or ICC, Owner (ACCS) and College (college designated representative).

**(6)** The following are the minimum participation requirements for inspections:

**(a)** Required inspection without an AHJ or ICC - both the Contractor and Design Professional of record.
**(b)** Required inspection with an AHJ or ICC - both the Contractor and Design Professional of record.

## B TYPES of INSPECTIONS

**(1) SCHEDULED INSPECTIONS** and **CONFERENCES**. Scheduled Inspections and Conferences are conducted by the Architect, scheduled by the Architect in coordination with the Contractor and AHJ where applicable, and are attended by the Contractor and applicable Subcontractors, suppliers and manufacturers. Scheduled Inspections and Conferences of this Contract include:

**(a)** Pre-construction Conference.
**(b)** Pre-roofing Conference (not applicable if the Contract involves no roofing work)
**(c)** Pre-Asphalt Paving Installation and Expectations Conference
**(d)** Pre-Landscape Sod Installation and Expectations Conference
**(e)** Pre-Flooring Installation and Expectations Conference
**(f)** Below Slab/Underground Utility Inspection
**(g)** Footings and Foundation Inspection
**(h)** Concrete Slab Inspection
**(i)** Waterproofing and Building Envelope Inspection
**(j)** In-Wall Inspection
**(k)** Gypsum Board Inspection
**(l)** Roofing Inspection
**(m)** Storm Shelter Inspection (if applicable)

**(n)** Above Ceiling Inspection(s): An above ceiling inspection of all spaces in the building is required before the ceiling material is installed. Above ceiling inspections are to be conducted at a time when all above ceiling systems are complete and tested to the greatest extent reasonable pending installation of the ceiling material. System identifications and markings are to be complete. All fire-rated construction including fire-stopping of penetrations and specified identification above the ceiling shall be complete. Ceiling framing and suspension systems shall be complete with lights, grilles and diffusers, access panels, fire protection drops for sprinkler heads, etc., installed in their final locations to the greatest extent reasonable. Above ceiling framing to support ceiling mounted equipment shall be complete. The above ceiling construction shall be complete to the extent that after the inspection the ceiling material can be installed without disturbance.

**(o)** Elevator Inspection

**(p)** Fire Suppression Systems Inspection

**(q)** Fire Alarm System Inspection

**(r)** Emergency Lights and Exit Signs Inspection

**(s)** ADA Inspection

**(t)** Substantial Completion

**(u)** Final Inspection(s): A Final Inspection shall establish that the Work, or a designated portion of the Work, is Substantially Complete in accordance with Article 32 and is accepted by the Architect, Owner, and AHJ or other reviewing entity as being ready for the Owner's occupancy or use. At the conclusion of this inspection, items requiring correction or completion ("punch list" items) shall be minimal. Punch list items shall contain only items that can be reasonably completed and inspected within 30 days so that the Owner can occupy without disruption or interference by the Contractor and to establish Final Acceptance of the Work. If punch list items and closeout documents are not completed within 45 days of issuance of Certificate of Substantial Completion, a Notice to Cure may be issued. If the Work, or designated portion of the Work, includes the installation, or modification, of a fire alarm system or other life safety systems essential to occupancy, such systems shall have been tested and appropriately certified before the Final Inspection.

**(v)** Year-End Inspection(s): An inspection of the Work, or each separately completed portion thereof, is required near the end of the Contractor's one year warranty period(s). The subsequent delivery of the Architect's report of this inspection will serve as confirmation that the Contractor was notified of Defective Work found within the warranty period in accordance with Article 35.

**(2) PERIODIC INSPECTIONS.** Periodic Inspections are conducted throughout the course of the Work by the Architect, the Architect's consultants, their representatives, or other reviewing entity at the direction of the Owner, jointly or independently, with or without advance notice to the Contractor.

**(3) SPECIFIED INSPECTIONS** and **TESTS**. Specified Inspections and Tests include inspections, tests, demonstrations, and approvals that are either specified in the Contract Documents or required by laws, ordinances, rules, regulations, or orders of public authorities having jurisdiction, to be performed by the Contractor, one of its Subcontractors, or an independent testing laboratory or firm (whether paid for by the Contractor or Owner).

## C INSPECTIONS *by the* ARCHITECT

**(1)** The Architect is not authorized to revoke, alter, relax, or waive any requirements of the Contract Documents (other than "minor" deviations as defined in Article 9 and "minor" changes as defined in Article 19), to finally approve or accept any portion of the Work or to issue instructions contrary to the Contract Documents without concurrence of the Owner.

**(2)** The Architect will visit the site at intervals appropriate to the stage of the Contractor's operations and as otherwise necessary to:

**(a)** become generally familiar with the in-progress and completed Work and the quality of the Work,

**(b)** determine whether the Work is progressing in general accordance with the Contractor's schedule and is likely to be completed within the Contract Time,

**(c)** visually compare readily accessible elements of the Work to the requirements of the Contract Documents to determine, in general, if the Contractor's performance of the Work indicates that the Work will conform to the requirements of the Contract Documents when completed,

**(d)** endeavor to guard the Owner against Defective Work,

**(e)** review and address with the Contractor any problems in implementing the requirements of the Contract Documents that the Contractor may have encountered, and

**(f)** keep the Owner fully informed about the Project.

**(3)** The Architect shall have the authority to reject Defective Work or require its correction, but shall not be required to make exhaustive investigations or examinations of the in-progress or completed portions of the Work to expose the presence of Defective Work. However, it shall be an obligation of the Architect to report in writing, to the Owner, Contractor, and ACCS Facilities Division, any Defective Work recognized by the Architect.

**(4)** The Architect shall have the authority to require the Contractor to stop work only when, in the Architect's reasonable opinion, such stoppage is necessary to avoid Defective Work. The Architect shall not be liable to the Contractor or Owner for the consequences of any decisions made by the Architect in good faith either to exercise or not to exercise this authority.

**(5)** "Inspections by the Architect" includes appropriate inspections by the Architect's consultants as dictated by their respective disciplines of design and the stage of the Contractor's operations.

## D INSPECTIONS BY THE LOCAL AHJ OR INDEPENDENT CODE CONSULTANTS

**(1)** The Local AHJ or Independent Code Consultant will:

**(a)** participate in scheduled inspections and conferences as practicable,

**(b)** perform periodic inspections of in-progress and completed Work to ensure code compliance of the Project and general conformance of the Work with the Contract Documents, and

**(c)** monitor the Contractor's progress and performance of the Work.

**(2)** The Local AHJ or Independent Code Consultant shall have the authority to:

**(a)** reject Work that is not in compliance with the State Building Code, unless the Work is in accordance with the Contract Documents in which case the Architect shall initiate appropriate corrective action, and

**(b)** notify the Architect, Owner, and Contractor of Defective Work recognized by the Local AHJ or Independent Code Consultant.

**(3)** The Local AHJ or Independent Code Consultant's periodic inspections will usually be scheduled around key stages of construction based upon information reported by the Architect. As the Architect or Owner deems appropriate, the Local AHJ or Independent Code Consultants can be requested to schedule special inspections or meetings to address specific matters. The written findings of the Local AHJ or Independent Code Consultants will be transmitted to the Owner, Contractor, and Architect.

**(4)** The Local AHJ or Independent Code Consultant is not authorized to revoke, alter, relax, or waive any requirements of the Contract Documents, to finally approve or accept any portion of the Work or to issue instructions contrary to the Contract Documents without concurrence of the Owner. The Contractor shall not proceed with Work as a result of instructions or findings of the Local AHJ or Independent Code Consultant which the Contractor considers to be a change to the requirements of the Contract Documents without written authorization of the Owner through the Architect.

## E UNCOVERING WORK

**(1)** If the Contractor covers a portion of the Work before it is examined by the Architect and this is contrary to the Architect's request or specific requirements in the Contract Documents, then, upon written request of the Architect, the Work must be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

**(2)** Without a prior request or specific requirement that Work be examined by the Architect before it is covered, the Architect may request that Work be uncovered for examination and the Contractor shall uncover it. If the Work is in accordance with the Contract Documents, the Contract Sum shall be equitably adjusted under Article 19 to compensate the Contractor for the costs of uncovering and replacement. If the Work is not in accordance with the Contract Documents, uncovering, correction, and replacement shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

## F SPECIFIED INSPECTIONS *and* TESTS

**(1)** The Contractor shall schedule and coordinate Specified Inspections and Tests to be made at appropriate times so as not to delay the progress of the Work or the work of the Owner or separate contractors. If the Contract Documents require that a Specified Inspection or Test be witnessed or attended by the Architect or Architect's consultant, the Contractor shall give the Architect timely notice of the time and place of the Specified Inspection or Test. If a Specified Inspection or Test reveals that Work is not in compliance with requirements of the Contract Documents, the Contractor shall bear the costs of correction, repeating the Specified Inspection or Test, and any related costs incurred by the Owner, including reasonable charges, if any, by the Architect for additional services. Through appropriate Contract Change Order the Owner shall bear costs of tests, inspections or approvals which become Contract requirements subsequent to the receipt of bids.

**(2)** If the Architect, Owner, or public authority having jurisdiction determines that inspections, tests, demonstrations, or approvals in addition to Specified Inspections and Tests are required, the Contractor

shall, upon written instruction from the Architect, arrange for their performance by an entity acceptable to the Owner, giving timely notice to the architect of the time and place of their performance. Related costs shall be borne by the Owner unless the procedures reveal that Work is not in compliance with requirements of the Contract Documents, in which case the Contractor shall bear the costs of correction, repeating the procedures, and any related costs incurred by the Owner, including reasonable charges, if any, by the Architect for additional services.

**(3)** Unless otherwise required by the Contract Documents, required certificates of Specified Inspections and Tests shall be secured by the Contractor and promptly delivered to the Architect.

**(4)** Failure of any materials to pass Specified Inspections and Tests will be sufficient cause for refusal to consider any further samples of the same brand or make of that material for use in the Work.

## Article 17
## CORRECTION *of* DEFECTIVE WORK

**A** The Contractor shall, at the Contractor's expense, promptly correct Defective Work rejected by the Architect or which otherwise becomes known to the Contractor, removing the rejected or nonconforming materials and construction from the project site.

**B** Correction of Defective Work shall be performed in such a timely manner as will avoid delay of completion, use, or occupancy of the Work and the work of the Owner and separate contractors.

**C** The Contractor shall bear all expenses related to the correction of Defective Work, including but not limited to: **(1)** additional testing and inspections, including repeating Specified Inspections and Tests,

**(2)** reasonable services and expenses of the Architect, and (3) the expense of making good all work of the Contractor, Owner, or separate contractors destroyed or damaged by the correction of Defective Work.

**D** All Defective Work, or Deficiencies, shall be tracked on a Project Deficiency Log that is reviewed and updated at least monthly at OAC meetings.

## Article 18
## DEDUCTIONS *for* UNCORRECTED WORK

If the Owner deems it advisable and in the Owner's interest to accept Defective Work, the Owner may allow part or all of such Work to remain in place, provided an equitable deduction from the Contract Sum, acceptable to the Owner, is offered by the Contractor.

## Article 19
## CHANGES *in* WORK

**A** **GENERAL**

**(1)** The Owner may at any time direct the Contractor to make changes in the Work which are within the general scope of the Contract, including changes in the Drawings, Specifications, or other portions of the Contract Documents to add, delete, or otherwise revise portions of the Work. The Architect is authorized by the Owner to direct "minor" changes in the Work by written order to the Contractor through the use of an

Architect's Supplemental Instruction (ASI). These "minor" changes, or ASIs, in the Work are defined as those which are in the interest of the Owner, do not materially alter the quality or performance of the finished Work, and do not affect the cost or time of performance of the Work. Changes in the Work which are not "minor" may be authorized only by the Owner.

**(2)** If the Owner directs a change in the Work, the change shall be incorporated into the Contract by a Contract Change Order prepared by the Architect and signed by the Contractor, Owner, and other signatories to the Construction Contract, stating their agreement upon the change or changes in the Work and the adjustments, if any, in the Contract Sum and the Contract Time.

**(3)** Subject to compliance with Alabama's Public Works Law, the Owner may, upon agreement by the Contractor, incorporate previously unawarded bid alternates into the Contract.

**(4)** In the event of a claim or dispute as to the appropriate adjustment to the Contract Sum or Contract Time due to a directive to make changes in the Work, the Work shall proceed as provided in this article subject to subsequent agreement of the parties or final resolution of the dispute pursuant to Article 24.

**(5)** Consent of surety will be obtained for all Contract Change Orders involving an increase in the Contract Sum.

**(6)** Changes in the Work shall be performed under applicable provisions of the Contract Documents and the Contractor shall proceed promptly to perform changes in the Work, unless otherwise directed by the Owner through the Architect.

**(7)** Liquidated damages are routed as Change Orders for work that the Contractor has failed to substantially complete within the Contract Time. Before the process of applying liquidated damages begins, communication and approval is required from the ACCS Chief Facilities Officer.

**(8)** All change orders require completion of ACCS Form 2-F Contract Change Order and ACCS Form 2-G Contract Change Order Justification forms. Only Change Orders 10% or greater of the current contract amount require the Owner's legal advisor's signature on the Change Order Justification form.

## B DETERMINATION *of* ADJUSTMENT *of the* CONTRACT SUM

The adjustment of the Contract Sum resulting from a change in the Work shall be determined by one of the following methods, or a combination thereof, as selected by the Owner:

**(1)** Lump Sum. By mutual agreement to a lump sum based on or negotiated from an itemized cost proposal from the Contractor. This amount shall be all-inclusive, covering direct costs, as well as any fees. Contractor shall furnish to the Owner an itemized breakdown of the quantities and prices to be used in estimating the value of any changes that might be ordered. For the purposes of this method, Contractor and Subcontractors, shall furnish, at a minimum, the following on their own letterhead; all material or vendor quotes (with quantities and unit cost), labor hours, labor rates, labor burdens, equipment, and any other relevant information necessary to analyze the quote. Changes which involve a net credit to the Owner shall include fair and reasonable credits for overhead and profit on the deducted work, in no case less than 5%. For the purposes of this method of determining an adjustment of the Contract Sum, "overhead" shall cover the Contractor's indirect costs of the change, such as the cost of bonds, superintendent and other job office

personnel, watchman, joboffice, job office supplies and expenses, temporary facilities and utilities, and home office expenses.

**(a)** For the Party performing the work, the cost of the work, less any credits, shall have a maximum markup for Overhead and Profit of 10%.

**(b)** The prime contractor or upper-tier subcontractor's markup on work performed by lower-tier subcontractors shall not exceed 10%. No more than 10% shall be added by each successive lower-tier subcontractor, if applicable, for a maximum of 20%.

**(c)** Article 19.B.1.a and 19.B.1.b shall also apply to Force Account changes.

**(2)** Unit Price. By application of Unit Prices included in the Contract or subsequently agreed to by the parties. However, if the character or quantity originally contemplated is materially changed so that application of such unit price to quantities of Work proposed will cause substantial inequity to either party, the applicable unit price shall be equitably adjusted. Each unit price is to include overhead, profit, and all other related costs.

**(3)** Force Account. By directing the Contractor to proceed with the change in the Work on a "force account" basis under which the Contractor shall be reimbursed for reasonable expenditures incurred by the Contractor and its Subcontractors in performing added Work and the Owner shall receive reasonable credit for any deleted Work. The Contractor shall keep and present, in such form as the Owner may prescribe, an itemized accounting of the cost of the change together with sufficient supporting data. Unless otherwise stated in the directive, the adjustment of the Contract Sum shall be limited to the following:

**(a)** costs of labor and supervision, including employee benefits, social security, retirement, unemployment and workers' compensation insurance required by law, agreement, or under Contractor's or Subcontractor's standard personnel policy;

**(b)** cost of materials, supplies and equipment, including cost of delivery, whether incorporated or consumed;

**(c)** rental cost of machinery and equipment, not to exceed prevailing local rates if contractor-owned;

**(d)** costs of premiums for insurance required by the Contract Documents, permit fees, and sales, use or similar taxes related to the change in the Work;

**(e)** reasonable credits to the Owner for the value of deleted Work, without Contractor or Subcontractor mark-ups; and

## C ADJUSTMENT *of the* CONTRACT TIME *due to* CHANGES

**(1)** Unless otherwise provided in the Contract Documents, the Contract Time shall be equitably adjusted for the performance of a change provided that the Contractor notifies the Architect in writing that the change will increase the time required to complete the Work. Such notice shall be provided no later than:

**(a)** with the Contractor's cost proposal stating the number of days of extension requested, or

**(b)** within ten days after the Contractor receives a directive to proceed with a change in advance of submitting a cost proposal, in which case the notice should provide an estimated number of days of extension to be requested, which may be subject to adjustment in the cost proposal.

**(2)** The Contract Time shall be extended only to the extent that the change affects the time required to complete the entire Work of the Contract, taking into account the concurrent performance of the changed and unchanged Work. All Contract Time extension requests will be considered in relation to the Critical Path of the Construction Schedule. For purposes of this section, the Critical Path of the Construction Schedule determines the sequence of dependent tasks for project completion and identifies the shortest possible duration for completing the project.

## D CHANGE ORDER PROCEDURES

**(1)** If the Owner proposes to make a change in the Work, the Architect will request that the Contractor provide a cost proposal for making the change to the Work. The request shall be in writing and shall adequately describe the proposed change using drawings, specifications, narrative, or a combination thereof. Within 14 days after receiving such a request, or such other time as may be stated in the request, the Contractor shall prepare and submit a written proposal along with the Change Proposal Recap Sheet to the Architect, properly itemized and supported by sufficient substantiating data to facilitate evaluation. The stated time within which the Contractor must submit a proposal may be extended if, within that time, the Contractor makes a written request with reasonable justification thereof.

**(2)** The Contractor may voluntarily offer a change proposal which, in the Contractor's opinion, will reduce the cost of construction, maintenance, or operation or will improve the cost-effective performance of an element of the Project, in which case the Owner, through the Architect, will accept, reject, or respond otherwise within 21 days after receipt of the proposal, or such other reasonable time as the Contractor may state in the proposal.

**(3)** If the Contractor's proposal is acceptable to the Owner, or is negotiated to the mutual agreement of the Contractor and Owner, the Architect will prepare an appropriate Contract Change Order for execution. Upon receipt of the fully executed Contract Change Order, the Contractor shall proceed with the change.

**(4)** In advance of delivery of a fully executed Contract Change Order, the Architect may furnish to the Contractor a written authorization to proceed with an agreed change utilizing the Change Order Justification (ACCS Form 2-G). However, such an authorization shall be effective only if it:

- **(a)** identifies the Contractor's accepted or negotiated proposal for the change,
- **(b)** states the agreed adjustments, if any, in Contract Sum and Contract Time,
- **(c)** states that funds are available to pay for the change, and
- **(d)** is signed by the Owner.

**(5)** If the Contractor and Owner cannot agree on the amount of the adjustment in the Contract Sum for a change, the Owner, through the Architect, may order the Contractor to proceed with the change on a Force Account basis, but the net cost to the Owner shall not exceed the amount quoted in the Contractor's proposal. Such order shall state that funds are available to pay for the change.

**(6)** If the Contractor does not promptly respond to a request for a proposal, or the Owner determines that the change is essential to the final product of the Work and that the change must be effected immediately to avoid delay of the Project, the Owner may:

- **(a)** determine with the Contractor a sufficient maximum amount to be authorized for the change and

**(b)** direct the Contractor to proceed with the change on a Force Account basis pending delivery of the Contractor's proposal, stating the maximum increase in the Contract Sum that is authorized for the change.

**(7)** Pending agreement of the parties or final resolution of any dispute of the total amount due the Contractor for a change in the Work, amounts not in dispute for such changes in the Work may be included in Applications for Payment accompanied by an interim Change Order indicating the parties' agreement with part of all of such costs or time extension. Once a dispute is resolved, it shall be implemented by preparation and execution of an appropriate Change Order.

## Article 20
## CLAIMS *for* EXTRA COST *or* EXTRA WORK

**A** If the Contractor considers any instructions by the Architect, Owner, or public authority having jurisdiction or Independent Code Consultant, to be contrary to the requirements of the Contract Documents and will involve extra work and/or cost under the Contract, the Contractor shall give the Architect written notice thereof within ten days after receipt of such instructions, and in any event before proceeding to execute such work. As used in this Article, "instructions" shall include written or oral clarifications, directions, instructions, interpretations, or determinations.

**B** The Contractor's notification pursuant to Paragraph 20.A shall state: **(1)** the date, circumstances, and source of the instructions, **(2)** that the Contractor considers the instructions to constitute a change to the Contract Documents and why, and **(3)** an estimate of extra cost and time that may be involved to the extent an estimate may be reasonably made at that time.

**C** Except for claims relating to an emergency endangering life or property, no claim for extra cost or extra work shall be considered in the absence of prior notice required under Paragraph 20.A.

**D** Within ten days of receipt of a notice pursuant to Paragraph 20.A, the Architect will respond in writing to the Contractor, stating one of the following:

**(1)** The cited instruction is rescinded.

**(2)** The cited instruction is a change in the Work and in which manner the Contractor is to proceed with procedures of Article 19, Changes in the Work.

**(3)** The cited instruction is reconfirmed, is not considered by the Architect to be a change in the Contract Documents, and the Contractor is to proceed with Work as instructed.

**E** If the Architect's response to the Contractor is as in Paragraph 20.D(3), the Contractor shall proceed with the Work as instructed. If the Contractor continues to consider the instructions to constitute a change in the Contract Documents, the Contractor shall, within ten days after receiving the Architect's response, notify the Architect in writing that the Contractor intends to submit a claim pursuant to Article 24, Resolution of Claims and Disputes.

## Article 21
# DIFFERING SITE CONDITIONS

**A** **DEFINITION**

"Differing Site Conditions" are:

**(1)** subsurface or otherwise concealed physical conditions at the Project site which differ materially from those indicated in the Contract Documents, or

**(2)** unknown physical conditions at the Project site which are of an unusual nature, differing materially from conditions ordinarily encountered and generally recognized as inherent in construction activities of the character required by the Contract Documents.

**B** **PROCEDURES**

If Differing Site Conditions are encountered, then the party discovering the condition shall promptly notify the other party before the condition is disturbed and in no event later than ten days after discovering the condition. Upon such notice and verification that a Differing Site Condition exists, the Architect will, with reasonable promptness and with the Owner's concurrence, make changes in the Drawings and/or Specifications as are deemed necessary to conform to the Differing Site Condition. Any increase or decrease in the Contract Sum or Contract Time that is warranted by the changes will be made as provided under Article 19, Changes in the Work. If the Architect determines a Differing Site Condition has not been encountered, the Architect shall notify the Owner and Contractor in writing, stating the reason for that determination.

## Article 22
# CLAIMS *for* DAMAGES

If either party to the Contract suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time after the discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

## Article 23
# DELAYS

**A** A delay beyond the Contractor's control at any time in the commencement or progress of Work by an act or omission of the Owner, Architect, or any separate contractor or by labor disputes, unusual delay in deliveries, unavoidable casualties, fires, abnormal floods, tornadoes, or other cataclysmic events of nature, may entitle the Contractor to an extension of the Contract Time provided, however, that the Contractor shall, within ten days after the delay first occurs, give written notice to the Architect of the cause of the delay and its probable effect on progress of the entire Work.

**B** Adverse weather conditions that are more severe than anticipated for the locality of the Work during any given month may entitle the Contractor to an extension of Contract Time provided, however;

**(1)** the weather conditions had an adverse effect on construction scheduled to be performed during the period in which the adverse weather occurred, which in reasonable sequence would have an effect on completion of the entire Work,

**(2)** the Contractor shall, within twenty-one days after the end of the month in which the delay occurs, give the Architect written notice of the delay that occurred during that month and its probable effect on progress of the Work, and

**(3)** within a reasonable time after giving notice of the delay, the Contractor provides the Architect with sufficient data to document that the weather conditions experienced were unusually severe for the locality of the Work during the month in question. Unless otherwise provided in the Contract Documents, data documenting unusually severe weather conditions shall compare actual weather conditions to the average weather conditions for the month in question during the previous five years as recorded by the National Oceanic and Atmospheric Administration (NOAA) or similar record-keeping entities.

**C** Adjustments, if any, of the Contract Time pursuant to this Article shall be incorporated into the Contract by a Contract Change Order prepared by the Architect and signed by the Contractor, Owner, and other signatories to the Construction Contract or, at closeout of the Contract, by mutual written agreement between the Contractor and Owner. The adjustment of the Contract Time shall not exceed the extent to which the delay extends the time required to complete the entire Work of the Contract.

**D** The Contractor shall not be entitled to any adjustment of the Contract Sum for damage due to delays claimed pursuant to this Article unless the delay was caused by the Owner or Architect and was either:

**(1)** the result of bad faith or active interference or

**(2)** beyond the contemplation of the parties and not remedied within a reasonable time after notification by the Contractor of its presence.

## Article 24
## RESOLUTION *of* CLAIMS *and* DISPUTES

**A** **APPLICABILITY *of* ARTICLE**

**(1)** As used in this Article, "Claims and Disputes" include claims or disputes asserted by the Contractor, its Surety, or Owner arising out of or related to the Contract, or its breach, including without limitation claims seeking, under the provisions of the Contract, equitable adjustment of the Contract Sum or Contract Time and claims and disputes arising between the Contractor (or its Surety) and Owner regarding interpretation of the Contract Documents, performance of the Work, or breach of or compliance with the terms of the Contract.

**(2)** "Resolution" addressed in this Article applies only to Claims and Disputes arising between the Contractor (or its Surety) and Owner and asserted after execution of the Construction Contract and prior to the date upon which final payment is made. Upon making application for final payment the Contractor may reserve the right to subsequent Resolution of existing Claims by including a list of all Claims, in stated amounts, which remain to be resolved and specifically excluding them from any release of claims executed by the Contractor, and in that event Resolution may occur after final payment is made.

**B** **CONTINUANCE *of* PERFORMANCE**

An unresolved Claim or Dispute shall not be just cause for the Contractor to fail or refuse to proceed diligently with performance of the Contract or for the Owner to fail or refuse to continue to make payments in accordance with the Contract Documents.

**C** **GOOD FAITH EFFORT *to* SETTLE**

The Contractor and Owner agree that, upon the assertion of a Claim by the other, they will make a good faith effort, with the Architect's assistance and advice, to achieve mutual resolution of the Claim. If mutually agreed, the Contractor and Owner may endeavor to resolve a Claim through mediation. If efforts to settle are not successful, the Claim shall be resolved in accordance with paragraph D or E below, whichever applies.

**D** **FINAL RESOLUTION for STATE-FUNDED CONTRACTS**

**(1)** If the Contract is funded in whole or in part with state funds, the final Resolution of Claims and Disputes which cannot be resolved by the Contractor (or its Surety) and Owner shall be by the Chancellor, whose decision shall be final, binding, and conclusive upon the Contractor, its Surety, and the Owner.

**(2)** When it becomes apparent to the party asserting a Claim (the Claimant) that an impasse to mutual resolution has been reached, the Claimant may request in writing to the Chancellor that the Claim be resolved by decision of a Professional, with Alabama licensing if the profession requires it, appointed by the Chancellor to review and determine the Claim. Such request by the Contractor (or its Surety) shall be submitted through the Owner. Should the Owner fail or refuse to submit the Contractor's request within ten days of receipt of same, the Contractor may forward such request directly to the Chief Facilities Officer. Upon receipt of a request to resolve a Claim, the Chief Facilities Officer will instruct the parties as to procedures to be initiated and followed.

**(3)** If the respondent to a Claim fails or refuses to participate or cooperate in the Resolution procedures to the extent that the Claimant is compelled to initiate legal proceedings to induce the Respondent to participate or cooperate, the Claimant will be entitled to recover, and may amend its Claim to include, the expense of reasonable attorney's fees so incurred.

## Article 25
## OWNER'S RIGHT *to* CORRECT DEFECTIVE WORK

If the Contractor fails or refuses to correct Defective Work in a timely manner that will avoid delay of completion, use, or occupancy of the Work or work by the Owner or separate contractors, the Architect may give the Contractor written Notice to Cure the Defective Work within a reasonable, stated time. If within ten days after receipt of the Notice to Cure the Contractor has not proceeded and satisfactorily continued to cure the Defective Work or provided the Architect with written verification that satisfactory positive action is in process to cure the Defective Work, the Owner may, without prejudice to any other remedy available to the Owner, correct the Defective Work and deduct the actual cost of the correction from payment then or thereafter due to the Contractor.

## Article 26
## OWNER'S RIGHT *to* STOP *and* SUSPEND *the* WORK

**A** **STOPPING *the* WORK *for* CAUSE**

If the Contractor fails to correct Defective Work or persistently fails to carry out Work in accordance with the Contract Documents, the Owner may direct the Contractor in writing to stop the Work, or any part of the

Work, until the cause for the Owner's directive has been eliminated; however, the Owner's right to stop the Work shall not be construed as a duty of the Owner to be exercised for the benefit of the Contractor or any other person or entity.

**B** **SUSPENSION** *by the* **OWNER** *for* **CONVENIENCE**

**(1)** The Owner may, at any time and without cause, direct the Contractor in writing to suspend, delay or interrupt the Work, or any part of the Work, for a period of time as the Owner may determine.

**(2)** The Contract Sum and Contract Time shall be adjusted, pursuant to Article 19, for reasonable increases in the cost and time caused by an Owner-directed suspension, delay or interruption of Work for the Owner's convenience. However, no adjustment to the Contract Sum shall be made to the extent that the same or concurrent Work is, was or would have been likewise suspended, delayed or interrupted for other reasons not caused by the Owner.

## Article 27
## OWNER'S RIGHT *to* TERMINATE CONTRACT

**A** **TERMINATION** *by the* **OWNER** *for* **CAUSE**

**(1)** Causes: The Owner may terminate the Contractor's right to complete the Work, or any designated portion of the Work, if the Contractor:

**(a)** should be adjudged bankrupt, or should make a general assignment for the benefit of the Contractor's creditors, or if a receiver should be appointed on account of the Contractor's insolvency to the extent termination for these reasons is permissible under applicable law;

**(b)** refuses or fails to prosecute the Work, or any part of the Work, with the diligence that will insure its completion within the Contract Time, including any extensions, or fails to complete the Work within the Contract Time;

**(c)** refuses or fails to perform the Work, including prompt correction of Defective Work, in a manner that will insure that the Work, when fully completed, will be in accordance with the Contract Documents;

**(d)** fails to pay for labor or materials supplied for the Work or to pay Subcontractors in accordance with the respective Subcontract;

**(e)** persistently disregards laws, ordinances, or rules, regulations or orders of a public authority having jurisdiction, or the instructions of the Architect or Owner; or

**(f)** is otherwise guilty of a substantial breach of the Contract.

**(2)** Procedure for Unbonded Construction Contracts (Generally, contracts less than $100,000):

**(a)** Notice to Cure: In the presence of any of the above conditions the Architect may give the Contractor written notice to cure the condition within a reasonable, stated time, but not less than ten days after the Contractor receives the notice.

**(b)** Notice of Termination: If, at the expiration of the time stated in the Notice to Cure, the Contractor has not proceeded and satisfactorily continued to cure the condition or provided the Architect with written verification that satisfactory positive action is in process to cure the condition, the Owner may, without prejudice to any other rights or remedies of the Owner, give the Contractor written notice that the Contractor's right to complete the Work, or a designated portion of the Work, shall terminate seven days after the Contractor's receipt of the written Notice of Termination.

**(c)** If the Contractor satisfies a Notice to Cure, but the condition for which the notice was first given reoccurs, the Owner may give the Contractor a seven day Notice of Termination without giving the Contractor another Notice to Cure.

**(d)** At the expiration of the seven days of the termination notice, the Owner may:

**.1** take possession of the site, of all materials and equipment stored on and off site, and of all Contractor-owned tools, construction equipment and machinery, and facilities located at the site, and

**.2** finish the Work by whatever reasonable method the Owner may deem expedient.

**(e)** The Contractor shall not be entitled to receive further payment under the Contract until the Work is completed.

**(f)** If the Owner's cost of completing the Work, including correction of Defective Work, compensation for additional architectural, engineering, managerial, and administrative services, and reasonable attorneys' fees due to the default and termination, is less than the unpaid balance of the Contract Sum, the excess balance less liquidated damages for delay shall be paid to the Contractor. If such cost to the Owner including attorney's fees, plus liquidated damages, exceeds the unpaid balance of the Contract Sum, the Contractor shall pay the difference to the Owner. Final Resolution of any claim or Dispute involving the termination or any amount due any party as a result of the termination shall be pursuant to Article 24.

**(g)** Upon the Contractor's request, the Owner shall furnish to the Contractor a detailed accounting of the Owner's cost of completing the Work.

**(3)** Procedure for Bonded Construction Contracts (Generally, contracts over $100,,000):

**(a)** Notice to Cure: In the presence of any of the above conditions the Architect may give the Contractor and its Surety written Notice to Cure the condition within a reasonable, stated time, but not less than ten days after the Contractor receives the notice.

**(b)** Notice of Termination: If, at the expiration of the time stated in the Notice to Cure, the Contractor has not proceeded and satisfactorily continued to cure the condition or provided the Architect with written verification that satisfactory positive action is in process to cure the condition, the Owner may, without prejudice to any other rights or remedies of the Owner, give the Contractor and its Surety written notice declaring the Contractor to be in default under the Contract and stating that the Contractor's right to complete the Work, or a designated portion of the Work, shall terminate seven days after the Contractor's receipt of the written Notice of Termination.

**(c)** If the Contractor satisfies a Notice to Cure, but the condition for which the notice was first given reoccurs, the Owner may give the Contractor a Notice of Termination without giving the Contractor another Notice to Cure.

**(d)** Demand on the Performance Bond: With the Notice of Termination the Owner shall give the Surety a written demand that, upon the effective date of the Notice of Termination, the Surety promptly fulfill its obligation to take charge of and complete the Work in accordance with the terms of the Performance Bond.

**(e)** Surety Claims: Upon receiving the Owner's demand on the Performance Bond, the Surety shall assume all rights and obligations of the Contractor under the Contract. However, the Surety shall also have the right to assert "Surety Claims" to the Owner, which are defined as claims relating to acts or omissions of the Owner or Architect prior to termination of the Contractor which may have prejudiced its rights as Surety or its interest in the unpaid balance of the Contract Sum. If the Surety wishes to assert a Surety Claim, it shall give the Owner, through the Architect, written notice within twenty-one days after first recognizing the condition giving rise to the Surety Claim. The Surety Claim shall then be submitted to the Owner, through the Architect, no later than sixty days after giving notice thereof, but no such Surety Claims shall be considered if submitted after the date upon which final payment becomes due. Final resolution of Surety Claims shall be pursuant to Article 24, Resolution of Claims and Disputes. The presence or possibility of a Surety Claim shall not be just cause for the Surety to fail or refuse to take charge of and complete the Work or for the Owner to fail or refuse to continue to make payments in accordance with the Contract Documents.

**(f)** Payments to Surety: The Surety shall be paid for completing the Work in accordance with the Contract Documents as if the Surety were the Contractor. The Owner shall have the right to deduct from payments to the Surety any reasonable costs incurred by the Owner, including compensation for additional architectural, engineering, managerial, and administrative services, and attorneys' fees as necessitated by termination of the Contractor and completion of the Work by the Surety. No further payments shall be made to the Contractor by the Owner. The Surety shall be solely responsible for any accounting to the Contractor for the portion of the Contract Sum paid to Surety by Owner or for the costs and expenses of completing the Work.

**(4)** Wrongful Termination: If any notice of termination by the Owner for cause, made in good faith, is determined to have been wrongly given, such termination shall be effective and compensation therefore determined as if it had been a termination for convenience pursuant to Paragraph B below.

## B TERMINATION *by the* OWNER *for* CONVENIENCE

**(1)** The Owner may, without cause and at any time, terminate the performance of Work under the Contract in whole, or in part, upon determination by the Owner that such termination is in the Owner's best interest. Such termination is referred to herein as Termination for Convenience.

**(2)** Upon receipt of a written notice of Termination for Convenience from the Owner, the Contractor shall:

**(a)** stop Work as specified in the notice;

**(b)** enter into no further subcontracts or purchase orders for materials, services, or facilities, except as may be necessary for Work directed to be performed prior to the effective date of the termination or to complete Work that is not terminated;

**(c)** terminate all existing subcontracts and purchase orders to the extent they relate to the terminated Work;

**(d)** take such actions as are necessary, or directed by the Architect or Owner, to protect, preserve, and make safe the terminated Work; and

**(e)** complete performance of the Work that is not terminated.

**(3)** In the event of Termination for Convenience, the Contractor shall be entitled to receive payment for the Work performed prior to its termination, including materials and equipment purchased and delivered for incorporation into the terminated Work, and any reasonable costs incurred because of the termination. Such payment shall include reasonable mark-up of costs for overhead and profit, not to exceed the limits stated in Article 19, Changes in the Work. The Contractor shall be entitled to receive payment for reasonable anticipated overhead ("home office") and shall not be entitled to receive payment for any profits anticipated to have been gained from the terminated Work. A proposal for decreasing the Contract Sum shall be submitted to the Architect by the Contractor in such time and detail, and with such supporting documentation, as is reasonably directed by the Owner. Final modification of the Contract shall be by Contract Change Order pursuant to Article 19. Any Claim or Dispute involving the termination or any amount due a party as a result shall be resolved pursuant to Article 24.

## Article 28
## CONTRACTOR'S RIGHT *to* SUSPEND *or* TERMINATE *the* CONTRACT

### A SUSPENSION *by the* OWNER

If all of the Work is suspended or delayed for the Owner's convenience or under an order of any court, or other public authority, for a period of sixty days, through no act or fault of the Contractor or a Subcontractor, or anyone for whose acts they may be liable, then the Contractor may give the Owner a written Notice of Termination which allows the Owner fourteen days after receiving the Notice in which to give the Contractor appropriate written authorization to resume the Work. Absent the Contractor's receipt of such authorization to resume the Work, the Contract shall terminate upon expiration of this fourteen day period and the Contractor will be compensated by the Owner as if the termination had been for the Owner's convenience pursuant to Article 27.B.

### B NONPAYMENT

The Owner's failure to pay the undisputed amount of an Application for Payment within sixty days after receiving it from the Architect (Certified pursuant to Article 30) shall be just cause for the Contractor to give the Owner fourteen days' written notice that the Work will be suspended pending receipt of payment but that the Contract shall terminate if payment is not received within fourteen days (or a longer period stated by the Contractor) of the expiration of the fourteen day notice period.

**(1)** If the Work is then suspended for nonpayment, but resumed upon receipt of payment, the Contractor will be entitled to compensation as if the suspension had been by the Owner pursuant to Article 26, Paragraph B.

**(2)** If the Contract is then terminated for nonpayment, the Contractor will be entitled to compensation as if the termination had been by the Owner pursuant to Article 27, Paragraph B.

## Article 29
# PROGRESS PAYMENTS

### A FREQUENCY *of* PROGRESS PAYMENTS
Unless otherwise provided in the Contract Documents, the Owner will make payments to the Contractor as the Work progresses based on monthly estimates prepared and certified by the Contractor, approved and certified by the Architect, and approved by the Owner and other authorities whose approval is required.

### B SCHEDULE *of* VALUES
Within twenty-four (24) hours after the Bid Opening, the Contractor shall submit to the Architect ACCS Form 6-E, Schedule of Values, which is a breakdown of the Contract Sum showing the value of the various parts of the Work for billing purposes. The Schedule of Values shall divide the Contract Sum into as many parts ("line items") as the Architect and Owner determine necessary to permit evaluation and to show amounts attributable to Subcontractors. The Contractor's overhead and profit are to be proportionately distributed throughout the line items of the Schedule of Values. Upon approval, the Schedule of Values shall be used as a basis for monthly Applications for Payment, unless it is later found to be in error. Approved change order amounts shall be added to or incorporated into the Schedule of Values as mutually agreed by the Contractor and Architect.

### C APPLICATIONS *for* PAYMENTS
**(1)** Based on the approved Schedule of Values, each Application and Certificate for Payment shall show the Contractor's estimate of the value of Work performed in each line item as of the end of the billing period. The Contractor's cost of materials and equipment not yet incorporated into the Work, but delivered and suitably stored on the site, may be considered in monthly Applications for Payment. One payment application per month may be submitted. Each Application and Certificate for Payment shall match to the penny and be accompanied by an attached Schedule of Values.

**(2)** The Contractor's estimate of the value of Work performed and stored materials must represent such reasonableness as to warrant certification by the Architect to the Owner in accordance with Article 30. Each monthly Application for Payment shall be supported by such data as will substantiate the Contractor's right to payment, including without limitation copies of requisitions from subcontractors and material suppliers.

**(3)** If no other date is stated in the Contract Documents or agreed upon by the parties, each Application for Payment shall be submitted to the Architect on or about the first day of each month and payment shall be issued to the Contractor within thirty days after an Application for Payment is Certified pursuant to Article 30 and delivered to the Owner.

**(4)** Application and Certificate for Payment shall be electronically submitted to ACCS Facilities Division for review following the Contractor's, Notary's, Architect's and Owner's signatures.

### D MATERIALS STORED OFF SITE
Unless otherwise provided in the Contract Documents, the Contractor's cost of materials and equipment to be incorporated into the Work, which are stored off the site, may also be considered in monthly Applications for Payment under the following conditions:

**(1)** the contractor has received written approval from the Architect and Owner to store the materials or equipment off site in advance of delivering the materials to the off site location;

**(2)** a Certificate of Insurance is furnished to the Architect evidencing that a special insurance policy, or rider to an existing policy, has been obtained by the Contractor providing all-risk property insurance coverage, specifically naming the materials or equipment stored, and naming the Owner as an additionally insured party;

**(3)** the Architect is provided with a detailed inventory of the stored materials or equipment and the materials or equipment are clearly marked in correlation to the inventory to facilitate inspection and verification of the presence of the materials or equipment by the Architect or Owner;

**(4)** the materials or equipment are properly and safely stored in a bonded warehouse, or a facility otherwise approved in advance by the Architect and Owner; and

**(5)** compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest.

## E RETAINAGE

**(1)** Retainage for ACCS Projects shall be governed by Title 39 of the Alabama Code.

**(2)** "Retainage" is defined as that money belonging to the contractor which has been retained by ACCS conditioned on final completion and acceptance of all work in connection with a project or projects by the contractor. Retainage will not be reduced. Full retainage will only be released with the final payment after completion of all punch list items, receipt of Certificate of Occupancy from AHJ, submittal of all warranties, releases of claims are received, surety consent to final payment received, submittal of record documents and all other closeout documents required by contract. Retainage shall not be relied upon by Contractor (or Surety) to cover or off-set unearned monies attributable to uncompleted or uncorrected Work.

**(3)** In making progress payments the Owner shall retain five percent of the estimated amount of work done and the value of materials stored on the site or suitably stored and insured off-site, and after 50 percent completion has been accomplished, no further retainage shall be withheld. The retainage as set out above shall be held until final completion and acceptance of all work covered by the contract.

## F CONTRACTOR'S CERTIFICATION

**(1)** Each Application for Payment shall bear the Contractor's notarized certification that, to the best of the Contractor's knowledge, information, and belief, the Work covered by the Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payments were issued and payments received from the Owner and that the current payment shown in the Application for Payment has not yet been received.

**(2)** By making this certification the Contractor represents to the Architect and Owner that, upon receipt of previous progress payments from the Owner, the Contractor has promptly paid each Subcontractor, in accordance with the terms of its agreement with the Subcontractor, the amount due the Subcontractor from the amount included in the progress payment on account of the Subcontractor's Work and stored materials. The Architect and Owner may advise Subcontractors and suppliers regarding percentages of completion or amounts requested and/or approved in an Application for Payment on account of the Subcontractor's Work and stored materials.

**G** **PAYMENT ESTABLISHES OWNERSHIP**
All material and Work covered by progress payments shall become the sole property of the Owner, but the Contractor shall not be relieved from the sole responsibility for the care and protection of material and Work upon which payments have been made and for the restoration of any damaged material and Work.

## Article 30
## CERTIFICATION *and* APPROVALS *for* PAYMENT

**A** The Architect's review, approval, and certification of Applications for Payment shall be based on the Architect's general knowledge of the Work obtained through site visits and the information provided by the Contractor with the Application. The Architect shall not be required to perform exhaustive examinations, evaluations, or estimates of the cost of completed or uncompleted Work or stored materials to verify the accuracy of amounts requested by the Contractor, but the Architect shall have the authority to adjust the Contractor's estimate when, in the Architect's reasonable opinion, such estimates are overstated or understated.

Within seven days after receiving the Contractor's monthly Application for Payment, or such other time as may be stated in the Contract Documents, the Architect will take one of the following actions:

**(1)** The Architect will approve and certify the Application as submitted and forward it to the Owner as a Certification for Payment for approval by the Owner (and other approving authorities, if any) and payment.

**(2)** If the Architect takes exception to any amounts claimed by the Contractor and the Contractor and Architect cannot agree on revised amounts, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to certify to the Owner, transmitting a copy of same to the Contractor.

**(3)** To the extent the Architect determines may be necessary to protect the Owner from loss on account of any of the causes stated in Article 31, the Architect may subtract from the Contractor's estimates and will issue a Certificate for Payment to the Owner, with a copy to the Contractor, for such amount as the Architect determines is properly due and notify the Contractor and Owner in writing of the Architect's reasons for withholding payment in whole or in part.

**B** Neither the Architect's issuance of a Certificate for Payment nor the Owner's resulting progress payment shall be a representation to the Contractor that the Work in progress or completed at that time is accepted or deemed to be in conformance with the Contract Documents.

**C** The Architect shall not be required to determine that the Contractor has promptly or fully paid Subcontractors and suppliers or how or for what purpose the Contractor has used monies paid under the Construction Contract. However, the Architect may, upon request and if practical, inform any Subcontractor or supplier of the amount, or percentage of completion, approved or paid to the Contractor on account of the materials supplied or the Work performed by the Subcontractor.

## Article 31
## PAYMENTS WITHHELD

**A** The Architect may nullify or revise a previously issued Certificate for Payment prior to Owner's payment thereunder to the extent as may be necessary in the Architect's opinion to protect the Owner from loss on

account of any of the following causes not discovered or fully accounted for at the time of the certification or approval of the Application for Payment:

**(1)** Defective Work;

**(2)** filed, or reasonable evidence indicating probable filing of, claims arising out of the Contract by other parties against the Contractor;

**(3)** the Contractor's failure to pay for labor, materials or equipment or to pay Subcontractors;

**(4)** reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;

**(5)** damage suffered by the Owner or another contractor caused by the Contractor, a Subcontractor, or anyone for whose acts they may be liable;

**(6)** reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance is insufficient to cover applicable liquidated damages; or

**(7)** the Contractor's persistent failure to conform to the requirements of the Contract Documents.

**B** If the Owner deems it necessary to withhold payment pursuant to preceding Paragraph A, the Owner will notify the Contractor and Architect in writing of the amount to be withheld and the reason for same.

**C** The Architect shall not be required to withhold payment for completed or partially completed Work for which compliance with the Contract Documents remains to be determined by Specified Inspections or Final Inspections to be performed in their proper sequence. However, if Work for which payment has been approved, certified, or made under an Application for Payment is subsequently determined to be Defective Work, the Architect shall determine an appropriate amount that will protect the Owner's interest against the Defective Work.

**(1)** If payment has not been made against the Application for Payment first including the Defective Work, the Architect will notify the Owner and Contractor of the amount to be withheld from the payment until the Defective Work is brought into compliance with the Contract Documents.

**(2)** If payment has been made against the Application for Payment first including the Defective Work, the Architect will withhold the appropriate amount from the next Application for Payment submitted after the determination of noncompliance, such amount to then be withheld until the Defective Work is brought into compliance with the Contract Documents.

**D** The amount withheld will be paid with the next Application for Payment certified and approved after the condition for which the Owner has withheld payment is removed or otherwise resolved to the Owner's satisfaction.

**E** The Owner shall have the right to withhold from payments due the Contractor under this Contract an amount equal to any amount which the Contractor owes the Owner under another contract.

## Article 32
# SUBSTANTIAL COMPLETION

**A** Substantial Completion is the stage in the progress of the Work when the Work or designated portion of the Work is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use without disruption or interference by the Contractor in completing or correcting any remaining unfinished Work ("punch list" items). Substantial Completion of the Work, or a designated portion of the Work, is not achieved until so agreed in a Certificate of Substantial Completion signed by the Contractor, Architect, Owner, and AHJ, where applicable.

**B** The Contractor shall notify the Architect in writing when it considers the Work, or a portion of the Work which the Owner has agreed to accept separately, to be substantially complete and ready for a Final Inspection pursuant to Article 16. In this notification the Contractor shall identify any items remaining to be completed or corrected for Final Acceptance prior to final payment.

**C** Substantial Completion is achieved and a Final Inspection, as specified in Article 16, is appropriate only when a minimal number of punch list items exists and only a short period of time will be required to correct or complete them. For the Certificate of Substantial Completion to be issued, the punch list of incomplete items must contain only items that the contractor can complete and reinspect within 30 days and will allow the Owner to occupy or utilize the Work for its intended use without disruption or interference by the Contractor completing or correcting the work. The contractor must submit a schedule that shows all punch list items completed in 30 days as an attachment to the Certificate of Substantial Completion. If punch list items are not completed within 45 days of issuance of Certificate of Substantial Completion, a Notice to Cure may be issued. Upon receipt of the Contractor's notice for a Final Inspection, the Architect will advise the Contractor in writing of any conditions of the Work which the Architect or Owner is aware do not constitute Substantial Completion, otherwise, a Final Inspection will proceed within a reasonable time after the Contractor's notice is given. However, the Architect will not be required to prepare lengthy listings of punch list items; therefore, if the Final Inspection discloses that Substantial Completion has not been achieved, the Architect may discontinue or suspend the inspection until the Contractor does achieve Substantial Completion.

**D** **CERTIFICATE of SUBSTANTIAL COMPLETION**

**(1)** When the Work or a designated portion of the Work is substantially complete, the Architect will prepare and sign a Certificate of Substantial Completion to be signed in order by the Contractor and Owner.

**(2)** When signed by all parties, the Certificate of Substantial Completion shall establish the Date of Substantial Completion which is the date upon which:

**(a)** the Work, or designated portion of the Work, is accepted by the Architect and Owner,

**(b)** the Contractor's one-year and special warranties for the Work covered by the Certificate commence, unless stated otherwise in the Certificate (the one-year warranty for punch list items completed or corrected after the period allowed in the Certificate shall commence on the date of their Final Acceptance), and

**(c)** Owner becomes responsible for building security, maintenance, utility services, and insurance, unless stated otherwise in the Certificate.

**(3)** The Certificate of Substantial Completion shall set the time within which the Contractor shall finish all items on the "punch list" accompanying the Certificate. The completion of punch list items shall be a condition precedent to Final Payment.

**(4)** If the Work or designated portion covered by a ACCS Form 6-K, Certificate of Substantial Completion, includes roofing work, the General Contractor's (5-year) Roofing Guarantee form must be executed by the Contractor and attached to the Certificate of Substantial Completion. If the Contract Documents specify any other roofing warranties to be provided by the roofing manufacturer, Subcontractor, or Contractor, they must also be attached to the Certificate of Substantial Completion. Failure to do so voids any Certificate of Substantial Completion. This requirement cannot be waived.

**(5)** Other attachments to the Certificate of Substantial Completion shall include the Punch List, the schedule of when Punch List items will be complete, an executed Pre Close Out Meeting Checklist, and a Change Order log showing that there are no outstanding change orders.

**E** The Date of Substantial Completion of the Work, as set in the Certificate of Substantial Completion of the Work or of the last completed portion of the Work, establishes the extent to which the Contractor is liable for Liquidated Damages, if any; however, should the Contractor fail to complete all punch list items within thirty days, or such other time as may be stated in the respective Certificate of Substantial Completion, the Contractor shall bear any expenses, including additional Architectural services and expenses, incurred by the Owner as a result of such failure to complete punch list items in a timely manner.

**F** The Contractor shall complete or correct all items of any remaining Work ("punch list" items) , ready for re-inspection for Final Acceptance, within 30 days after the Date of Substantial Completion unless another date is specified in the Certificate of Substantial Completion. If completed or corrected within this period, warranties of these items commence on the Date of Substantial Completion, otherwise such warranties commence on the date of Final Acceptance of each item. Failure to complete or correct any items of remaining Work ("punch list" items) within 45 days will result in all warranties commencing on the Date of Final Acceptance.

**G** Nothing herein, including paragraph E above, shall limit or waive the Owner's rights under Article 27, including but not limited to issuance of Notices to Cure or Notice of Termination issued to Contractors and Sureties, to obtain completion, correction, or repair of any remaining unfinished Work ("punch list" items).

## Article 33
## OCCUPANCY *or* USE PRIOR *to* COMPLETION

**A** **UPON SUBSTANTIAL COMPLETION**

Prior to completion of the entire Work, the Owner may occupy or begin utilizing any designated portion of the Work on the agreed Date of Substantial Completion of that portion of the Work.

**B** **BEFORE SUBSTANTIAL COMPLETION**

**(1)** The Owner shall not occupy or utilize any portion of the Work before Substantial Completion of that portion has been achieved.

**(2)** The Owner may deliver furniture and equipment and store, or install it in place ready for occupancy and use, in any designated portion of the Work before it is substantially completed under the following conditions:

**(a)** The Owner's storage or installation of furniture and equipment will not unreasonably disrupt or interfere with the Contractor's completion of the designated portion of the Work.

**(b)** The Contractor consents to the Owner's planned action (such consent shall not be unreasonably withheld).

**(c)** The Owner shall be responsible for insurance coverage of the Owner's furniture and equipment, and the Contractor's liability shall not be increased.

**(d)** The Contractor, Architect, and Owner will jointly inspect and record the condition of the Work in the area before the Owner delivers and stores or installs furniture and equipment; the Owner will equitably compensate the Contractor for making any repairs to the Work that may subsequently be required due to the Owner's delivery and storage or installation of furniture and equipment.

**(e)** The Owner's delivery and storage or installation of furniture and equipment shall not be deemed an acceptance of any Work not completed in accordance with the requirements of the Contract Documents.

## Article 34
## FINAL PAYMENT *and* PROJECT CLOSEOUT

### A PREREQUISITES *to* FINAL PAYMENT

The following requirements must be accomplished before Owner issues Final Payment:

**(1)** Full execution of a Certificate of Substantial Completion for the Work, or each designated portion of the Work.

**(2)** Final Acceptance of the Work.

**(3)** Final building cleaning completed and accepted by Architect and Owner.

**(4)** Final punch list completed, reinspected and accepted by Architect and Owner.

**(5)** The Contractor's completion, to the satisfaction of the Architect and Owner, of all documentary requirements of the Contract Documents; such as delivery of "as-built" documents, operating and maintenance manuals, owner training videos, warranties (Contractor's One-Year, General Contractor's Five-Year Roofing, etc.), schedule of attic stock including quantity, label, and storage location, etc.

**(6)** Delivery to the Owner of a final Application for Payment, prepared by the Contractor and approved and certified by the Architect. The Architect will prepare the Final Payment Checklist and forward it to the Owner along with the final Application for Payment.

**(7)** Completion of an Advertisement for Completion pursuant to Paragraph C below.

**(8)** Delivery by the Contractor to the Owner through the Architect of a Release of Claims and such other documents as may be required by Owner, satisfactory in form to the Owner pursuant to Paragraph D below

**(9)** Consent of Surety to Final Payment, if any, to Contractor. This Consent of Surety is required for projects which have Payment and Performance Bonds.

**(10)** Delivery by the Contractor to the Architect and Owner of other documents, if any, required by the Contract Documents as prerequisites to Final Payment.

## B FINAL ACCEPTANCE *of the* WORK

"Final Acceptance of the Work" shall be achieved when all "punch list" items recorded with the Certificate(s) of Substantial Completion are accounted for by either: (1) their completion or correction by the Contractor and acceptance by the Architect, Owner, and AHJ if applicable, or (2) their resolution under Article 18, Deductions for Uncorrected Work.

## C ADVERTISEMENT *for* COMPLETION

**(1)** If the Contract Sum is $100,000 or less, there is no requirement for Advertisement for Completion.

**(2)** If the Contract Sum is more than $100,000: The Contractor, immediately after being notified by the Architect that all other requirements of the Contract have been completed, shall give public notice of completion of the Contract by having an Advertisement for Completion, similar to the sample contained in the Project Manual, published for a period of three successive weeks in some newspaper of general circulation published within the city or county where the Work was performed. Proof of publication of the Advertisement for Completion shall be made by the Contractor to the Architect by affidavit of the publisher, in duplicate, and a printed copy of the Advertisement for Completion published, in duplicate. If no newspaper is published in the county where the work was done, the notice may be given by posting at the Court House for thirty days and proof of same made by Probate Judge or Sheriff and the Contractor. Final payment shall not be due until thirty days after this public notice is completed.

## D RELEASE *of* CLAIMS

The Release of Claims and other documents referenced in Paragraph A(6) above are as follows:

**(1)** A release executed by Contractor of all claims and claims of lien against the Owner arising under and by virtue of the Contract, other than such claims of the Contractor, if any, as may have been previously made in writing and as may be specifically excepted by the Contractor from the operation of the release in stated amounts to be set forth therein.

**(2)** An affidavit under oath, if required, stating that so far as the Contractor has knowledge or information, there are no claims or claims of lien which have been or will be filed by any Subcontractor, Supplier or other party for labor or material for which a claim or claim of lien could be filed.

**(3)** A release, if required, of all claims and claims of lien made by any Subcontractor, Supplier or other party against the Owner or unpaid Contract funds held by the Owner arising under or related to the Work on the Project; provided, however, that if any Subcontractor, Supplier or others refuse to furnish a release of such claims or claims of lien, the Contractor may furnish a bond executed by Contractor and its Surety to the Owner to provide an unconditional obligation to defend, indemnify and hold harmless the Owner against any loss, cost or expense, including attorney's fees, arising out of or as a result of such claims, or claims of lien, in which event Owner may make Final Payment notwithstanding such claims or claims of lien. If Contractor and Surety fail to fulfill their obligations to Owner under the bond, the Owner shall be entitled to recover damages as a result of such failure, including all costs and reasonable attorney's fees incurred to recover such damages.

## E EFFECT *of* FINAL PAYMENT

**(1)** The making of Final Payment shall constitute a waiver of Claims by the Owner except those arising from:

**(a)** liens, claims, security interests or encumbrances arising out of the Contract and unsettled;

**(b)** failure of the Work to comply with the requirements of the Contract Documents;

**(c)** terms of warranties or indemnities required by the Contract Documents, or

**(d)** latent defects.

**(2)** Acceptance of Final Payment by the Contractor shall constitute a waiver of claims by Contractor except those previously made in writing, identified by Contractor as unsettled at the time of final Application for Payment, and specifically excepted from the release provided for in Paragraph D(1), above.

## Article 35
## CONTRACTOR'S WARRANTY

### A GENERAL WARRANTY

The Contractor warrants to the Owner and Architect that all materials and equipment furnished under the Contract will be of good quality and new, except such materials as may be expressly provided or allowed in the Contract Documents to be otherwise, and that none of the Work will be Defective Work as defined in Article 1.

### B ONE-YEAR WARRANTY

**(1)** If, within one year after the date of Substantial Completion of the Work or each designated portion of the Work (or otherwise as agreed upon in a mutually-executed Certificate of Substantial Completion), any of the Work is found to be Defective Work, the Contractor shall promptly upon receipt of written notice from the Owner or Architect, and without expense to either, replace or correct the Defective Work to conform to the requirements of the Contract Documents, and repair all damage to the site, the building and its contents which is the result of Defective Work or its replacement or correction.

**(2)** The one-year warranty for punch list items shall begin on the Date of Substantial Completion if they are completed or corrected within the time period allowed in the Certificate of Substantial Completion in which they are recorded. The one-year warranty for punch list items that are not completed or corrected within the time period allowed in the Certificate of Substantial Completion, and other Work performed after Substantial Completion, shall begin on the date of Final Acceptance of the Work. The Contractor's correction of Work pursuant to this warranty does not extend the period of the warranty. The Contractor's one-year warranty does not apply to defects or damages due to improper or insufficient maintenance, improper operation, or wear and tear during normal usage.

**(3)** Upon recognizing a condition of Defective Work, the Owner shall promptly notify the Contractor of the condition. If the condition is causing damage to the building, its contents, equipment, or site, the Owner shall take reasonable actions to mitigate the damage or its continuation, if practical. If the Contractor fails to proceed promptly to comply with the terms of the warranty, or to provide the Owner with satisfactory written verification that positive action is in process, the Owner may have the Defective Work replaced or corrected and the Contractor and the Contractor's Surety shall be liable for all expense incurred.

**(4)** Year-end Inspection(s): An inspection of the Work, or each separately completed portion thereof, is required near the end of the Contractor's one-year warranty period(s). The inspection must be scheduled

with the Owner, Architect, and AHJ or an Independent Code Consultant, where applicable. The subsequent delivery of the Architect's report of a Year-end Inspection will serve as confirmation that the Contractor was notified of Defective Work found within the warranty period.

**(5)** The Contractor's warranty of one year is in addition to, and not a limitation of, any other remedy stated herein or available to the Owner under applicable law.

**C** **GENERAL CONTRACTOR'S ROOFING GUARANTEE**

**(1)** In addition to any other roof related warranties or guarantees that may be specified in the Contract Documents, the roof and associated work shall be guaranteed by the General Contractor against leaks and defects of materials and workmanship for a period of five (5) years, starting on the Date of Substantial Completion of the Project as stated in the Certificate of Substantial Completion. This guarantee for punch list items shall begin on the Date of Substantial Completion if they are completed or corrected within the time period allowed in the Certificate of Substantial Completion in which they are recorded. The guarantee for punch list items that are not completed or corrected within the time period allowed in the Certificate of Substantial Completion shall begin on the date of Final Acceptance of the Work.

**(2)** The "General Contractor's Roofing Guarantee", ACCS Form 6-L included in the Project Manual, shall be executed in triplicate, signed by the appropriate party and submitted to the Architect for submission with the Certificate of Substantial Completion to the Owner.

**(3)** This guarantee does not include costs which might be incurred by the General Contractor in making visits to the site requested by the Owner regarding roof problems that are due to lack of proper maintenance (keeping roof drains and/or gutters clear of debris that cause a stoppage of drainage which results in water ponding, overflowing of flashing, etc.), or damages caused by vandalism or misuse of roof areas. Should the contractor be required to return to the job to correct problems of this nature that are determined not to be related to faulty workmanship and materials in the installation of the roof, payment for actions taken by the Contractor in response to such request will be the responsibility of the Owner. A detailed written report shall be made by the General Contractor on each of these 'Service Calls' with copies to the Architect and Owner.

**D** **SPECIAL WARRANTIES**

**(1)** The Contractor shall deliver to the Owner through the Architect all special or extended warranties required by the Contract Documents from the Contractor, Subcontractors, and suppliers.

**(2)** The Contractor and the Contractor's Surety shall be liable to the Owner for such special warranties during the Contractor's one-year warranty; thereafter, the Contractor's obligations relative to such special warranties shall be to provide reasonable assistance to the Owner in their enforcement.

**E** **ASSUMPTION of GUARANTEES *of* OTHERS**

If the Contractor disturbs, alters, or damages any work guaranteed under a separate contract, thereby voiding the guarantee of that work, the Contractor shall restore the work to a condition satisfactory to the Owner and shall also guarantee it to the same extent that it was guaranteed under the separate contract.

## Article 36
# INDEMNIFICATION AGREEMENT

To the fullest extent permitted by law, the Contractor shall defend, indemnify, and hold harmless the Owner, Architect, Architect's consultants, ACCS Facilities Division, and their agents, employees, and consultants

(hereinafter collectively referred to as the "Indemnitees") from and against all claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of, related to, or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property, including loss of use resulting therefrom, and is caused in whole or in part by negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them, or anyone for whose acts they may be liable, regardless of whether such claim, damage, loss or expense is caused in part, or is alleged but not legally established to have been caused in whole or in part by the negligence or other fault of a party indemnified hereunder.

**(1)** This indemnification shall extend to all claims, damages, losses and expenses for injury or damage to adjacent or neighboring property, or persons injured thereon, that arise out of, relate to, or result from performance of the Work.

**(2)** This indemnification does not extend to the liability of the Architect, or the Architect's Consultants, agents, or employees, arising out of (1) the preparation or approval of maps, shop drawings, opinions, reports, surveys, field orders, Change Orders, drawings or specifications, or (2) the giving of or the failure to give directions or instructions, provided such giving or failure to give instructions is the primary cause of the injury or damage.

**(3)** This indemnification does not apply to the extent of the sole negligence of the Indemnitees.

## Article 37
## CONTRACTOR'S *and* SUBCONTRACTORS' INSURANCE

(Provide entire Article 37 to Contractor's insurance representative.)

### A GENERAL

**(1) RESPONSIBILITY.** The Contractor shall be responsible to the Owner from the time of the signing of the Construction Contract or from the beginning of the first work, whichever shall be earlier, for all injury or damage of any kind resulting from any negligent act or omission or breach, failure or other default regarding the work by the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of who may be the owner of the property.

**(2) PROOF OF INSURANCE.** The Contractor shall be responsible for providing proof of the insurance coverage required in this Article. Failure to provide proof of the insurance required in this Article will prevent a construction contract from being executed and may result in the Contractor's bid being deemed non-responsive. After execution of a Construction Contract, failure to provide proof of insurance required in this Article will prevent payment of all pending pay applications, will immediately result in a Project wide stop work order, and will result in termination of the Construction Contract if proof is not timely provided. If ACCS cannot determine whether insurance requirements have been met through the Contractor's Certificate of Insurance submission, it shall be the Contractor's responsibility to provide additional documentation that shows these insurance requirements are satisfied.

**(3) INSURANCE PROVIDERS.** Each of the insurance coverages required below shall be issued by an insurer licensed by the Insurance Commissioner to transact the business of insurance in the State of Alabama for the applicable line of insurance, and such insurer (or, for qualified self-insureds or group self-insureds, a specific excess insurer providing statutory limits) must have a Best Policyholders Rating of "A-" or better and a financial size rating of Class V or larger.

**(4) NOTIFICATION ENDORSEMENT.** Each policy shall be endorsed to provide that the insurance company agrees that the policy shall not be canceled, changed, allowed to lapse or allowed to expire for any reason until thirty days after the Owner has received written notice by certified mail as evidenced by return receipt or until such time as other insurance coverage providing protection equal to protection called for in the Contract Documents shall have been received, accepted and acknowledged by the Owner. Such notice shall be valid only as to the Project as shall have been designated by Project Name and Number in said notice.

**(a.)** If the Contractor's insurance carrier will not provide a 30 day cancellation notice for non-payment of premium, Contractor agrees that the following must be added to the Construction Contract:

**.1** Contractor or its insurance broker or other insurance representative will provide ACCS 30 day written notice by certified mail as evidenced by return receipt of any reasonably expected or known failure to make any premium payment(s) that could result in cancellation of any policy for non-payment of premium.

**.2** Contractor will provide proof of premium payment(s) with each Pay app submitted.

**.3** Contractor will provide proof of premium payment(s) if ever requested by ACCS. Contractor also understands that failure to provide proof of premium payment will prevent payment of all pending pay apps, will immediately result in a Project wide stop work order, and will result in termination of the Construction contract if proof is not timely provided.

**(5) INSURANCE CERTIFICATES**. The Contractor shall procure the insurance coverages identified below, or as otherwise required in the Contract Documents, at the Contractor's own expense, and to evidence that such insurance coverages are in effect, the Contractor shall furnish the Owner an insurance certificate(s) acceptable to the Owner and listing the Owner as the certificate holder. The insurance certificate(s) must be delivered to the Owner with the Construction Contract and Bonds for final approval and execution of the Construction Contract.

A replacement certificate must be provided to ACCS Facilities Division and the College accounting office at least 10 calendar days prior to the expiration of any policy. All renewed or replaced policies must meet the insurance requirements of ACCS.

The insurance certificate must provide the following:

**(a)** Name and address of authorized agent of the insurance company
**(b)** Name and address of insured
**(c)** Name of insurance company or companies
**(d)** Description of policies
**(e)** Policy Number(s)
**(f)** Policy Period(s)
**(g)** Limits of liability
**(h)** Name and address of Owner as certificate holder
**(i)** Project Name and Number, if any
**(j)** Signature of authorized agent of the insurance company
**(k)** Telephone number of authorized agent of the insurance company
**(l)** Mandatory thirty day notice of cancellation / non-renewal / change

**(6) MAXIMUM DEDUCTIBLE.** Self-insured retention, except for qualified self-insurers or group self-insurers, in any policy shall not exceed $25,000.00.

## B INSURANCE COVERAGES

Unless otherwise provided in the Contract Documents, the Contractor shall purchase the types of insurance coverages with liability limits not less than as follows:

### (1) WORKERS' COMPENSATION *and* EMPLOYER'S LIABILITY INSURANCE

**(a)** Workers' Compensation coverage shall be provided in accordance with the statutory coverage required in Alabama. A group insurer must submit a certificate of authority from the Alabama Department of Industrial Relations approving the group insurance plan. A self-insurer must submit a certificate from the Alabama Department of Industrial Relations stating the Contractor qualifies to pay its own workers' compensation claims.

**(b)** Employer's Liability Insurance limits shall be at least:

**.1** Bodily Injury by Accident - $1,000,000 each accident

**.2** Bodily Injury by Disease - $1,000,000 each employee

### (2) COMMERCIAL GENERAL LIABILITY INSURANCE

**(a)** Commercial General Liability Insurance, written on an ISO Occurrence Form (current edition as of the date of Advertisement for Bids) or equivalent, shall include, but need not be limited to, coverage for bodily injury and property damage arising from premises and operations liability, products and completed operations liability, blasting and explosion, collapse of structures, underground damage, personal injury liability and contractual liability. The Commercial General Liability Insurance shall provide at minimum the following limits:

**Coverage Limit**

**.1** General Aggregate $2,000,000.00 per Project

**.2** Products, Completed Operations Aggregate $2,000,000.00 per Project

**.3** Personal and Advertising Injury $1,000,000.00 per Occurrence

**.4** Each Occurrence $1,000,000.00

**(b)** Additional Requirements for Commercial General Liability Insurance:

**.1** The policy shall name the Owner, Architect, ACCS, and their agents, consultants and employees as additional insureds, state that this coverage shall be primary insurance for the additional insureds; and contain no exclusions of the additional insureds relative to job accidents.

**.2** The policy must include separate per project aggregate limits.

### (3) COMMERCIAL BUSINESS AUTOMOBILE LIABILITY INSURANCE

**(a)** Commercial Business Automobile Liability Insurance which shall include coverage for bodily injury and property damage arising from the operation of any owned, non-owned or hired automobile. The Commercial Business Automobile Liability Insurance Policy shall provide not less than $1,000,000 Combined Single Limits for each occurrence.

**(b)** The policy shall name the Owner, Architect, ACCS, and their agents, consultants, and employees as additional insureds.

**(4) COMMERCIAL UMBRELLA LIABILITY INSURANCE**

**(a)** Commercial Umbrella Liability Insurance to provide excess coverage above the Commercial General Liability, Commercial Business Automobile Liability and the Workers' Compensation and Employer's Liability to satisfy the minimum limits set forth herein.

**(b)** Minimum Commercial/Excess Umbrella Limits of:

**.1** $5,000,000 per Occurrence

**.2** $5,000,000 Aggregate

**(c)** Additional Requirements for Commercial Umbrella Liability Insurance:

**.1** The policy shall name the Owner, Architect, ACCS, and their agents, consultants, and employees as additional insureds.

**.2** The policy must be on an "occurrence" basis.

**(5) BUILDER'S RISK INSURANCE**

**(a)** The general contractor is required to purchase builder's risk coverage. Coverage should be "all-risk" including, but not limited to, the following perils: fire, windstorm, hail, water damage, flood, mold, earth movement (also known as "earthquake"), vehicle or equipment collision, paint overspray, collapse, vandalism and lightning. Coverage must be on a replacement cost basis. The carrier must be A- rated or better by AM Best and admitted in the State of Alabama. The coverage period must start on the first day of construction and must extend a minimum of 30 days after receipt of the Certificate of Substantial Completion. Property must be insured while in transit, while stored at an off-site location, while on the construction site but not yet attached to the building and after being attached to the building. The general contractor is responsible for absorbing the deductible in the event of a loss, and the deductible cannot exceed $10,000. ACCS must be included on the policy as both an additional named insured and a loss payee. An Evidence of Property Insurance certificate must be provided showing both additional named insured and loss payee status, coverages and limits prior to the start of construction. Coverage limits must be as follows:

**.1** Hard Costs: insured to full value

**.2** Soft Costs: insured to full value

**.3** Furniture and Fixtures: insured to the full value of items being purchased and/or installed by the contractor under the construction contract.

**.4** Business Interruption: $100,000

**(b)** On information technology projects or any other project approved in writing by the ACCS Chief of Facilities, an Installation Floater policy may be approved in place of a Builder's Risk policy described above. Coverage should be "all-risk." The Installation Floater policy must have a minimum policy limit to cover all material, equipment, or other property for which the Contractor is legally liable. The presumed minimum policy limit shall be $2 Million unless a higher or lower limit is approved in writing prior to the opening of bids by the ACCS Facilities Division. With its COI, Contractor shall submit documentation from its insurance broker or agent confirming that ACCS's Installation Floater insurance requirements are met by Contractor's policy.

## C SUBCONTRACTORS' INSURANCE

**(1) WORKERS' COMPENSATION** *and* **EMPLOYER'S LIABILITY INSURANCE.** The Contractor shall require each Subcontractor to obtain and maintain Workers' Compensation and Employer's Liability Insurance coverages as described in preceding Paragraph B, or to be covered by the Contractor's Workers' Compensation and Employer's Liability Insurance while performing Work under the Contract.

**(2) LIABILITY INSURANCE.** The Contractor shall require each Subcontractor to obtain and maintain adequate General Liability, Automobile Liability, and Umbrella Liability Insurance coverages similar to those described in preceding Paragraph B. Such coverage shall be in effect at all times that a Subcontractor is performing Work under the Contract.

**(3) ENFORCEMENT RESPONSIBILITY.** The Contractor shall have responsibility to enforce its Subcontractors' compliance with these or similar insurance requirements; however, the Contractor shall, upon request, provide the Architect or Owner acceptable evidence of insurance for any Subcontractor.

## D TERMINATION *of* OBLIGATION *to* INSURE

Unless otherwise expressly provided in the Contract Documents, the obligation to insure as provided herein shall continue as follows:

**(1) BUILDER'S RISK INSURANCE.** The obligation to insure under Subparagraph B(5) shall remain in effect until the Date of Substantial Completion as shall be established in the Certificate of Substantial Completion. In the event that multiple Certificates of Substantial Completion covering designated portions of the Work are issued, Builder's Risk coverage shall remain in effect until the Date of Substantial Completion as shall be established in the last issued Certificate of Substantial Completion. However, in the case that the Work involves separate buildings, Builder's Risk coverage of each separate building may terminate on the Date of Substantial Completion as established in the Certificate of Substantial Completion issued for each building.

**(2) PRODUCTS** *and* **COMPLETED OPERATIONS.** The obligation to carry Products and Completed Operations coverage specified under Subparagraph B(2) shall remain in effect for two years after the Date(s) of Substantial Completion.

**(3) ALL OTHER INSURANCE.** The obligation to carry other insurance coverages specified under Subparagraphs B(1) through B(4) and Paragraph C shall remain in effect after the Date(s) of Substantial Completion until such time as all Work required by the Contract Documents is completed. Equal or similar insurance coverages shall remain in effect if, after completion of the Work, the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, returns to the Project to perform warranty or maintenance work pursuant to the terms of the Contract Documents.

## E WAIVERS *of* SUBROGATION

The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors performing construction or operations related to the Project, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss. But said waiver shall apply only to the extent the loss or damage is covered by builder's risk insurance applicable to the Work or to other property located within or adjacent to the Project, except such rights as

they may have to proceeds of such insurance held by the Owner or Contractor as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors, if any, and the subcontractor, sub-subcontractors, suppliers, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The Policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to the person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged. The waivers provided for in this paragraph shall not be applicable to loss or damage that occurs after final acceptance of the Work.

## Article 38
## PERFORMANCE *and* PAYMENT BONDS

### A GENERAL

Upon signing and returning the Construction Contract to the Owner for final approval and execution, the Contractor shall, at the Contractor's expense, furnish to the Owner a Performance Bond and a Payment Bond (P&P Bonds), ACCS Form 2-C and 2-D, as contained in the Project Manual, each in a penal sum equal to 100% of the Contract Sum. Each bond shall be on the form contained in the Project Manual, shall be executed by a surety company (Surety) acceptable to the Owner and duly authorized and qualified to make such bonds in the State of Alabama in the required amount. There shall be six original P&P Bonds submitted with original signatures for each of the six contracts required. The P&P bonds must be signed either on the same day or after the construction contract date. Each P&P Bond shall have attached thereto an original power of attorney (POA) of the signing official. The POA signature date must be the same day as the P&P Bond's signature date. All signatures must be present.

The provisions of this Article are not applicable to this Contract if the Contract Sum is less than $100,000, unless bonds are required for this Contract in the Supplemental General Conditions.

### B PERFORMANCE BOND

Through the Performance Bond, the Surety's obligation to the Owner shall be to assure the prompt and faithful performance of the Contract and Contract Change Orders. The Penal Sum shall remain equal to the Contract Sum as the Contract Sum is adjusted by Contract Change Orders. In case of default on the part of the Contractor, the Surety shall take charge of and complete the Work in accordance with the terms of the Performance Bond. Any reasonable expenses incurred by the Owner as a result of default on the part of the Contractor, including architectural, engineering, administrative, and legal services, shall be recoverable under the Performance Bond.

### C PAYMENT BOND

Through the Payment Bond the Surety's obligation to the Owner shall be to guarantee that the Contractor and its Subcontractors shall promptly make payment to all persons supplying labor, materials, or supplies for, or in, the prosecution of the Work, including the payment of reasonable attorneys fees incurred by successful claimants or plaintiffs in civil actions on the Bond. Any person or entity indicating that they have a claim of nonpayment under the Bond shall, upon written request, be promptly furnished a certified copy of the Bond and Construction Contract by the Contractor, Architect, Owner, or ACCS, whomever is recipient of the request.

**D** **CHANGE ORDERS**

The Penal Sum shall remain equal to the Contract Sum as the Contract Sum is adjusted by Contract Change Orders. All Contract Change Orders involving an increase in the Contract Sum will require consent of Surety by endorsement of the Contract Change Order form. The Surety waives notification of any Contract Change Orders involving only extension of the Contract Time.

**E** **EXPIRATION**

The obligations of the Contractor's performance bond surety shall be coextensive with the contractor's performance obligations under the Contract Documents; provided, however, that the surety's obligation shall expire at the end of the one-year warranty period(s) of Article 35.

## Article 39
## ASSIGNMENT

The Contractor shall not assign the Contract or sublet it as a whole nor assign any moneys due or to become due to the Contractor thereunder without the previous written consent of the Owner (and of the Surety, in the case of a bonded Construction Contract). As prescribed by the Public Works Law, the Contract shall in no event be assigned to an unsuccessful bidder for the Contract whose bid was rejected because the bidder was not a responsible or responsive bidder.

## Article 40
## CONTRACTION *by* OWNER *or* SEPARATE CONTRACTORS

**A** **OWNER'S RESERVATION *of* RIGHT**

**(1)** The Owner reserves the right to self-perform, or to award separate contracts for, other portions of the Project and other Project related construction and operations on the site. The contractual conditions of such separate contracts shall be substantially similar to those of this Contract, including insurance requirements and the provisions of this Article. If the Contractor considers such actions to involve delay or additional cost under this Contract, notifications and assertion of claims shall be as provided in Article 20 and Article 23.

**(2)** When separate contracts are awarded, the term "Contractor" in the separate Contract Documents shall mean the Contractor who executes the respective Construction Contract.

**B** **COORDINATION**

Unless otherwise provided in the Contract Documents, the Owner shall be responsible for coordinating the activities of the Owner's forces and separate contractors with the Work of the Contractor. The Contractor shall cooperate with the Owner and separate contractors, shall participate in reviewing and comparing their construction schedules relative to that of the Contractor when directed to do so, and shall make and adhere to any revisions to the construction schedule resulting from a joint review and mutual agreement.

**C** **CONDITIONS APPLICABLE *to* WORK PERFORMED *by* OWNER**

Unless otherwise provided in the Contract Documents, when the Owner self-performs construction or operations related to the Project, the Owner shall be subject to the same obligations to Contractor as Contractor would have to a separate contractor under the provision of this Article 40.

**D** **MUTUAL RESPONSIBILITY**

**(1)** The Contractor shall reasonably accommodate the required introduction and storage of materials and equipment and performance of activities by the Owner and separate contractors and shall connect and coordinate the Contractor's Work with theirs as required by the Contract Documents.

**(2)** By proceeding with an element or portion of the Work that is applied to or performed on construction by the Owner or a separate contractor, or which relies upon their operations, the Contractor accepts the condition of such construction or operations as being suitable for the Contractor's Work, except for conditions that are not reasonably discoverable by the Contractor. If the Contractor discovers any condition in such construction or operations that is not suitable for the proper performance of the Work, the Contractor shall not proceed, but shall instead promptly notify the Architect in writing of the condition discovered.

**(3)** The Contractor shall reimburse the Owner for any costs incurred by a separate contractor and payable by the Owner because of acts or omissions of the Contractor. Likewise, the Owner shall be responsible to the Contractor for any costs incurred by the Contractor because of the acts or omissions of a separate contractor.

**(4)** The Contractor shall not cut or otherwise alter construction by the Owner or a separate contractor without the written consent of the Owner and separate contractor; such consent shall not be unreasonably withheld. Likewise, the Contractor shall not unreasonably withhold its consent allowing the Owner or a separate contractor to cut or otherwise alter the Work.

**(5)** The Contractor shall promptly remedy any damage caused by the Contractor to the construction or property of the Owner or separate contractors.

## Article 41
## SUBCONTRACTS

**A** **AWARD** *of* **SUBCONTRACTS** *and* **OTHER CONTRACTS** *for* **PORTIONS** *of the* **WORK**

(1) Unless otherwise provided in the Contract Documents, when delivering the executed Construction Contract, bonds, and evidence of insurance to the Architect, the Contractor shall also submit a listing of Subcontractors proposed for each principal portion of the Work and fabricators or suppliers proposed for furnishing materials or equipment fabricated to the design of the Contract Documents. This listing shall be in addition to any naming of Subcontractors, fabricators, or suppliers that may have been required in the bid process. The Architect will promptly reply to the Contractor in writing stating whether or not the Owner, after due investigation, has reasonable objection to any Subcontractor, fabricator, or supplier proposed by the Contractor. The issuance of the Notice to Proceed in the absence of such objection by the Owner shall constitute notice that no reasonable objection to them is made.

**(2)** The Contractor shall not contract with a proposed Subcontractor, fabricator, or supplier to whom the Owner has made reasonable and timely objection. Except in accordance with prequalification procedures as may be contained in the Contract Documents, through specified qualifications, or on the grounds of reasonable objection, the Owner may not restrict the Contractor's selection of Subcontractors, fabricators, or suppliers.

**(3)** Upon the Owner's reasonable objection to a proposed Subcontractor, fabricator, or supplier, the Contractor shall promptly propose another to whom the Owner has no reasonable objection. If the proposed Subcontractor, fabricator, or supplier to whom the Owner made reasonable objection was reasonably capable

of performing the Work, the Contract Sum and Contract Time shall be equitably adjusted by Contract Change Order for any resulting difference if the Contractor has acted promptly and responsively in this procedure.

**(4)** The Contractor shall not change previously selected Subcontractors, fabricators, or suppliers without notifying the Architect and Owner in writing of proposed substitute Subcontractors, fabricators, or suppliers. If the Owner does not make a reasonable objection to a proposed substitute within three working days, the substitute shall be deemed approved.

**B** **SUBCONTRACTUAL RELATIONS**

**(1)** The Contractor agrees to bind every Subcontractor and material supplier (and require every Subcontractor to so bind its subcontractors and material suppliers) to all the provisions of the Contract Documents as they apply to the Subcontractor's and material supplier's portion of the Work.

**(2)** Nothing contained in the Contract Documents shall be construed as creating any contractual relationship between any Subcontractor and the Owner, nor to create a duty of the Architect, Owner, or Director to resolve disputes between or among the Contractor or its Subcontractors and suppliers or any other duty to such Subcontractors or suppliers.

## Article 42
## ARCHITECT'S STATUS

**A** The Architect is an independent contractor performing, with respect to this Contract, pursuant to an agreement executed between the Owner and the Architect. The Architect has prepared the Drawings and Specifications and assembled the Contract Document and is, therefore, charged with their interpretation and clarification as described in the Contract Documents. As a representative of the Owner, the Architect will endeavor to guard the Owner against variances from the requirements of the Contract Documents by the Contractor. On behalf of the Owner, the Architect will administer the Contract as described in the Contract Documents during construction and the Contractor's one-year warranty.

So as to maintain continuity in administration of the Contract and performance of the Work, and to facilitate complete documentation of the project record, all communications between the Contractor and Owner regarding matters of or related to the Contract shall be directed through the Architect, unless direct communication is otherwise required to provide a legal notification. Unless otherwise authorized by the Architect, communications by and with the Architect's consultants shall be through the Architect. Unless otherwise authorized by the Contractor, communications by and with Subcontractors and material suppliers shall be through the Contractor.

**B** **ARCHITECT'S AUTHORITY**

Subject to other provisions of the Contract Documents, the following summarizes some of the authority vested in the Architect by the Owner with respect to the Construction Contract and as further described or conditioned in other Articles of these General Conditions of the Contract.

**(1)** The Architect is authorized to:

**(a)** approve "minor" deviations through the use of Architect's Supplemental Instruction (ASI), as defined in Article 9, Submittals,

**(b)** make "minor" changes, through the use of Architect's Supplemental Instruction (ASI), in the Work as defined in Article 19, Changes in the Work,

**(c)** reject or require the correction of Defective Work,

**(d)** require the Contractor to stop the performance of Defective Work,

**(e)** adjust an Application for Payment by the Contractor pursuant to Article 30, Certification and Approval of payments, and

**(f)** issue Notices to Cure pursuant to Article 27.

**(2)** The Architect is not authorized to:

**(a)** revoke, alter, relax, or waive any requirements of the Contract Documents (other than "minor" deviations and changes) without concurrence of the Owner,

**(b)** finally approve or accept any portion of the Work without concurrence of the Owner,

**(c)** issue instructions contrary to the Contract Documents,

**(d)** issue Notice of Termination or otherwise terminate the Contract, or

**(e)** require the Contractor to stop the Work except only to avoid the performance of Defective Work.

## C LIMITATIONS *of* RESPONSIBILITIES

**(1)** The Architect shall not be responsible to Contractors or to others for supervising or coordinating the performance of the Work or for the Construction Methods or safety of the Work, unless the Contract Documents give other specific instructions concerning these matters.

**(2)** The Architect will not be responsible to the Contractor (nor the Owner) for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents or for acts or omissions of the Contractor, a Subcontractor, or anyone for whose acts they may be liable. However, the Architect will report to the Owner and Contractor any Defective Work recognized by the Architect.

**(3)** The Architect will endeavor to secure faithful performance by Owner and Contractor, and the Architect will not show partiality to either or be liable to either for results of interpretations or decisions rendered in good faith.

**(4)** The Contractor's remedies for additional time or expense arising out of or related to this Contract, or the breach thereof, shall be solely as provided for in the Contract Documents. The Contractor shall have no claim or cause of action against the Owner, Architect, or its consultants for any actions or failures to act, whether such claim may be in contract, tort, strict liability, or otherwise, it being the agreement of the parties that the Contractor shall make no claim against the Owner or any agents of the Owner, including the Architect or its consultants, except as may be provided for claims or disputes submitted in accordance with Article 24. The Architect and Architect's consultants shall be considered third party beneficiaries of this provision of the Contract and entitled to enforce same.

## D ARCHITECT'S DECISIONS

Decisions by the Architect shall be in writing The Architect's decisions on matters relating to aesthetic effect will be final and binding if consistent with the intent expressed in the Contract Documents. The Architect's decisions regarding disputes arising between the Contractor and Owner shall be advisory.

## Article 43
# CASH ALLOWANCES

**A** All allowances stated in the Contract Documents shall be included in the Contract Sum. Items covered by allowances shall be supplied by the Contractor as directed by the Architect or Owner and the Contractor shall afford the Owner the economy of obtaining competitive pricing from responsible bidders for allowance items unless other purchasing procedures are specified in the Contract Documents.

**B** Unless otherwise provided in the Supplementary Conditions of the Contract Documents:
**(1)** allowances shall cover the cost to the Contractor of materials and equipment delivered to the Project site and all applicable taxes, less applicable trade discounts;

**(2)** the Contractor's costs for unloading, storing, protecting, and handling at the site, labor, installation, overhead, profit and other expenses related to materials or equipment covered by an allowance shall be included in the Contract Sum but not in the allowances;

**(3)** if required, the Contract Sum shall be adjusted by Change Order to reflect the actual costs of an allowance.

**C** Any selections of materials or equipment required of the Architect or Owner under an allowance shall be made in sufficient time to avoid delay of the Work.

## Article 44
# PERMITS, LAWS, *and* REGULATIONS

**A** **PERMITS, FEES AND NOTICES**
**(1)** Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit and other permits and governmental fees, licenses, and inspections (including all AHJ fees) necessary for proper execution and completion of the Work which are customarily secured after award of the Construction Contract and which are in effect on the date of receipt of bids.
**(2)** The Contractor shall comply with and give notices required by all laws, ordinances, rules, regulations, and lawful orders of public authorities applicable to performance of the Work.

**B** **TAXES**
Unless stated otherwise in the Contract Documents, materials incorporated into the Work are exempt from sales and use tax pursuant to Section 40-9-33, Code of Alabama, 1975 as amended. The Owner, Contractor and its subcontractors shall be responsible for complying with rules and regulations of the Sales, Use, & Business Tax Division of the Alabama Department of Revenue regarding certificates and other qualifications necessary to claim such exemption when making qualifying purchases from vendors. The Contractor shall pay all applicable taxes that are not covered by the exemption of Section 40-9-33 and which are imposed as of the date of receipt of bids, including those imposed as of the date of receipt of bids but scheduled to go into effect after that date.

**C** **COMPENSATION *for* INCREASES**
The Contractor shall be compensated for additional costs incurred because of increases in tax rates imposed after the date of receipt of bids.

**D** **ALABAMA IMMIGRATION LAW**

Per ACT 2011-535 as codified in Title 31, Chapter 13 of the Code of Alabama, 1975, as amended:
The contracting parties affirm, for the duration of the agreement, that they will not violate federal immigration law or knowingly employ, hire for employment, or continue to employ an unauthorized alien within the State of Alabama. Furthermore, a contracting party found to be in violation of this provision shall be deemed in breach of the agreement and shall be responsible for all damages resulting therefrom.

**E** **ALABAMA BOYCOTT LAW**

Per Act 2016-312as codified in Title 41, Chapter 16, Article 1, of the Code of Alabama, 1975, as amended:
The contracting parties affirm, for the duration of the agreement, that they are not currently engaged in, and will not engage in, the boycott of a person or an entity based in or doing business with a jurisdiction with which this state can enjoy open trade.

**F** **ACCOUNTING *of* SALES TAX EXEMPT PROJECTS**

Per Act 2013-205 as codified in Title 40, Chapter 9, Article 1, of the Code of Alabama, 1975, as amended:
In bidding the work on a tax exempt project, the bid form shall provide an accounting for the tax savings.

## Article 45
## ROYALTIES, PATENTS, *and* COPYRIGHTS

The Contractor shall pay all royalties and license fees. The Contractor shall defend, indemnify and hold harmless the Owner, Architect, Architect's consultants, and their agents, employees, and consultants from and against all claims, damages, losses and expenses, including but not limited to attorney's fees, arising out of, related to, or resulting from all suits or claims for infringement of any patent rights or copyrights arising out of the inclusion of any patented or copyrighted materials, methods, or systems selected by the Contractor and used during the execution of or incorporated into the Work. This indemnification does not apply to any suits or claims of infringement of any patent rights or copyrights arising out of any patented or copyrighted materials, methods, or systems specified in the Contract Documents. However, if the Contractor has information that a specified material, method, or system is or may constitute an infringement of a patent or copyright, the Contractor shall be responsible for any resulting loss unless such information is promptly furnished to the Architect.

## Article 46
## USE *of the* SITE

**A** The Contractor shall confine its operations at the Project site to areas permitted by the Owner and by law, ordinances, permits and the Contract Documents and shall not unreasonably encumber the site with materials, equipment, employees' vehicles, or debris. The Contractor's operations at the site shall be restricted to the sole purpose of constructing the Work, use of the site as a staging, assembly, or storage area for other business which the Contractor may undertake shall not be permitted.

**B** Unless otherwise provided in the Contract Documents, temporary facilities, such as storage sheds, shops, and offices may be erected on the Project site with the approval of the Architect and Owner. Such temporary buildings and/or utilities shall remain the property of the Contractor, and be removed at the Contractor's expense upon completion of the Work, unless the Owner authorizes their abandonment without removal.

## Article 47
## CUTTING *and* PATCHING

**A** The Contractor shall be responsible for all cutting, fitting, or patching that may be required to execute the Work to the results indicated in the Contract Documents or to make its parts fit together properly.

**B** Any cutting, patching, or excavation by the Contractor shall be supervised and performed in a manner that will not endanger persons nor damage or endanger the Work or any fully or partially completed construction of the Owner or separate contractors.

## Article 48
## IN-PROGRESS *and* FINAL CLEANUP

**A** **IN-PROGRESS CLEAN-UP**

**(1)** The Contractor shall at all times during the progress of the Work keep the premises and surrounding area free from rubbish, scrap materials and debris resulting from the Work. Trash and combustible materials shall not be allowed to accumulate inside buildings or elsewhere on the premises. At no time shall any rubbish be thrown from window openings. Burning of trash and debris on site is not permitted.

**(2)** The Contractor shall make provisions to minimize and confine dust and debris resulting from construction activities.

**B** **FINAL CLEAN-UP**

**(1)** Before Substantial Completion or Final Acceptance is achieved, the Contractor shall have removed from the Owner's property all construction equipment, tools, and machinery; temporary structures and/or utilities including the foundations thereof (except such as the Owner permits in writing to remain); rubbish, debris, and waste materials; and all surplus materials, leaving the site clean and true to line and grade, and the Work in a safe and clean condition, ready for use and operation.

**(2)** In addition to the above, and unless otherwise provided in the Contract Documents, the Contractor shall be responsible for the following special cleaning for all trades as the Work is completed:

**(a)** Cleaning of all painted, enameled, stained, or baked enamel work: Removal of all marks, stains, finger prints and splatters from such surfaces.

**(b)** Cleaning of all glass: Cleaning and removing of all stickers, labels, stains, and paint from all glass, and the washing and polishing of same on interior and exterior.

**(c)** Cleaning or polishing of all hardware: Cleaning and polishing of all hardware.

**(d)** Cleaning all tile, floor finish of all kinds: Removal of all splatters, stains, paint, dirt, and dust, the washing and polishing of all floors as recommended by the manufacturer or required by the Architect.

**(e)** Cleaning of all manufactured articles, materials, fixtures, appliances, and equipment: Removal of all stickers, rust stains, labels, and temporary covers, and cleaning and conditioning of all manufactured articles, material, fixtures, appliances, and electrical, heating, and air conditioning equipment as recommended or directed by the manufacturers, unless otherwise required by the Architect; blowing out or flushing out of all foreign matter from all equipment, piping, tanks, pumps, fans, motors, devices, switches, panels, fixtures, boilers, sanitizing potable water systems; and freeing identification plates on all equipment of excess paint and the polishing thereof.

**C** **OWNER'S RIGHT *to* CLEAN-UP**
If the Contractor fails to comply with these clean-up requirements and then fails to comply with a written directive by the Architect to clean-up the premises within a specified time, the Architect or Owner may implement appropriate clean-up measures and the cost thereof shall be deducted from any amounts due or to become due the Contractor.

## Article 49
## LIQUIDATED DAMAGES

**A** Time is the essence of the Contract. Any delay in the completion of the Work required by the Contract Documents may cause inconvenience to the public and loss and damage to the Owner including but not limited to interest and additional administrative, architectural, inspection and supervision charges. By executing the Construction Contract, the Contractor agrees that the Contract Time is sufficient for the achievement of Substantial Completion.

**B** The Contract Documents may provide in the Construction Contract or elsewhere for a certain dollar amount for which the Contractor and its Surety (if any) will be liable to the Owner as liquidated damages for each calendar day after expiration of the Contract Time that the Contractor fails to achieve Substantial Completion of the Work. If such daily liquidated damages are provided for, Owner and Contractor, and its Surety, agree that such amount is reasonable and agree to be bound thereby.

**C** If a daily liquidated damage amount is not otherwise provided for in the Contract Documents, a time charge equal to six percent interest per annum on the total Contract Sum may be made against the Contractor for the entire period after expiration of the Contract Time that the Contractor fails to achieve Substantial Completion of the Work.

**D** The amount of liquidated damages due under either paragraph B or C, above, may be deducted by the Owner from the moneys otherwise due the Contractor in the Final Payment, not as a penalty, but as liquidated damages sustained, or the amount may be recovered from Contractor or its Surety. If part of the Work is substantially completed within the Contract Time and part is not, the stated charge for liquidated damages shall be equitably prorated to that portion of the Work that the Contractor fails to substantially complete within the Contract Time. It is mutually understood and agreed between the parties hereto that such amount is reasonable as liquidated damages.

**E** Liquidated Damages use ACCS Form 2-F and are routed as Change Orders for work that the contractor has failed to substantially complete within the Contract Time. Before the process of applying liquidated damages begins, communication and approval is required from the ACCS Chief Facilities Officer. The Contractor's signature is not required for Liquidated Damages using ACCS Form 2-F.

## Article 50
## USE *of* FOREIGN MATERIALS

**A** In the performance of the Work the Contractor agrees to use materials, supplies, and products manufactured, mined, processed or otherwise produced in the United States or its territories, if same are available at

reasonable and competitive prices and are not contrary to any sole source specification implemented under the Public Works Law.

**B** In the performance of the Work the Contractor agrees to use steel produced in the United States if the Contract Documents require the use of steel and do not limit its supply to a sole source pursuant to the Public Works Law. If the Owner decides that the procurement of domestic steel products becomes impractical as a result of national emergency, national strike, or other cause, the Owner shall waive this restriction.

**C** If domestic steel or other domestic materials, supplies, and products are not used in accordance with preceding Paragraphs A and B, the Contract Sum shall be reduced by an amount equal to any savings or benefits realized by the Contractor.

**D** This Article applies only to Public Works projects financed entirely by the State of Alabama or any political subdivision of the state.

## Article 51
## PROJECT SIGN

A project sign is not required for ACCS projects unless specifically indicated in the drawings or project manual.

END OF GENERAL CONDITIONS OF THE CONTRACT

# FACILITIES DIVISION

**ACCS FORM 2-C**

## PERFORMANCE BOND

| | |
|---|---|
| 7 **SURETY'S BOND NUMBER:** | |

1 The **PRINCIPAL** (Company name and address of Contractor as appears in the Construction Contract)

| | |
|---|---|
| **NAME:** | |
| Address: | |

2 The **SURETY** (Company name and primary place of business)

| | |
|---|---|
| **NAME:** | |
| Address: | |

3 The **OWNER:** THE ALABAMA COMMUNITY COLLEGE SYSTEM ON BEHALF OF:

| | |
|---|---|
| | |
| Address: | |

4 The **PENAL SUM** of this Bond (the Contract Sum):

5 **DATE** of the Construction Contract:

6 The **PROJECT:** (Same as appears in the Construction Contract)

**1. WE, THE PRINCIPAL (hereinafter "Contractor") AND THE SURETY**, jointly and severally, hereby bind ourselves, our heirs, executors, administrators, successors, and assigns to the Owner in the Penal Sum stated above for the performance of the Contract, and Contract Change Orders, in accord with the requirements of the Contract Documents, which are incorporated herein by reference. If the Contractor performs the Contract, and Contract Change Orders, in accordance with the Contract Documents, then this obligation shall be null and void; otherwise it shall remain in full force and effect.

**2.** The Penal Sum shall remain equal to the Contract Sum as the Contract Sum is adjusted by Contract Change Orders. All Contract Change Orders involving an increase in the Contract Sum will require consent of Surety by endorsement of the Contract Change Order form. The Surety waives notification of any Contract Change Orders involving only extension of the Contract Time.

**3.** Whenever the Architect gives the Contractor and the Surety, at their addresses stated above, a written Notice to Cure a condition for which the Contract may be terminated in accordance with the Contract Documents, the Surety may, within the time stated in the notice, cure or provide the Architect with written verification that satisfactory positive action is in process to cure the condition.

**4.** The Surety's obligation under this Bond becomes effective after the Contractor fails to satisfy a Notice to Cure and the Owner:

**(a)** gives the Contractor and the Surety, at their addresses stated above, a written Notice of Termination declaring the Contractor to be in default under the Contract and stating that the Contractor's right to complete the Work, or a designated portion of the Work, shall terminate seven days after the Contractor's receipt of the notice; and

**(b)** gives the Surety a written demand that, upon the effective date of the Notice of Termination, the Surety promptly fulfill its obligation under this Bond.

**5.** In the presence of the conditions described in Paragraph 4, the Surety shall, at its expense:

**(a)** On the effective date of the Notice of Termination, take charge of the Work and be responsible for the safety, security, and protection of the Work, including materials and equipment stored on and off the Project site, and

**(b)** Within twenty-one days after the effective date of the Notice of Termination, proceed, or provide the Owner with written verification that satisfactory positive action is in process to facilitate proceeding promptly, to complete the Work in accordance with the Contract Documents, either with the Surety's resources or through a contract between the Surety and a qualified contractor to whom the Owner has no reasonable objection.

**6.** As conditions precedent to taking charge of and completing the Work pursuant to Paragraph 5, the Surety shall neither require, nor be entitled to, any agreements or conditions other than those of this Bond and the Contract Documents. In taking charge of and completing the Work, the Surety shall assume all rights and obligations of the Contractor under the Contract Documents; however, the Surety shall also have the right to assert "Surety Claims" to the Owner in accordance with the Contract Documents. The presence or possibility of a Surety Claim shall not be just cause for the Surety to fail or refuse to promptly take charge of and complete the Work or for the Owner to fail or refuse to continue to make payments in accordance with the Contract Documents.

**7.** By accepting this Bond as a condition of executing the Construction Contract, and by taking the actions described in Paragraph 4, the Owner agrees that:

**(a)** the Owner shall promptly advise the Surety of the unpaid balance of the Contract Sum and, upon request, shall make available or furnish to the Surety, at the cost of reproduction, any portions of the Project Record, and

**(b)** as the Surety completes the Work, or has it completed by a qualified contractor, the Owner shall pay the Surety, in accordance with terms of payment of the Contract Documents, the unpaid balance of the Contract Sum, less any amounts that may be or become due the Owner from the Contractor under the Construction Contract or from the Contractor or the Surety under this Bond.

**8.** In the presence of the conditions described in Paragraph 4, the Surety's obligation includes responsibility for the correction of Defective Work, liquidated damages, and reimbursement of any reasonable expenses incurred by the Owner as a result of the Contractor's default under the Contract, including architectural, engineering, administrative, and legal services.

**9.** Nothing contained in this Bond shall be construed to mean that the Surety shall be liable to the Owner for an amount exceeding the Penal Sum of this Bond, except in the event that the Surety should be in default under the Bond by failing or refusing to take charge of and complete the Work pursuant to Paragraph 5. If the Surety should fail or refuse to take charge of and complete the Work, the Owner shall have the authority to take charge of and complete the Work, or have it completed, and the following costs to the Owner, less the unpaid balance of the Contract Sum, shall be recoverable under this Bond:

**(a)** the cost of completing the Contractor's responsibilities under the Contract, including correction of Defective Work;

**(b)** additional architectural, engineering, managerial, and administrative services, and reasonable attorneys' fees incident to completing the Work;

**(c)** interest on, and the cost of obtaining, funds to supplement the unpaid balance of the Contract Sum as may be necessary to cover the foregoing costs;

**(d)** the fair market value of any reductions in the scope of the Work necessitated by insufficiency of the unpaid balance of the Contract Sum and available supplemental funds to cover the foregoing costs; and

**(f)** additional architectural, engineering, managerial, and administrative services, and reasonable attorneys' fees incident to ascertaining and collecting the Owner's losses under the Bond.

**10.** All claims and disputes arising out of or related to this bond, or its breach, shall be resolved in accordance with Article 24, General Conditions of the Contract.

8 **SIGNED AND SEALED** this -Day- of -Month- -Year-

9 **SURETY:**

_____
SURETY COMPANY NAME

BY: _____
SIGNEE'S PRINTED NAME

TITLE: _____
SIGNEE'S TITLE

10 **CONTRACTOR** as **PRINCIPAL:**

_____
CONTRACTOR COMPANY NAME

BY: _____
SIGNEE'S PRINTED NAME

TITLE: _____
SIGNEE'S TITLE

11 **NOTE:** Original power of attorney for the Surety's signatory shall be furnished with the original bond form to be attached to each of the contract forms per project.

# FACILITIES DIVISION

**ACCS FORM 2-D**

## PAYMENT BOND

| | |
|---|---|
| 7 **SURETY'S BOND NUMBER:** | |

1 The **PRINCIPAL** (Company name and address of Contractor as appears in the Construction Contract)

| | |
|---|---|
| **NAME:** | |
| Address: | |

2 The **SURETY** (Company name and primary place of business)

| | |
|---|---|
| **NAME:** | |
| Address: | |

3 The **OWNER:** THE ALABAMA COMMUNITY COLLEGE SYSTEM ON BEHALF OF:

| | |
|---|---|
| | |
| Address: | |

4 The **PENAL SUM** of this Bond (the Contract Sum):

5 **DATE** of the Construction Contract:

6 The **PROJECT:** (Same as appears in the Construction Contract)

**1. WE, THE PRINCIPAL (hereinafter "Contractor") AND THE SURETY**, jointly and severally, hereby bind ourselves, our heirs, executors, administrators, successors, and assigns to the Owner in the Penal Sum stated above to promptly pay all persons supplying labor, materials, or supplies for or in the prosecution of the Contract, which is incorporated herein by reference, and any modifications thereof by Contract Change Orders. If the Contractor and its Subcontractors promptly pay all persons supplying labor, materials, or supplies for or in the prosecution of the Contract and Contract Change Orders, then this obligation shall be null and void; otherwise to remain and be in full force and effect.

**2.** The Penal Sum shall remain equal to the Contract Sum as the Contract Sum is adjusted by Contract Change Orders. All Contract Change Orders involving an increase in the Contract Sum will require consent of Surety by endorsement of the Contract Change Order form. The Surety waives notification of any Contract Change Orders involving only extension of the Contract Time.

**3.** Any person that has furnished labor, materials, or supplies for or in the prosecution of the Contract and Contract Change Orders for which payment has not been timely made may institute a civil action upon this Bond and have their rights and claims adjudicated in a civil action and judgment entered thereon. Notwithstanding the foregoing, a civil action may not be instituted on this bond until 45 days after written notice to the Surety of the amount claimed to be due and the nature of the claim. The civil action must commence not later than one year from the date of final settlement of the Contract. The giving of notice by registered or certified mail, postage prepaid, addressed to the Surety at any of its places of business or offices shall be deemed sufficient. In the event the Surety or Contractor fails to pay the claim in full within 45 days from the mailing of the notice, then the person or persons may recover from the Contractor and Surety, in addition to the amount of the claim, a reasonable attorney's fee based on the result, together with interest on the claim from the date of the notice.

**4.** Every person having a right of action on this bond shall, upon written application to the Owner indicating that labor, material, or supplies for the Work have been supplied and that payment has not been made, be promptly furnished a certified copy of this bond and the Construction Contract. The claimant may bring a civil action in the claimant's name on this Bond against the Contractor and the Surety, or either of them, in the county in which the Work is to be or has been performed or in any other county where venue is otherwise allowed by law.

**5.** This bond is furnished to comply with Code of Alabama, §39-1-1, and all provisions thereof shall be applicable to civil actions upon this bond.

**6.** All claims and disputes between Owner and either the Contractor or Surety arising out of or related to this bond, or its breach, shall be resolved in accordance with Article 24, General Conditions of the Contract.

8 **SIGNED AND SEALED** this -Day- of -Month- -Year-

9 **SURETY:**

_____
SURETY COMPANY NAME

**BY:** _____
SIGNEE'S PRINTED NAME

**TITLE:** _____
SIGNEE'S TITLE

10 **CONTRACTOR** as **PRINCIPAL:**

_____
CONTRACTOR COMPANY NAME

**BY:** _____
SIGNEE'S PRINTED NAME

**TITLE:** _____
SIGNEE'S TITLE

11 **NOTE:** Original power of attorney for the Surety's signatory shall be furnished with the original bond form to be attached to each of the contract forms per project.

# FACILITIES DIVISION

**ACCS FORM 2-F**

***NOTE: Any Change Orders without documented ACCS Facilities Division approval will be at the expense of the Architect and/or the Contractor.**

## CONTRACT CHANGE ORDER

| | |
|---|---|
| **ACCS PROJECT#:** | 2026108 TSCC |
| **CHANGE ORDER#:** | |
| **DATE:** | |

**PROJECT:**

**TO:** <Contractor Company Name>

| | |
|---|---|
| Address: | |

**TERMS:** You are hereby authorized, subject to the provisions of your Contract for this project, to make the following changes thereto in accordance with your proposal(s) dated:

**FURNISH** the necessary labor, materials, and equipment to:
(Description of work to be done or changes to be made. If the description is continued in an attachment, identify the attachment below.)

**Review/Initial of Regional Facilities Director** _____

**ACCS FORM 2-F**

| | | | |
|---|---|---|---|
| ORIGINAL CONTRACT SUM: | | ORIGINAL SUBSTANTIAL COMPLETION DATE: | |
| NET TOTAL OF PREVIOUS CHANGE ORDERS: | | ORIGINAL CONTRACT DURATION (DAYS): | |
| PREVIOUS REVISED CONTRACT SUM: | 0 | NET TOTAL OF DAYS FROM PREVIOUS CHANGE ORDERS: | 0 |
| THIS CHANGE ORDER WILL: ◯ INCREASE ◯ DECREASE ◯ USE ALLOWANCES | | THIS CHANGE ORDER WILL: ◯ INCREASE ◯ DECREASE | |
| THE CONTRACT SUM BY: | | THE CONTRACT DURATION BY (DAYS) | 0 |
| REVISED CONTRACT SUM, INCLUDING THIS CHANGE ORDER: | 0 | REVISED CONTRACT DURATION, INCLUDING THIS CHANGE ORDER: | |
| The amount of this Change Order will be the responsibility of: <Select Client> | | REVISED SUBSTANTIAL COMPLETION DATE, INCLUDING THIS CHANGE ORDER: | |

The **OWNER** does hereby certify that this **CHANGE ORDER** was executed per the provisions of Title 39, Code of Alabama, 1975, as amended.

## RECOMMENDED BY

_____
ARCHITECTURAL/ENGINEERING FIRM

BY: _____

NAME: _____

TITLE: _____

## APPROVALS

_____
COMMUNITY COLLEGE PRESIDENT

BY: _____
SIGNATURE OF OFFICER

NAME: _____

TITLE: _____

**ALABAMA COMMUNITY COLLEGE SYSTEM (ACCS)**

BY: _____ DATE: _____
CHIEF FACILITIES OFFICER

## CONTRACTING PARTIES

_____
CONTRACTOR COMPANY

BY: _____

NAME: _____

TITLE: _____

**ALABAMA COMMUNITY COLLEGE SYSTEM**
(AS OWNER)

BY: _____
CHANCELLOR

## CONSENT OF SURETY

_____
SURETY COMPANY

BY: _____
(ATTACH CURRENT POWER OF ATTORNEY)

**Review/Initial of Regional Facilities Director** _____

# FACILITIES DIVISION

**ACCS FORM 2-G**

***NOTE: Any Change Order without documented ACCS Facilities Division approval is the expense of the Architect and/or the Contractor.**

## CHANGE ORDER JUSTIFICATION

*•Purpose and instructions on next page. Do not staple this form and/or attachments; use clips*

| CHANGE ORDER JUSTIFICATION # | | ACCS PROJECT # | | DATE: | |
|---|---|---|---|---|---|

**A** **PROJECT NAME & LOCATION:**

**OWNER ENTITY NAME & ADDRESS:**

**CONTRACTOR COMPANY NAME & ADDRESS:**

**ARCHITECTURAL/ENGINEERING FIRM NAME & ADDRESS:**

**B** **DESCRIPTION OF PROPOSED CHANGE(S):** **Attach contractor's detailed cost proposal(s)*

| | | | |
|---|---|---|---|
| **C** THIS CHANGE ORDER WILL: ◯ INCREASE ◯ DECREASE | | THE CONTRACT SUM BY: | |
| THIS CHANGE ORDER WILL USE ALLOWANCES: ◯ YES ◯ NO | | THE AMOUNT OF ALLOWANCES USED: | |
| THIS CHANGE ORDER WILL: ◯ INCREASE ◯ DECREASE | | THE CONTRACT DURATION BY (DAYS): | |

**D** **THE CHANGE ORDER IS:**

- ◯ **Owner (ACCS) directed changes in the Work**
- ◯ **College requested changes in Work**
- ◯ **Differing (hidden) site conditions**
- ◯ **Other (please explain in Section D)**

**JUSTIFICATION FOR NEED OF CHANGE(S):**

Attach documented written approval from ACCS to proceed with change order.

**E** **JUSTIFICATION OF CHANGE ORDER** vs. **COMPETITIVE BID:**

**F** **ARCHITECT/ENGINEER'S EVALUATION OF PROPOSED COST:**

**Review/Initial of Regional Facilities Director** _____

**ACCS FORM 2-G**

| G CHANGER ORDER RECOMMENDED | CHANGE ORDER JUSTIFIED AND APPROVED |
|---|---|
| _____<br>ARCHITECTURAL/ENGINEERING FIRM NAME<br><br>BY: _____<br>ARCHITECT/ENGINEER'S SIGNATURE<br><br>BY: _____<br>OWNER'S DESIGNATED REPRESENTATIVE SIGNATURE | BY: _____<br>ACCS CHIEF FACILITIES OFFICER<br><br>BY: _____<br>OWNER'S LEGAL COUNSEL'S SIGNATURE<br>(FOR CHANGE ORDERS 10% OR GREATER) |

## **CHANGE ORDER JUSTIFICATION:** PURPOSE and INSTRUCTIONS

The **CHANGE ORDER JUSTIFICATION** is to be prepared by the design professional, who has evaluated the fairness and reasonableness of the proposed cost of the change(s) and recommends that the proposed Change Order be executed. The fully executed Form **CHANGE ORDER JUSTIFICATION** must accompany the proposed Change Order. Instructions for completing the Change Order Justification form are:

1. Insert the proposed Change Order Number, date of the Justification, and ACCS Project Number in the spaces provided in the upper right-hand corner.

2. **Section (A):** Insert the complete name and address of the PROJECT, OWNER(S), CONTRACTOR, AND ARCHITECT/ENGINEER.

3. **Section (B):** Provide a complete description of the proposed changes in work, referring to and attaching r evised specifications and/or drawings as appropriate. An attachment may be used if additional space is needed. **Attached a copy of the contractor's detailed cost proposal.**

4. **Section (C):** Insert the Contract Sum increase or decrease and the Contract Duration increase or decrease of Days of this Change Order request.

5. **Section (D):** Explain why it is necessary, or in the public's interest, to make the proposed change(s) to the Work. Select the type of Change Order. Attach documented written approval.

6. **Section (E):** Explain why award of the changed work to the existing contractor instead of awarding the work under the competitive bid process is justified.

7. **Section (F):** The design professional must state his or her evaluation of the reasonableness and fairness of the proposed costs based upon his or her review of the contractor's proposal.

8. **Section (G):** The design professional must recommend the Change Order to the Owner by signing the document; the Owner may require such recommendation from other individuals.

# FACILITIES DIVISION

**ACCS FORM 2-H**

# SUPPLY BOND

**BOND NUMBER:**

## KNOW ALL BY THESE PRESENTS:

That _____, called the Principal, and _____, a _____, called the Surety, and _____ , called the Obligee, in the amount of _____U.S. Dollars($_____ ), for payment whereof Principal and Surety bind themselves, their heirs, executors, administrators, successors and assigns, jointly and severally, as provided herein.

**WHEREAS**, Principal entered into that certain material and/or equipment contract ("Contract") with the Obligee dated _____ for _____, a copy of which is by reference made a part hereof ("Contract").

**NOW, THEREFORE**, if Principal shall faithfully comply with all terms and conditions of said Contract, or if the Principal or Surety shall pay, indemnify, and hold harmless the Obligee from all direct damages sustained by the Obligee as a result of any default by the Principal under the Contract, then this obligation shall be void, otherwise to remain in full force and effect.

**PROVIDED**, however, that it is a condition precedent to recovery under this bond that written notice of any default claimed under the Contract be provided to Surety at the following address:

_____

_____.

However, the failure to comply with this notice requirement shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or to release the Surety from its obligations, except to the extent that the Surety demonstrates actual prejudice;

**PROVIDED**, further, that any suit by the Obligee under this bond must be instituted before the later of (**a**) the expiration of one year from the date the Principal was obligated under the Contract, which may be extended by the agreement of Principal and Obligee, to deliver the materials and/or equipment to the Obligee, or (**b**) the expiration of one year from the date any other default by the Principal under the Contract;

**PROVIDED**, further, that notwithstanding anything herein to the contrary, the terms of this bond shall be read to be consistent with the requirements of **Title 39** of the **Code of Alabama** relating to performance bonds required of persons contracting for public works, and

**PROVIDED**, further that no right of action shall accrue on this bond to or for the use of any person or corporation other than the Obligee named herein or its successor.

Sealed with our seals and dated this ___ day of _____, _____.

**Witness** _____

**Witness** _____

Agreed and acknowledged this _____ day of _____ , _____.

By: _____

**Obligee**

**PRINCIPAL:**

_____

_____

**Title:** _____

**SURETY:**

_____

_____

**Title:** _____

# Dual Obligee Rider

**TO BE ATTACHED AND FORM A PART OF PERFORMANCE AND PAYMENT BOND NO. _____,** issued by _____, an _____ corporation as Surety, on the _____ day of _____, _____, on behalf of _____, a(n) corporation as principal.

**WHEREAS,** upon the request of the Principal and the _____, the attached bond(s) is (are) hereby amended to add **The Water Works and Sanitary Sewer Board of the City of the Montgomery of Montgomery, Alabama, as additional obligee.**

**PROVIDED, HOWEVER,** that nothwithstanding anything contained herein to the contrary, there shall be no liability on the part of the Principal or Surety under this bond to the Obligees, or any of them, unless the Obligees, or any of them shall make payments to the Principal, or to the Surety in the case it arranges for the completion of the contract upon default of the Principal, strictly in accordance with the terms of the contract as to payment, and shall perform all the other obligations required to be performed under said contract at the time and in the manner therein set forth; and

Aggregate liability of Surety hereunder to Obligees is limited to the penal sum provided in Bond No. _____, and Surety, upon making payment hereunder, shall be subrogated to, and shall be entitled to an assignment of all rights of the payee with respect to the particular obligation discharged by the payment, either against principal or against any other party liable to the payee on the discharged obligation.

**IT IS HEREBY UNDERSTOOD AND AGREED** that nothing herein contained shall be held to change, alter, or vary the terms of the above-described bond(s) except as herein set forth.

Signed, sealed and dated this _____ day of _____, _____.

ACCEPTED:

_____ (Company Name)

By: _____

As Its: _____

_____ (Company Name)

By: _____

As Its: _____

Obligee

_____ (Company Name)

By: _____

As Its: _____

Additional Obligee:

The Water Works and Sanitary Sewer Board of the City of Montgomery

By: _____

As Its: _____

# State of Alabama
# Disclosure Statement

Required by Article 3B of Chapter 16 of Title 41, Code of Alabama 1975

ENTITY COMPLETING FORM

ADDRESS

CITY, STATE, ZIP TELEPHONE NUMBER

STATE AGENCY/DEPARTMENT THAT WILL RECEIVE GOODS, SERVICES, OR IS RESPONSIBLE FOR GRANT AWARD

ADDRESS

CITY, STATE, ZIP TELEPHONE NUMBER

This form is provided with:

☐ Contract ☐ Proposal ☐ Request for Proposal ☐ Invitation to Bid ☐ Grant Proposal

Have you or any of your partners, divisions, or any related business units previously performed work or provided goods to any State Agency/Department in the current or last fiscal year?

☐ Yes ☐ No

If yes, identify below the State Agency/Department that received the goods or services, the type(s) of goods or services previously provided, and the amount received for the provision of such goods or services.

| STATE AGENCY/DEPARTMENT | TYPE OF GOODS/SERVICES | AMOUNT RECEIVED |
|---|---|---|
| | | |
| | | |

Have you or any of your partners, divisions, or any related business units previously applied and received any grants from any State Agency/Department in the current or last fiscal year?

☐ Yes ☐ No

If yes, identify the State Agency/Department that awarded the grant, the date such grant was awarded, and the amount of the grant.

| STATE AGENCY/DEPARTMENT | DATE GRANT AWARDED | AMOUNT OF GRANT |
|---|---|---|
| | | |
| | | |

**1.** List below the name(s) and address(es) of all public officials/public employees with whom you, members of your immediate family, or any of your employees have a family relationship and who may directly personally benefit financially from the proposed transaction. Identify the State Department/Agency for which the public officials/public employees work. (Attach additional sheets if necessary.)

| NAME OF PUBLIC OFFICIAL/EMPLOYEE | ADDRESS | STATE DEPARTMENT/AGENCY |
|---|---|---|
| | | |
| | | |

Company ID Number: _____

# THE E-VERIFY MEMORANDUM OF UNDERSTANDING FOR EMPLOYERS

## ARTICLE I PURPOSE AND AUTHORITY

The parties to this agreement are the Department of Homeland Security (DHS) and the _____(Employer). The purpose of this agreement is to set forth terms and conditions which the Employer will follow while participating in E-Verify.

E-Verify is a program that electronically confirms an employee's eligibility to work in the United States after completion of Form I-9, Employment Eligibility Verification (Form I-9). This Memorandum of Understanding (MOU) explains certain features of the E-Verify program and describes specific responsibilities of the Employer, the Social Security Administration (SSA), and DHS.

Authority for the E-Verify program is found in Title IV, Subtitle A, of the Illegal Immigration Reform and Immigrant Responsibility Act of 1996 (IIRIRA), Pub. L. 104-208, 110 Stat. 3009, as amended (8 U.S.C. § 1324a note). The Federal Acquisition Regulation (FAR) Subpart 22.18, "Employment Eligibility Verification" and Executive Order 12989, as amended, provide authority for Federal contractors and subcontractors (Federal contractor) to use E-Verify to verify the employment eligibility of certain employees working on Federal contracts.

## ARTICLE II RESPONSIBILITIES

### A. RESPONSIBILITIES OF THE EMPLOYER

1. The Employer agrees to display the following notices supplied by DHS in a prominent place that is clearly visible to prospective employees and all employees who are to be verified through the system**:**
    a. Notice of E-Verify Participation
    b. Notice of Right to Work
2. The Employer agrees to provide to the SSA and DHS the names, titles, addresses, and telephone numbers of the Employer representatives to be contacted about E-Verify. The Employer also agrees to keep such information current by providing updated information to SSA and DHS whenever the representatives' contact information changes.
3. The Employer agrees to grant E-Verify access only to current employees who need E-Verify access. Employers must promptly terminate an employee's E-Verify access if the employee is separated from the company or no longer needs access to E-Verify.

4. The Employer agrees to become familiar with and comply with the most recent version of the E-Verify User Manual.
5. The Employer agrees that any Employer Representative who will create E-Verify cases will complete the E-Verify Tutorial before that individual creates any cases.

a. The Employer agrees that all Employer representatives will take the refresher tutorials when prompted by E-Verify in order to continue using E-Verify**.** Failure to complete a refresher tutorial will prevent the Employer Representative from continued use of E-Verify.

6. The Employer agrees to comply with current Form I-9 procedures, with two exceptions:

a. If an employee presents a "List B" identity document, the Employer agrees to only accept "List B" documents that contain a photo. (List B documents identified in 8 C.F.R. § 274a.2(b)(1)(B)) can be presented during the Form I-9 process to establish identity.) If an employee objects to the photo requirement for religious reasons, the Employer should contact E-Verify at 888-464-4218.

b. If an employee presents a DHS Form I-551 (Permanent Resident Card), Form I-766 (Employment Authorization Document), or U.S. Passport or Passport Card to complete Form I-9, the Employer agrees to make a photocopy of the document and to retain the photocopy with the employee's Form I-9. The Employer will use the photocopy to verify the photo and to assist DHS with its review of photo mismatches that employees contest. DHS may in the future designate other documents that activate the photo screening tool.

Note: Subject only to the exceptions noted previously in this paragraph, employees still retain the right to present any List A, or List B and List C, document(s) to complete the Form I-9.

7. The Employer agrees to record the case verification number on the employee's Form I-9 or to print the screen containing the case verification number and attach it to the employee's Form I-9.
8. The Employer agrees that, although it participates in E-Verify, the Employer has a responsibility to complete, retain, and make available for inspection Forms I-9 that relate to its employees, or from other requirements of applicable regulations or laws, including the obligation to comply with the antidiscrimination requirements of section 274B of the INA with respect to Form I-9 procedures.

a. The following modified requirements are the only exceptions to an Employer's obligation to not employ unauthorized workers and comply with the anti-discrimination provision of the INA: (1) List B identity documents must have photos, as described in paragraph 6 above; (2) When an Employer confirms the identity and employment eligibility of newly hired employee using E-Verify procedures, the Employer establishes a rebuttable presumption that it has not violated section 274A(a)(1)(A) of the Immigration and Nationality Act (INA) with respect to the hiring of that employee; (3) If the Employer receives a final nonconfirmation for an employee, but continues to employ that person, the Employer must notify DHS and the Employer is subject to a civil money penalty between $550 and $1,100 for each failure to notify DHS of continued employment following a final nonconfirmation; (4) If the Employer continues to employ an employee after receiving a final nonconfirmation, then the Employer is subject to a rebuttable presumption that it has knowingly employed an unauthorized alien in

violation of section 274A(a)(1)(A); and (5) no E-Verify participant is civilly or criminally liable under any law for any action taken in good faith based on information provided through the E-Verify.

b. DHS reserves the right to conduct Form I-9 compliance inspections, as well as any other enforcement or compliance activity authorized by law, including site visits, to ensure proper use of E-Verify.

9. The Employer is strictly prohibited from creating an E-Verify case before the employee has been hired, meaning that a firm offer of employment was extended and accepted and Form I-9 was completed. The Employer agrees to create an E-Verify case for new employees within three Employer business days after each employee has been hired (after both Sections 1 and 2 of Form I-9 have been completed), and to complete as many steps of the E-Verify process as are necessary according to the E-Verify User Manual. If E-Verify is temporarily unavailable, the three-day time period will be extended until it is again operational in order to accommodate the Employer's attempting, in good faith, to make inquiries during the period of unavailability.

10. The Employer agrees not to use E-Verify for pre-employment screening of job applicants, in support of any unlawful employment practice, or for any other use that this MOU or the E-Verify User Manual does not authorize.

11. The Employer must use E-Verify for all new employees. The Employer will not verify selectively and will not verify employees hired before the effective date of this MOU. Employers who are Federal contractors may qualify for exceptions to this requirement as described in Article II.B of this MOU.

12. The Employer agrees to follow appropriate procedures (see Article III below) regarding tentative nonconfirmations. The Employer must promptly notify employees in private of the finding and provide them with the notice and letter containing information specific to the employee's E-Verify case. The Employer agrees to provide both the English and the translated notice and letter for employees with limited English proficiency to employees. The Employer agrees to provide written referral instructions to employees and instruct affected employees to bring the English copy of the letter to the SSA. The Employer must allow employees to contest the finding, and not take adverse action against employees if they choose to contest the finding, while their case is still pending. Further, when employees contest a tentative nonconfirmation based upon a photo mismatch, the Employer must take additional steps (see Article III.B. below) to contact DHS with information necessary to resolve the challenge.

13. The Employer agrees not to take any adverse action against an employee based upon the employee's perceived employment eligibility status while SSA or DHS is processing the verification request unless the Employer obtains knowledge (as defined in 8 C.F.R. § 274a.1(l)) that the employee is not work authorized. The Employer understands that an initial inability of the SSA or DHS automated verification system to verify work authorization, a tentative nonconfirmation, a case in continuance (indicating the need for additional time for the government to resolve a case), or the finding of a photo mismatch, does not establish, and should not be interpreted as, evidence that the employee is not work authorized. In any of such cases, the employee must be provided a full and fair opportunity to contest the finding, and if he or she does so, the employee may not be terminated or suffer any adverse employment consequences based upon the employee's perceived employment eligibility status (including denying, reducing, or extending work hours, delaying or preventing training, requiring an employee to work in poorer conditions, withholding pay, refusing to assign the employee to a Federal contract or other assignment, or otherwise assuming that he or she is unauthorized to work) until

and unless secondary verification by SSA or DHS has been completed and a final nonconfirmation has been issued. If the employee does not choose to contest a tentative nonconfirmation or a photo mismatch or if a secondary verification is completed and a final nonconfirmation is issued, then the Employer can find the employee is not work authorized and terminate the employee's employment. Employers or employees with questions about a final nonconfirmation may call E-Verify at 1-888-464-4218 (customer service) or 1-888-897-7781 (worker hotline).

14. The Employer agrees to comply with Title VII of the Civil Rights Act of 1964 and section 274B of the INA as applicable by not discriminating unlawfully against any individual in hiring, firing, employment eligibility verification, or recruitment or referral practices because of his or her national origin or citizenship status, or by committing discriminatory documentary practices. The Employer understands that such illegal practices can include selective verification or use of E-Verify except as provided in part D below, or discharging or refusing to hire employees because they appear or sound "foreign" or have received tentative nonconfirmations. The Employer further understands that any violation of the immigration-related unfair employment practices provisions in section 274B of the INA could subject the Employer to civil penalties, back pay awards, and other sanctions, and violations of Title VII could subject the Employer to back pay awards, compensatory and punitive damages. Violations of either section 274B of the INA or Title VII may also lead to the termination of its participation in E-Verify. If the Employer has any questions relating to the anti-discrimination provision, it should contact OSC at 1-800-255-8155 or 1-800-237-2515 (TDD).

15. The Employer agrees that it will use the information it receives from E-Verify only to confirm the employment eligibility of employees as authorized by this MOU. The Employer agrees that it will safeguard this information, and means of access to it (such as PINS and passwords), to ensure that it is not used for any other purpose and as necessary to protect its confidentiality, including ensuring that it is not disseminated to any person other than employees of the Employer who are authorized to perform the Employer's responsibilities under this MOU**,** except for such dissemination as may be authorized in advance by SSA or DHS for legitimate purposes.

16. The Employer agrees to notify DHS immediately in the event of a breach of personal information. Breaches are defined as loss of control or unauthorized access to E-Verify personal data. All suspected or confirmed breaches should be reported by calling 1-888-464-4218 or via email at E-Verify@dhs.gov. Please use "Privacy Incident – Password" in the subject line of your email when sending a breach report to E-Verify.

17. The Employer acknowledges that the information it receives from SSA is governed by the Privacy Act (5 U.S.C. § 552a(i)(1) and (3)) and the Social Security Act (42 U.S.C. 1306(a)). Any person who obtains this information under false pretenses or uses it for any purpose other than as provided for in this MOU may be subject to criminal penalties.

18. The Employer agrees to cooperate with DHS and SSA in their compliance monitoring and evaluation of E-Verify, which includes permitting DHS, SSA, their contractors and other agents, upon reasonable notice, to review Forms I-9 and other employment records and to interview it and its employees regarding the Employer's use of E-Verify, and to respond in a prompt and accurate manner to DHS requests for information relating to their participation in E-Verify.

19. The Employer shall not make any false or unauthorized claims or references about its participation in E-Verify on its website, in advertising materials, or other media. The Employer shall not describe its services as federally-approved, federally-certified, or federally-recognized, or use language with a similar intent on its website or other

materials provided to the public. Entering into this MOU does not mean that E-Verify endorses or authorizes your E-Verify services and any claim to that effect is false.
20. The Employer shall not state in its website or other public documents that any language used therein has been provided or approved by DHS, USCIS or the Verification Division, without first obtaining the prior written consent of DHS.
21. The Employer agrees that E-Verify trademarks and logos may be used only under license by DHS/USCIS (see M-795 (Web)) and, other than pursuant to the specific terms of such license, may not be used in any manner that might imply that the Employer's services, products, websites, or publications are sponsored by, endorsed by, licensed by, or affiliated with DHS, USCIS, or E-Verify.
22. The Employer understands that if it uses E-Verify procedures for any purpose other than as authorized by this MOU, the Employer may be subject to appropriate legal action and termination of its participation in E-Verify according to this MOU.

## B. RESPONSIBILITIES OF FEDERAL CONTRACTORS

1. If the Employer is a Federal contractor with the FAR E-Verify clause subject to the employment verification terms in Subpart 22.18 of the FAR, it will become familiar with and comply with the most current version of the E-Verify User Manual for Federal Contractors as well as the E-Verify Supplemental Guide for Federal Contractors.
2. In addition to the responsibilities of every employer outlined in this MOU, the Employer understands that if it is a Federal contractor subject to the employment verification terms in Subpart 22.18 of the FAR it must verify the employment eligibility of any "employee assigned to the contract" (as defined in FAR 22.1801). Once an employee has been verified through E-Verify by the Employer, the Employer may not create a second case for the employee through E-Verify.

a. An Employer that is not enrolled in E-Verify as a Federal contractor at the time of a contract award must enroll as a Federal contractor in the E-Verify program within 30 calendar days of contract award and, within 90 days of enrollment, begin to verify employment eligibility of new hires using E-Verify. The Employer must verify those employees who are working in the United States, whether or not they are assigned to the contract. Once the Employer begins verifying new hires, such verification of new hires must be initiated within three business days after the hire date. Once enrolled in E-Verify as a Federal contractor, the Employer must begin verification of employees assigned to the contract within 90 calendar days after the date of enrollment or within 30 days of an employee's assignment to the contract, whichever date is later.

b. Employers enrolled in E-Verify as a Federal contractor for 90 days or more at the time of a contract award must use E-Verify to begin verification of employment eligibility for new hires of the Employer who are working in the United States, whether or not assigned to the contract, within three business days after the date of hire. If the Employer is enrolled in E-Verify as a Federal contractor for 90 calendar days or less at the time of contract award, the Employer must, within 90 days of enrollment, begin to use E-Verify to initiate verification of new hires of the contractor who are working in the United States, whether or not assigned to the contract. Such verification of new hires must be initiated within three business days after the date of hire. An Employer enrolled as a Federal contractor in E-Verify must begin verification of each employee assigned to the contract within 90 calendar days after date of contract award or within 30 days after assignment to

the contract, whichever is later.

c. Federal contractors that are institutions of higher education (as defined at 20 U.S.C. 1001(a)), state or local governments, governments of Federally recognized Indian tribes, or sureties performing under a takeover agreement entered into with a Federal agency under a performance bond may choose to only verify new and existing employees assigned to the Federal contract. Such Federal contractors may, however, elect to verify all new hires, and/or all existing employees hired after November 6, 1986. Employers in this category must begin verification of employees assigned to the contract within 90 calendar days after the date of enrollment or within 30 days of an employee's assignment to the contract, whichever date is later.

d. Upon enrollment, Employers who are Federal contractors may elect to verify employment eligibility of all existing employees working in the United States who were hired after November 6, 1986, instead of verifying only those employees assigned to a covered Federal contract. After enrollment, Employers must elect to verify existing staff following DHS procedures and begin E-Verify verification of all existing employees within 180 days after the election.

e. The Employer may use a previously completed Form I-9 as the basis for creating an E-Verify case for an employee assigned to a contract as long as:

i. That Form I-9 is complete (including the SSN) and complies with Article II.A.6,
ii. The employee's work authorization has not expired, and
iii. The Employer has reviewed the Form I-9 information either in person or in communications with the employee to ensure that the employee's Section 1, Form I-9 attestation has not changed (including, but not limited to, a lawful permanent resident alien having become a naturalized U.S. citizen).

f. The Employer shall complete a new Form I-9 consistent with Article II.A.6 or update the previous Form I-9 to provide the necessary information if:

i. The Employer cannot determine that Form I-9 complies with Article II.A.6,
ii. The employee's basis for work authorization as attested in Section 1 has expired or changed, or
iii. The Form I-9 contains no SSN or is otherwise incomplete.

Note: If Section 1 of Form I-9 is otherwise valid and up-to-date and the form otherwise complies with Article II.C.5, but reflects documentation (such as a U.S. passport or Form I-551) that expired after completing Form I-9, the Employer shall not require the production of additional documentation, or use the photo screening tool described in Article II.A.5, subject to any additional or superseding instructions that may be provided on this subject in the E-Verify User Manual.

g. The Employer agrees not to require a second verification using E-Verify of any assigned employee who has previously been verified as a newly hired employee under this MOU or to authorize verification of any existing employee by any Employer that is not a Federal contractor based on this Article.

3. The Employer understands that if it is a Federal contractor, its compliance with this MOU is a performance requirement under the terms of the Federal contract or subcontract, and the Employer consents to the release of information relating to compliance with its verification responsibilities under this MOU to contracting officers or

other officials authorized to review the Employer's compliance with Federal contracting requirements.

## C. RESPONSIBILITIES OF SSA

1. SSA agrees to allow DHS to compare data provided by the Employer against SSA's database. SSA sends DHS confirmation that the data sent either matches or does not match the information in SSA's database.
2. SSA agrees to safeguard the information the Employer provides through E-Verify procedures. SSA also agrees to limit access to such information, as is appropriate by law, to individuals responsible for the verification of Social Security numbers or responsible for evaluation of E-Verify or such other persons or entities who may be authorized by SSA as governed by the Privacy Act (5 U.S.C. § 552a), the Social Security Act (42 U.S.C. 1306(a)), and SSA regulations (20 CFR Part 401).
3. SSA agrees to provide case results from its database within three Federal Government work days of the initial inquiry. E-Verify provides the information to the Employer.
4. SSA agrees to update SSA records as necessary if the employee who contests the SSA tentative nonconfirmation visits an SSA field office and provides the required evidence. If the employee visits an SSA field office within the eight Federal Government work days from the date of referral to SSA, SSA agrees to update SSA records, if appropriate, within the eight-day period unless SSA determines that more than eight days may be necessary. In such cases, SSA will provide additional instructions to the employee. If the employee does not visit SSA in the time allowed, E-Verify may provide a final nonconfirmation to the employer.

Note: If an Employer experiences technical problems, or has a policy question, the employer should contact E-Verify at 1-888-464-4218.

## D. RESPONSIBILITIES OF DHS

1. DHS agrees to provide the Employer with selected data from DHS databases to enable the Employer to conduct, to the extent authorized by this MOU:
    a. Automated verification checks on alien employees by electronic means, and
    b. Photo verification checks (when available) on employees.
2. DHS agrees to assist the Employer with operational problems associated with the Employer's participation in E-Verify. DHS agrees to provide the Employer names, titles, addresses, and telephone numbers of DHS representatives to be contacted during the E-Verify process.
3. DHS agrees to provide to the Employer with access to E-Verify training materials as well as an E-Verify User Manual that contain instructions on E-Verify policies, procedures, and requirements for both SSA and DHS, including restrictions on the use of E-Verify.
4. DHS agrees to train Employers on all important changes made to E-Verify through the use of mandatory refresher tutorials and updates to the E-Verify User Manual. Even without changes to E-Verify, DHS reserves the right to require employers to take mandatory refresher tutorials.
5. DHS agrees to provide to the Employer a notice, which indicates the Employer's participation in E-Verify. DHS also agrees to provide to the Employer anti-discrimination

notices issued by the Office of Special Counsel for Immigration-Related Unfair Employment Practices (OSC), Civil Rights Division, U.S. Department of Justice.
6. DHS agrees to issue each of the Employer's E-Verify users a unique user identification number and password that permits them to log in to E-Verify.
7. DHS agrees to safeguard the information the Employer provides, and to limit access to such information to individuals responsible for the verification process, for evaluation of E-Verify, or to such other persons or entities as may be authorized by applicable law. Information will be used only to verify the accuracy of Social Security numbers and employment eligibility, to enforce the INA and Federal criminal laws, and to administer Federal contracting requirements.
8. DHS agrees to provide a means of automated verification that provides (in conjunction with SSA verification procedures) confirmation or tentative nonconfirmation of employees' employment eligibility within three Federal Government work days of the initial inquiry.
9. DHS agrees to provide a means of secondary verification (including updating DHS records) for employees who contest DHS tentative nonconfirmations and photo mismatch tentative nonconfirmations. This provides final confirmation or nonconfirmation of the employees' employment eligibility within 10 Federal Government work days of the date of referral to DHS, unless DHS determines that more than 10 days may be necessary. In such cases, DHS will provide additional verification instructions.

## ARTICLE III
## REFERRAL OF INDIVIDUALS TO SSA AND DHS

### A. REFERRAL TO SSA

1. If the Employer receives a tentative nonconfirmation issued by SSA, the Employer must print the notice as directed by E-Verify. The Employer must promptly notify employees in private of the finding and provide them with the notice and letter containing information specific to the employee's E-Verify case. The Employer also agrees to provide both the English and the translated notice and letter for employees with limited English proficiency to employees. The Employer agrees to provide written referral instructions to employees and instruct affected employees to bring the English copy of the letter to the SSA. The Employer must allow employees to contest the finding, and not take adverse action against employees if they choose to contest the finding, while their case is still pending.
2. The Employer agrees to obtain the employee's response about whether he or she will contest the tentative nonconfirmation as soon as possible after the Employer receives the tentative nonconfirmation. Only the employee may determine whether he or she will contest the tentative nonconfirmation.
3. After a tentative nonconfirmation, the Employer will refer employees to SSA field offices only as directed by E-Verify. The Employer must record the case verification number, review the employee information submitted to E-Verify to identify any errors, and find out whether the employee contests the tentative nonconfirmation. The Employer will transmit the Social Security number, or any other corrected employee information that SSA requests, to SSA for verification again if this review indicates a need to do so.
4. The Employer will instruct the employee to visit an SSA office within eight Federal Government work days. SSA will electronically transmit the result of the referral to the Employer within 10 Federal Government work days of the referral unless it determines

that more than 10 days is necessary.
5. While waiting for case results, the Employer agrees to check the E-Verify system regularly for case updates.
6. The Employer agrees not to ask the employee to obtain a printout from the Social Security Administration number database (the Numident) or other written verification of the SSN from the SSA.

## B. REFERRAL TO DHS

1. If the Employer receives a tentative nonconfirmation issued by DHS, the Employer must promptly notify employees in private of the finding and provide them with the notice and letter containing information specific to the employee's E-Verify case. The Employer also agrees to provide both the English and the translated notice and letter for employees with limited English proficiency to employees. The Employer must allow employees to contest the finding, and not take adverse action against employees if they choose to contest the finding, while their case is still pending.
2. The Employer agrees to obtain the employee's response about whether he or she will contest the tentative nonconfirmation as soon as possible after the Employer receives the tentative nonconfirmation. Only the employee may determine whether he or she will contest the tentative nonconfirmation.
3. The Employer agrees to refer individuals to DHS only when the employee chooses to contest a tentative nonconfirmation.
4. If the employee contests a tentative nonconfirmation issued by DHS, the Employer will instruct the employee to contact DHS through its toll-free hotline (as found on the referral letter) within eight Federal Government work days.
5. If the Employer finds a photo mismatch, the Employer must provide the photo mismatch tentative nonconfirmation notice and follow the instructions outlined in paragraph 1 of this section for tentative nonconfirmations, generally.
6. The Employer agrees that if an employee contests a tentative nonconfirmation based upon a photo mismatch, the Employer will send a copy of the employee's Form I-551, Form I-766, U.S. Passport, or passport card to DHS for review by:
    a. Scanning and uploading the document, or
    b. Sending a photocopy of the document by express mail (furnished and paid for by the employer).
7. The Employer understands that if it cannot determine whether there is a photo match/mismatch, the Employer must forward the employee's documentation to DHS as described in the preceding paragraph. The Employer agrees to resolve the case as specified by the DHS representative who will determine the photo match or mismatch.
8. DHS will electronically transmit the result of the referral to the Employer within 10 Federal Government work days of the referral unless it determines that more than 10 days is necessary.
9. While waiting for case results, the Employer agrees to check the E-Verify system regularly for case updates.

# ARTICLE IV
# SERVICE PROVISIONS

## A. NO SERVICE FEES

1. SSA and DHS will not charge the Employer for verification services performed under this MOU. The Employer is responsible for providing equipment needed to make inquiries. To access E-Verify, an Employer will need a personal computer with Internet access.

## ARTICLE V
## MODIFICATION AND TERMINATION

## A. MODIFICATION

1. This MOU is effective upon the signature of all parties and shall continue in effect for as long as the SSA and DHS operates the E-Verify program unless modified in writing by the mutual consent of all parties.
2. Any and all E-Verify system enhancements by DHS or SSA, including but not limited to E-Verify checking against additional data sources and instituting new verification policies or procedures, will be covered under this MOU and will not cause the need for a supplemental MOU that outlines these changes.

## B. TERMINATION

1. The Employer may terminate this MOU and its participation in E-Verify at any time upon 30 days prior written notice to the other parties.
2. Notwithstanding Article V, part A of this MOU, DHS may terminate this MOU, and thereby the Employer's participation in E-Verify, with or without notice at any time if deemed necessary because of the requirements of law or policy, or upon a determination by SSA or DHS that there has been a breach of system integrity or security by the Employer, or a failure on the part of the Employer to comply with established E-Verify procedures and/or legal requirements. The Employer understands that if it is a Federal contractor, termination of this MOU by any party for any reason may negatively affect the performance of its contractual responsibilities. Similarly, the Employer understands that if it is in a state where E-Verify is mandatory, termination of this by any party MOU may negatively affect the Employer's business.
3. An Employer that is a Federal contractor may terminate this MOU when the Federal contract that requires its participation in E-Verify is terminated or completed. In such cases, the Federal contractor must provide written notice to DHS. If an Employer that is a Federal contractor fails to provide such notice, then that Employer will remain an E-Verify participant, will remain bound by the terms of this MOU that apply to non-Federal contractor participants, and will be required to use the E-Verify procedures to verify the employment eligibility of all newly hired employees.
4. The Employer agrees that E-Verify is not liable for any losses, financial or otherwise, if the Employer is terminated from E-Verify.

## ARTICLE VI
## PARTIES

A. Some or all SSA and DHS responsibilities under this MOU may be performed by contractor(s), and SSA and DHS may adjust verification responsibilities between each

other as necessary. By separate agreement with DHS, SSA has agreed to perform its responsibilities as described in this MOU.
B. Nothing in this MOU is intended, or should be construed, to create any right or benefit, substantive or procedural, enforceable at law by any third party against the United States, its agencies, officers, or employees, or against the Employer, its agents, officers, or employees.
C. The Employer may not assign, directly or indirectly, whether by operation of law, change of control or merger, all or any part of its rights or obligations under this MOU without the prior written consent of DHS, which consent shall not be unreasonably withheld or delayed. Any attempt to sublicense, assign, or transfer any of the rights, duties, or obligations herein is void.
D. Each party shall be solely responsible for defending any claim or action against it arising out of or related to E-Verify or this MOU, whether civil or criminal, and for any liability wherefrom, including (but not limited to) any dispute between the Employer and any other person or entity regarding the applicability of Section 403(d) of IIRIRA to any action taken or allegedly taken by the Employer.
E. The Employer understands that its participation in E-Verify is not confidential information and may be disclosed as authorized or required by law and DHS or SSA policy, including but not limited to, Congressional oversight, E-Verify publicity and media inquiries, determinations of compliance with Federal contractual requirements, and responses to inquiries under the Freedom of Information Act (FOIA).
F. The individuals whose signatures appear below represent that they are authorized to enter into this MOU on behalf of the Employer and DHS respectively. The Employer understands that any inaccurate statement, representation, data or other information provided to DHS may subject the Employer, its subcontractors, its employees, or its representatives to: (1) prosecution for false statements pursuant to 18 U.S.C. 1001 and/or; (2) immediate termination of its MOU and/or; (3) possible debarment or suspension.
G. The foregoing constitutes the full agreement on this subject between DHS and the Employer.

**To be accepted as an E-Verify participant, you should only sign the Employer's Section of the signature page. If you have any questions, contact E-Verify at 1-888-464-4218.**

**Approved by:**

| **E-Verify Employer** | |
|---|---|
| Name (Please Type or Print) | Title |
| Signature | Date |

| | |
|---|---|
| | |
| **Department of Homeland Security – Verification Division** | |
| Name (Please Type or Print) | Title |
| Signature | Date |

| **Information Required for E-Verify**<br><br>Information relating to your Company: | |
|---|---|
| Company Name: | |
| Company Facility Address: | |
| Company Alternate Address: | |
| County or Parish: | |
| Employer Identification Number: | |
| North American Industry<br><br>Classification Systems<br><br>Code: | |
| Parent Company: | |
| Number of Employees: | |
| Number of Sites Verified for: | |

| Are you verifying for more than one site?<br>If yes, please provide the number of sites verified for in each State: | | |
|---|---|---|
| State | Number of sites | Site(s) |

| Information relating to the Program Administrator(s) for your Company on policy questions or operational problems: | |
|---|---|
| Name: | |
| Telephone Number: | |
| Fax Number: | |
| E-mail Address: | |

| Name: | |
|---|---|
| Telephone Number: | |
| Fax Number: | |
| E-mail Address: | |

**2.** List below the name(s) and address(es) of all family members of public officials/public employees with whom you, members of your immediate family, or any of your employees have a family relationship and who may directly personally benefit financially from the proposed transaction. Identify the public officials/public employees and State Department/Agency for which the public officials/public employees work. (Attach additional sheets if necessary.)

| NAME OF FAMILY MEMBER | ADDRESS | NAME OF PUBLIC OFFICIAL/ PUBLIC EMPLOYEE | STATE DEPARTMENT/ AGENCY WHERE EMPLOYED |
|---|---|---|---|
| | | | |
| | | | |

If you identified individuals in items one and/or two above, describe in detail below the direct financial benefit to be gained by the public officials, public employees, and/or their family members as the result of the contract, proposal, request for proposal, invitation to bid, or grant proposal. (Attach additional sheets if necessary.)

Describe in detail below any indirect financial benefits to be gained by any public official, public employee, and/or family members of the public official or public employee as the result of the contract, proposal, request for proposal, invitation to bid, or grant proposal. (Attach additional sheets if necessary.)

List below the name(s) and address(es) of all paid consultants and/or lobbyists utilized to obtain the contract, proposal, request for proposal, invitation to bid, or grant proposal:

| NAME OF PAID CONSULTANT/LOBBYIST | ADDRESS |
|---|---|
| | |
| | |

***By signing below, I certify under penalty of perjury (in the jurisdiction in which it is executed) that all statements on or attached to this form are true and correct to the best of my knowledge. I further understand that a person who knowingly violates this article shall be subject to civil penalty in an amount of ten thousand dollars ($10,000), or 10 percent of the amount of the contract, whichever is less, to be deposited in the State General Fund. Also, the contract or grant shall be voidable by the awarding agency.***

Authorized Signatory Date Jurisdiction in which this Disclosure Statement is executed

*The disclosure statement is required to be completed and filed with grant proposals in excess of $25,000 and contracts that meet or exceed the threshold for bid or other formal solicitations under Article 5 of Chapter 4 of Title 41 or any other law that requires formal solicitation procedures for awarding public contracts.*

# FACILITIES DIVISION

**ACCS FORM 6-A**

# PRE-CONSTRUCTION CONFERENCE CHECKLIST

| | | | |
|---|---|---|---|
| **PROJECT NAME:** | | | |
| **ACCS PROJECT #** | | **DATE:** | |
| **ANTICIPATED NTP DATE:** | | **MEETING PLACE:** | |
| **ANTICIPATED COMPLETION DATE:** | | **MEETING TIME:** | |

| NA | | | |
|---|---|---|---|
| | **1.** | | **INTRODUCTIONS** |
| ○ ○ | **A.** | | **Attendees have all completed Pre-Construction Sign-In Sheet (Name/Company/Telephone/Email)** |
| ○ ○ | **B.** | | **Define the Project Team - Introduction of all participants and their roles** |
| ○ ○ | | **1.** | College Personnel - Owner; ACCS Facilities; College |
| ○ ○ | | **2.** | Design Professional(s) - Architect's Representative(s); Engineer's Representative(s) |
| ○ ○ | | **3.** | Contractor(s) - Project Manager; Superintendent; Major Sub-Contractor(s) |
| | **2.** | | **PROJECT CONTRACT** |
| ○ ○ | **A.** | | **ACCS Facilities Division authority** |
| ○ ○ | | **1.** | After bid there are no scope changes, change orders, etc without ACCS approval |
| ○ ○ | | **2.** | Acknowledgment of Understanding for Use of Allowances and Change Orders |
| ○ ○ | **B.** | | **Identify Contract Amount - Base Bid plus Alternates** |
| ○ ○ | | **1.** | Verify Alternates accepted |
| ○ ○ | | **2.** | Review of Allowance and Unit Prices |
| ○ ○ | | **3.** | Value Engineering |
| ○ ○ | **C.** | | **Verify end of Contract has everything checked** |
| ○ ○ | **D.** | | **Notice to Proceed Date** |
| ○ ○ | **E.** | | **Contract Completion Date** |
| ○ ○ | **F.** | | **Liquidated Damages will be processed as Change Orders** |
| ○ ○ | **G.** | | **Conformance Documents set of Drawings and Project Manual made available to contractor** |
| ○ ○ | **H.** | | **Approved Schedule of Values** |
| ○ ○ | | **1.** | How to correctly calculate the percentage of the schedule |
| ○ ○ | **I.** | | **Letter from manufacturer on long lead times** |
| ○ ○ | **J.** | | **Approved list of sub-contractors** |
| ○ ○ | **K.** | | **Approved Weather Days – How to correctly calculate weather days** |
| ○ ○ | **L.** | | **Contractor to provide building permit status** |
| ○ ○ | **M.** | | **Pay Applications** |
| ○ ○ | | **1.** | Pay Applications will be presented and reviewed in OAC meetings |
| ○ ○ | | **2.** | Pay Applications require the following attachments: **Schedule of Values**, **Construction Schedule**, **Progress Schedule**, and copies of any **Change Orders** requested for payment |
| ○ ○ | | **3.** | Any Pay Application with a Change Order shall have back up documentation before it can be reviewed |
| ○ ○ | | **4.** | All Final Pay Applications for Contractor and Design Professional will require ACCS Facilities Division review and approval |
| ○ ○ | **N.** | | **Change Order process** |
| | **3.** | | **PROCEDURAL AND COORDINATION ITEMS** |
| ○ ○ | **A.** | | **Point of contact for project. Job Superintendent and phone number.** |
| ○ ○ | **B.** | | **Contractor's duty to coordinate work of separate contractors** |
| ○ ○ | | **1.** | CMa responsible for multi-prime contracts |
| ○ ○ | **C.** | | **Conduct of contractor's personnel** |
| ○ ○ | | **1.** | Construction crew members shall conduct themselves professionally at all times |
| ○ ○ | | **2.** | No interaction with faculty, staff and/ or students |
| ○ ○ | | **3.** | No foul language |

| NA | | | 3. PROCEDURAL AND COORDINATION ITEMS (CONTINUED) |
|---|---|---|---|
| ○ | | ○ | 4. No smoking or use of tobacco products |
| ○ | | ○ | 5. No drugs or alcohol |
| ○ | | ○ | 6. No firearms on school property |
| ○ | ○ | | **D. Project sign and other job signs** |
| ○ | ○ | | **E. Overall phasing of the work** |
| ○ | ○ | | **F. Communication from College regarding dates and times of unavailability** |
| ○ | | ○ | 1. Coordinate outages and work in existing building(s) with Owner |
| ○ | ○ | | **G. Use of site and existing building(s), access drive, keep existing exit paths open** |
| ○ | | ○ | 1. Project limits as shown on drawings |
| ○ | | ○ | 2. Building location(s) relative to critical property line, easement, setback, etc. |
| ○ | | ○ | 3. Verify sanitary outfall before committing floor level |
| ○ | | ○ | 4. Protecting trees |
| ○ | | ○ | 5. Contractor must provide own dumpster(s) and cannot use facility dumpsters |
| ○ | | ○ | 6. Parking for workers |
| ○ | ○ | | **H. Use of existing toilets or need for temporary toilet facilities** |
| ○ | ○ | | **I. Coordinate and utilities supplied by Owner** |
| ○ | | ○ | 1. Where utility cut off valves are onsite in case of emergency |
| ○ | ○ | | **J. Material storage, lay down areas and staging areas** |
| ○ | ○ | | **K. Routine job cleanup** |
| ○ | | ○ | 1. Secure job site (tools, materials, work) |
| ○ | ○ | | **L. OSHA - report all accidents - safety General Contractor's responsibility** |
| ○ | ○ | | **M. Contractors reminded of obligation to comply with the Alabama Child Labor Law and E-Verify** |
| ○ | ○ | | **N. Bring to our attention any issues revealed during work** |
| NA | | | **4. OAC MEETINGS FORMAT** |
| ○ | ○ | | **A. Frequency of OAC meeting** |
| ○ | ○ | | **B. Architect shall coordinate, schedule, and conduct the OAC Meetings** |
| ○ | ○ | | **C. Agenda items to be included:** |
| ○ | | ○ | 1. Review previous OAC meeting minutes |
| ○ | | ○ | 2. Project Schedule (Critical Path, Delays/Justifications, Recovery Schedule, 2-3 Week Look ahead, Upcoming Inspections/Testing) |
| ○ | | ○ | 3. RFIs and Submittals Log (Procurement and Materials) |
| ○ | | ○ | 4. ASIs and Open Change Order Requests |
| ○ | | ○ | 5. Allowances Log |
| ○ | | ○ | 6. Change Orders (Additional Days, Calculation of Weather Days) |
| ○ | | ○ | 7. Pay Applications (Schedule of Values review, Percentage Completion, Progress Schedule) |
| ○ | | ○ | 8. Job Site Logistics (Access, Site Use, Temporary Facilities, Deliveries, Cleaning, Safety Plans) |
| ○ | | ○ | 9. Field Observations and Deficiencies Log |
| ○ | | ○ | 10. Review Date and Time of next OAC meeting |
| ○ | | ○ | 11. Site Visit after meeting |
| ○ | ○ | | **D. Architect shall complete the meeting minutes for circulation and for the Project Record** |
| NA | | | **5. INSPECTIONS AND TESTING** |
| ○ | ○ | | **A. Advance notice for required inspections, must be requested 14 days in advance** |
| ○ | | ○ | 1. Contractor to notify architect by email of date project will be ready for inspection by AHJ |
| ○ | | ○ | 2. Contractor to verify that their own inspection has been completed before AHJ inspection |
| ○ | ○ | | **B. Cancellations of inspections may subject contractor to payment of any AHJ cancellation fees** |
| ○ | ○ | | **C. Other inspections required before work is covered** |
| ○ | ○ | | **D. Third-party inspections/special inspections** |

| NA | 5. INSPECTIONS AND TESTING (CONTINUED) | |
|---|---|---|
| ○ ○ | E. | **Soil Testing** |
| ○ ○ | 1. | Soil compaction, soil type, lab tests, etc. |
| ○ ○ | 2. | Soil treatment, mix on site in presence of Superintendent |
| ○ ○ | 3. | Stock piling top soil (location and protection) |
| ○ ○ | 4. | Procedure if bad soil or rock is encountered, Geotech and special inspections |
| ○ ○ | 5. | ADEM land disturbance permits shall be required if site is over 1 acre |
| ○ ○ | F. | **Below Slab/Underground Utility Inspection** |
| ○ ○ | G. | **Footings and Foundations Inspection** |
| ○ ○ | H. | **Concrete Slab Inspection** |
| ○ ○ | I. | **Weatherproofing/Building Envelope Inspection** |
| ○ ○ | J. | **In-Wall/Framing Inspection** |
| ○ ○ | K. | **Gypsum Board Inspection** |
| ○ ○ | L. | **Roofing Inspection** |
| ○ ○ | M. | **Storm Shelter Inspection (if applicable)** |
| ○ ○ | N. | **Above Ceiling Inspections** |
| ○ ○ | 1. | Required attendees: Contractor, Owner, Architect, MEP Engineers, Major Subs |
| ○ ○ | 2. | All work must be completed except for installation of ceiling tiles and/or hard ceilings |
| ○ ○ | 3. | Space must be conditioned |
| ○ ○ | 4. | Permanent power must be connected unless otherwise arranged |
| ○ ○ | 5. | Grease duct must be inspected and approved prior to fire wrapping |
| ○ ○ | O. | **Life Safety Inspections (Elevator, Fire Suppression, Fire Alarm, Emergency Lights, ADA)** |
| ○ ○ | 1. | Required attendees: Contractor, Owner, Architect, Engineers, Major Subs, Local Fire Marshall |
| ○ ○ | 2. | Fire alarm certification |
| ○ ○ | 3. | Fire alarm monitoring requirements (who is listed as first responder) |
| ○ ○ | 4. | All sprinkler system valves must be electrically supervised |
| ○ ○ | 5. | Project Schedule (Critical Path, Delays/Justifications, Recovery Schedule, 2-3 Week Look ahead, Upcoming Inspections/Testing) |
| ○ ○ | 6. | Above ground and below ground sprinkler certifications |
| ○ ○ | 7. | Emergency and exit lighting tests |
| ○ ○ | 8. | Kitchen hood fire suppression systems must be complete and certified |
| ○ ○ | 9. | Fire alarm and fire sprinkler contractors must be permitted through the State of Alabama Fire Marshall's office. Provide permits |
| ○ ○ | 10. | Flush/pressure test for new and/or existing fire hydrants |
| ○ ○ | 11. | Must have clear egress/access and emergency (for first responders) access to building |
| ○ ○ | 12. | Must have ADA access completed |
| ○ ○ | P. | **Substantial Completion** |
| ○ ○ | 1. | General Contractor's Roofing Guarantee and Manufacturer' s Roofing Warranties must be presented to Owner at Final Inspection and submitted with Certificate of Substantial Completion |
| ○ ○ | 2. | Certification of Structural Observations from the Structural Engineer of Record must be attached to the Certificate of Substantial Completion form |
| ○ ○ | 3. | Certificate of Substantial Completion/Final Inspection |
| ○ ○ | 4. | Advertisement for Completion for projects more than $100,000 |
| ○ ○ | Q. | **Final Inspection** |
| ○ ○ | 1. | Completed certificate of structural engineer's observations (for storm shelter) |
| ○ ○ | 2. | Elevator inspection completed and certificate of operation provided by the State of AL Dept of Labor |
| ○ ○ | 3. | Boiler/vessels inspection completed and certificate of operation provided by the State of Alabama Department of Labor |

| NA | | |
|---|---|---|
| | **5.** | **INSPECTIONS AND TESTING** (CONTINUED) |
| ○ ○ | **4.** | Elevators/Pressure Vessels must be inspected and approved by the State of Alabama Department of Labor prior to final inspection |
| ○ ○ | **5.** | Release of retainage - 30 days after completion of advertisement |
| ○ ○ | **R.** | **Year-End Inspection** |
| NA | **6.** | **CONFERENCES** |
| ○ ○ | **A.** | **Storm Shelter** |
| ○ ○ | **1.** | Required attendees: Contractor, Owner, Architect, Structural Engineer, Major Subs, Special Inspections Representative |
| ○ ○ | **2.** | Completed and signed Contractor's Statement of Responsibility for Construction of Tornado Storm Shelter (Hurricane Shelter Where Applicable) along with the required Quality Assurance Plan (QAP) must be submitted to the Owner at or before the pre-construction conference |
| ○ ○ | **B.** | **Pre-Roofing Conference** |
| ○ ○ | **1.** | Required attendees: Contractor, Owner, Architect, Roofing Sub, Roofing Manufacturer's Rep |
| ○ ○ | **2.** | No roofing materials installed prior to conference |
| ○ ○ | **3.** | Light gauge metal roof framing and/or wood truss framing to be inspected by structural engineer |
| ○ ○ | **4.** | Roofing submittals and warranties must be approved by Architect prior to pre-roofing conference |
| ○ ○ | **5.** | Roofing manufacturer must provide documentation that roof design and roofing materials meet code requirements for wind uplift and impact resistance |
| ○ ○ | **6.** | Copy of sample roof warranty |
| ○ ○ | **C.** | **Pre-Asphalt Paving Installation and Expectations Meeting** |
| ○ ○ | **1.** | Required attendees: Contractor, Owner, Architect, Asphalt Sub |
| ○ ○ | **2.** | Review sequencing and schedule of paving and striping |
| ○ ○ | **3.** | Schedule to make sure surrounding irrigation is 2 days before and 2 days after paving |
| ○ ○ | **4.** | Subgrade, milled surface, underlying pavement surface has been approved for paving |
| ○ ○ | **5.** | Review examples of expectations for finished project |
| ○ ○ | **D.** | **Pre-Landscape Sod Installation and Expectations Meeting** |
| ○ ○ | **1.** | Required attendees: Contractor, Owner, Architect, Landscape Sub |
| ○ ○ | **2.** | Review sequencing and schedule of landscaping materials |
| ○ ○ | **3.** | Review expectations of cleared site, rough grade, top soil depth, finish grade and settled surface |
| ○ ○ | **4.** | Review examples of expectations for finished project |
| ○ ○ | **E.** | **Pre-Flooring Installation and Expectations Meeting** |
| ○ ○ | **1.** | Required attendees: Contractor, Owner, Architect, Flooring Sub |
| ○ ○ | **2.** | Review sequencing of the surrounding work (ceilings, walls, painting) |
| ○ ○ | **3.** | Surrounding work completed before final flooring is installed |
| ○ ○ | **F.** | **Pre-Closeout Review** |
| ○ ○ | **1.** | Required attendees: Contractor, Owner, Architect |
| ○ ○ | **2.** | Review timeline and checklist |
| NA | **7.** | **QUALITY CONTROL** |
| ○ ○ | **A.** | **Concrete** |
| ○ ○ | **1.** | Ready mix plant, file delivery tickets, slump tests, cylinders |
| ○ ○ | **2.** | Surveyor to check foundation wall if location critical |
| ○ ○ | **3.** | Quality of concrete work; concrete testing |
| ○ ○ | **4.** | Inspections before pouring concrete |
| ○ ○ | **B.** | **What is expected of masonry work, mortar additive** |
| ○ ○ | **C.** | **Problems with hollow metal (install proper fire labels)** |
| ○ ○ | **D.** | **Fire damper installation issues** |
| ○ ○ | **E.** | **Potential conflict of mechanical and electrical equipment (shop drawings)** |
| ○ ○ | **F.** | **Return air plenums (no combustibles)** |

| NA | 8. PROJECT CLOSEOUT | |
|---|---|---|
| ○ | G. | Protect mechanical and electrical items during interior work |
| ○ | H. | Coordinate with local fire authority to assure access to the building for firefighting equipment during construction and before final acceptance. Provide fire extinguishers as required. |
| ○ | A. | All items received by Owner before Final Acceptance will be issued |
| ○ | 1. | Closeout Documentation |
| ○ | 2. | Final Pay Application, fully executed |
| ○ | 3. | Conformance documents (digital copy) |
| ○ | 4. | Owner acceptance of nonconforming work by Change Order |
| ○ | 5. | Schedule of Attic Stock |
| ○ | 6. | Letter from Design Professional certifying that the work is complete |
| ○ | B. | All closeout documentation must be submitted per specifications |
| ○ | C. | Project Closeout Documentation |
| ○ | 1. | Warranties |
| ○ | 2. | Lien Waivers |
| ○ | 3. | Operation and Maintenance Manuals and Owner Training videos |
| ○ | 4. | As-Built Drawings |
| ○ | 5. | Submittals |
| ○ | 6. | Tests and Reports |
| ○ | D. | After Project Closeout, Contractor to submit Advertisement for Completion |
| ○ | E. | Sales tax savings (Alabama Department of Revenue) |
| ○ | F. | Warranty Document Information |
| ○ | 1. | Alabama Community College System |
| ○ | 2. | Name of College |
| ○ | 3. | Address/Name of College Building |
| ○ | 4. | Contact Person: Office of the President |

| NA | 9. OTHER (ADDITIONAL ITEMS SPECIFIC TO THE PROJECT) | |
|---|---|---|
| ○ | 1. | |
| ○ | 2. | |
| ○ | 3. | |
| ○ | 4. | |
| ○ | 5. | |
| ○ | 6. | |
| ○ | 7. | |

| ATTENDEES | |
|---|---|
| **NAME:** | **COMPANY:** |
| | |
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**APPROVALS**

**BY:** _____ **DATE:** _____
SIGNATURE OF ARCHITECTURAL/ENGINEERING FIRM

**BY:** _____ **DATE:** _____
OWNER'S DESIGNATED REPRESENTATIVE

**BY:** _____ **DATE:** _____
SIGNATURE OF CONTRACTOR

**BY:** _____ **DATE:** _____
SIGNATURE OF REGIONAL FACILITIES DIRECTOR

# FACILITIES DIVISION

**ACCS FORM 6-C**

## STATEMENT OF FIELD OBSERVATIONS

| | | | | | |
|---|---|---|---|---|---|
| **ACCS PROJECT#:** | | **DATE:** | | **TIME:** | |
| **PROJECT NAME:** | | | | | |
| Address: | | | | | |
| **OWNER ENTITY:** | | | | | |
| Address: | | Phone: | | | |
| | | Email: | | | |
| **CONTRACTOR COMPANY:** | | | | | |
| Address: | | Phone: | | | |
| | | Email: | | | |
| **ARCHITECTURAL/ENGINEERING FIRM:** | | | | | |
| Address: | | Phone: | | | |
| | | Email: | | | |

**PROJECT DATA ON THE DATE OF OBSERVATION**

| | | | |
|---|---|---|---|
| **#OF WORKERS:** | | **START DATE:** | |
| **WEATHER:** | | | |
| **SITE CONDITIONS:** | | | |
| **CONTRACT COMPLETION DATE:** | | **CONTRACTOR COMPLETION DATE:** | |
| **SCHEDULED STATE OF COMPLETION:** | % | **ESTIMATED ACTUAL COMPLETION:** | % |
| **CONTRACTOR'S SUPERINTENDENT:** | | **JOB PHONE:** | |

**COMMENTS/DEFICIENCIES:**

| | | | |
|---|---|---|---|
| **SIGNATURE:** | | **REPORT#:** | |

**CC:** Owner, Architect/Engineer, Contractor

# FACILITIES DIVISION ACCS FORM 6-D

## APPLICATION AND CERTIFICATE FOR PAYMENT

| ACCS PROJECT#: | | APPLICATION#: | | DATE: | |
|---|---|---|---|---|---|
| PROJECT: | | | | | |

| | | | |
|---|---|---|---|
| **TO COLLEGE:** | | | |
| Address: | | Phone: | |
| | | Email: | |
| **FROM CONTRACTOR:** | | | |
| Address: | | Phone: | |
| | | Email: | |
| **ARCHITECT/ENGINEER:** | | | |
| Address: | | Phone: | |
| | | Email: | |

| | |
|---|---|
| **TOTAL ORIGINAL CONTRACT:** | |
| **FULLY EXECUTED CHANGE ORDER(S) NUMBERS THROUGH** | |
| **TOTAL CONTRACT TO DATE:** | $ 0.00 |
| **Work Completed to Date per attached Schedule of Values:** | |
| **Stored Materials:** | |
| **Total Completed Work and Stored Materials:** ( % of Contract To Date) | $ 0.00 |
| *5% of Total Completed Work and Stored Materials (TCWSM) is retained when TCWSM is less than or equal to 50% of Total Contract to Date. 0% retained when TCWSM is more than 50% of Total Contract to Date. 0 is retained on final pay app.* | ☐ **Final Payment Application** |
| **Less Retainage:** $ 0.00 **Total Due:** | $ 0.00 |
| **Less Total Previous Payments:** | $ 0.00 |
| **Balance Due This Estimate:** | $ 0.00 |

### 1 CONTRACTOR'S CERTIFICATION

The undersigned Contractor certifies that to the best of his knowledge, information, and belief the Work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by him for Work for which previous Certificates for Payments were issued and payments received from the Owner and that current payment shown herein has not yet been received.

**By:** _____ **Date:** _____
CONTRACTOR'S SIGNATURE

**Name:** _____

**Title:** _____

Sworn and subscribed before me this _____ day of <month>

*(SEAL)* _____
NOTARY PUBLIC'S SIGNATURE

### 2 ARCHITECT'S/ENGINEER'S CERTIFICATION

In accordance with the Contract Documents, the Architect or Engineer of Record certifies to the Owner and College that to the best of the Architect's/Engineer's knowledge and belief:

1. the work has progressed to the point indicated herein **and according to the updated attached project master schedule,**
2. the quality of the Work is in accordance with the Contract documents, and
3. the Contractor is entitled to payment of the amount approved.

**By:** _____ **Date:** _____
ARCHITECT'S/ENGINEER'S SIGNATURE

**Name:** _____

**Title:** _____

### INSTRUCTIONS

- Contractor's signature date cannot precede this Pay App date.
- One payment application per month may be submitted.
- Retainage is released as final payment when all close-out requirements per General Conditions Article 34 are completed with ACCS Form 7-F Project Close Out Checklist attached.

### 3 COLLEGE APPROVAL

**By:** _____ **Date:** _____
COLLEGE

**Name:** _____

**Title:** _____

**REQUIRED ATTACHMENTS:** 1 ACCS Form 6-E Schedule of Values; 2 practicable construction schedule approved when the Notice to Proceed was issued; 3 updated construction schedule using ACCS Form 6-H Progress Schedule & Report or approved "more comprehensive schedule format;" 4 copies of all approved ACCS Form 2-F Contract Change Orders requesting payment this Pay Application (see General Conditions of the Contract, Article 12 – Progress Schedule).

**IF APPLICABLE: ANY PAY APPLICATION THAT REDUCES RETAINAGE REQUIRES ACCS APPROVAL PRIOR TO PROCESSING FOR PAYMENT**

_____ **Name:** _____ **Date:** _____
ACCS FACILITIES REPRESENTATIVE

VER:09302025

# SCHEDULE OF VALUES

ACCS Form 6-E

Project:

ACCS Project No.:

Contractor Company:

Application No.:

Retainage: *5% of Completed Work and Stored Materials to Date (G) is retained when G Total is less than 50% of Scheduled Value (C) Total. 0 is retained on final payment application.*

Application Date:

Period From: Period To:

| A | B | C | D | E | F | G | | H | I |
|---|---|---|---|---|---|---|---|---|---|
| Item No. | Description of Work | Scheduled Value (including fully executed change orders) | Work Completed: From Previous Application (D+E) | Work Completed: This Period | Materials Presently Stored (Not in D or E) | Completed Work & Stored Materials to Date (D+E+F) | % of Contract to Date (G/C) | Balance to Finish (C-G) | Retainage (Variable Rate) |
| 1. | | | | | | $ - | | | $ - |
| 2. | | | | | | $ - | | | $ - |
| 3. | | | | | | $ - | | | $ - |
| 4. | | | | | | $ - | | | $ - |
| 5. | | | | | | $ - | | | $ - |
| 6. | | | | | | $ - | | | $ - |
| 7. | | | | | | $ - | | | $ - |
| 8. | | | | | | $ - | | | $ - |
| 9. | | | | | | $ - | | | $ - |
| 10. | | | | | | $ - | | | $ - |
| 11. | | | | | | $ - | | | $ - |
| 12. | | | | | | $ - | | | $ - |
| 13. | | | | | | $ - | | | $ - |
| 14. | | | | | | $ - | | | $ - |
| 15. | | | | | | $ - | | | $ - |
| 16. | | | | | | $ - | | | $ - |
| 17. | | | | | | $ - | | | $ - |
| 18. | | | | | | $ - | | | $ - |
| 19. | | | | | | $ - | | | $ - |
| 20. | | | | | | $ - | | | $ - |
| 21. | | | | | | $ - | | | $ - |
| 22. | | | | | | $ - | | | $ - |
| 23. | | | | | | $ - | | | $ - |
| 24. | | | | | | $ - | | | $ - |
| 25. | | | | | | $ - | | | $ - |
| 26. | | | | | | $ - | | | $ - |
| 27. | | | | | | $ - | | | $ - |
| 28. | | | | | | $ - | | | $ - |
| 29. | | | | | | $ - | | | $ - |
| 30. | | | | | | $ - | | | $ - |
| | | | | | | | | | |
| | **TOTALS:** | **$ -** | **$ -** | **$ -** | **$ -** | **$ -** | | **$ -** | **$ -** |

# INVENTORY OF STORED MATERIALS

| Project: | ACCS Project No.: |
|---|---|
| | |
| Contractor: | For Estimate No.: |
| | For Period Ending: |

| A | B | C | D | E | F |
|---|---|---|---|---|---|
| DESCRIPTION | MATERIALS STORED LAST PERIOD | PURCHASED THIS PERIOD | TOTAL COLUMNS B + C | MATERIALS USED THIS PERIOD | MATERIALS PRESENTLY STORED |
| | | | | | |
| | | | | | |

To be used as documentation to support value of Stored Materials reported on APPLICATION AND CERTIFICATE FOR PAYMENT.

# PROJECT DEFICIENCY LOG

ACCS Form 6-G

| | | | |
|---|---|---|---|
| ACCS Project #: | | ACCS Project Name: | |
| Design Professional: | | Contractor: | |

| Item No. | Description | Location *(Bldg, Room, Level, Etc.)* | Identified By | Date Identified | Priority *(Critical, Major, Minor)* | Report Identifying Deficiency | Target Date for Completion | Assigned To | Date Completed | Signed Off By | Date Signed Off | Status *(Complete, In Progress, Not Started)* | Comments (Reviewer or Contractor) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
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REV. 102825

**ACCS FORM 6-H**

## SAMPLE PROGRESS SCHEDULE & REPORT

ACCS Project No.:

PROJECT:

CONTRACTOR (Contractor may use own form ):

ARCHITECT/ENGINEER:

DATE OF REPORT:

PROCEED DATE:

PROJECTED COMPLETION DATE:

| | WORK DIVISION | % | AMOUNT | |
|---|---|---|---|---|
| 1. | GENERAL REQUIREMENTS | | | |
| 2. | SITEWORK | | | |
| 3. | CONCRETE | | | |
| 4. | MASONRY | | | |
| 5. | METALS | | | |
| 6. | WOOD AND PLASTIC | | | 100% |
| 7. | THERMAL AND MOISTURE PROTECTION | | | 90% |
| 8. | DOORS AND WINDOWS | | | 80% |
| 9. | FINISHES | | | 70% |
| 10. | SPECIALTIES | | | 60% |
| 11. | EQUIPMENT | | | 50% |
| 12. | FURNISHINGS | | | 40% |
| 13. | SPECIAL CONSTRUCTION | | | 30% |
| 14. | CONVEYING SYSTEMS | | | 20% |
| 15. | MECHANICAL | | | 10% |
| 16. | ELECTRICAL | | | 0% |
| TOTAL ORIG. CONTRACT | | 100% | | |
| ANTICIPATED DRAW IN $1,000 | | | | |
| ACTUAL DRAW IN $1,000 | | | | |

LEGEND: ANTICIPATED ACTIVITY ACTUAL ACTIVITY ANTICIPATED CASH FLOW ACTUAL CASH FLOW

USE ADDITIONAL SHEETS IF JOB IS SCHEDULED OVER 12 MONTHS.

# FACILITIES DIVISION

**ACCS FORM 6-J**

# CERTIFICATION OF STRUCTURAL OBSERVATIONS

| | |
|---|---|
| **ACCS PROJECT#:** | |
| **PROJECT NAME:** | |
| **OWNER:** | |
| **CONTRACTING COMPANY:** | |

I _____, do hereby verify that I have personally conducted the visual Design Professional observations of the construction of the structural system for conformance to the approved construction documents for the referenced project. The visual observations of the structural systems were personally conducted by me at all significant construction stages and at the completion of the construction of the structural system. To the best of my knowledge, all structural deficiencies have been resolved except as noted below:

**Signed on this date,** _____ **Design Professional's Seal**

_____

ARCHITECTURAL / ENGINEERING FIRM

_____

SIGNATURE OF ARCHITECT OR
STRUCTURAL ENGINEER OF RECORD

**PRINTED NAME:** _____

# FACILITIES DIVISION

**ACCS FORM 6-K**

# CERTIFICATE OF SUBSTANTIAL COMPLETION

TO: **ACCS FACILITIES DIVISION,** 135 S. Union Street Montgomery, AL 36130 | 334.293.4500

• *Do not staple this form and/or attachments; use clips. Print single-sided; do not submit double-side printed documents*

| | **ACCS PROJECT#:** | |
|---|---|---|
| **OWNER ENTITY NAME AND ADDRESS:**<br><br>Email to receive executed copy: | | **ARCHITECTURAL/ENGINEERING FIRM NAME & ADDRESS:**<br><br>Email to receive executed copy: |
| **CONTRACTOR COMPANY NAME AND ADDRESS:**<br><br>Email to receive executed copy: | | **BONDING COMPANY NAME AND ADDRESS:**<br><br>Email to receive executed copy: |

**PROJECT:**

**Substantial Completion** has been achieved for: ◯ **the entire Work** ◯ **the following portion of the Work:**

The **Date of Substantial Completion** of the Work covered by this certificate is established to be: _____

"Substantial Completion" means the stage in the progress of the Work, or designated portion of the Work, that all punch list items are completed, all change orders are executed, the Owner can occupy or utilize the Work for its intended use, warranties commence, Contractor is no longer liable for Liquidated Damages, and the Owner becomes responsible for security, utilities, insurance and maintenance.

"The Date of Substantial Completion of the Work establishes the extent to which the Contractor is liable for Liquidated Damages, if any. If the Contractor fails to complete all closeout items within forty-five (45) days, the Contractor shall bear any expenses, including additional Architectural services and expenses, incurred by the Owner as a result of failure to complete closeout items in a timely manner and may be issued a Notice to Cure.

The Year End Inspection Date to help identify and address any construction defects or warranty issues shall be established as _____ , which is 11 months after the Date of Substantial Completion.

**Nothing herein shall limit or waive the Owner's rights under Article 27 of the General Conditions (ACCS Form 2-B), including but not limited to issuance of Notices to Cure or Notice of Termination issued to Contractors and Sureties, to obtain completion, correction, or repair of any remaining unfinished Work.**

**Only one (1) originally executed substantial completion form shall be routed for signature. ACCS Facilities Division office will mail the fully-executed original to the Owner and email copies to all parties.**

**ATTACHMENTS:**

- ☐ Completed Punch List
- ☐ Change Order Log: All change orders and their execution date, no outstanding change orders
- ☐ Pre-Closeout Meeting Review Checklist executed with signatures
- ☐ Documentation from the AHJ of their review and approval
- ☐ General Contractor's Roofing Guarantee (ACCS Form 6-L) and any other warranties specified in the Contract Documents - (if project includes roofing)
- ☐ Certification of Structural Observations (ACCS Form 6-J) - (if project includes classrooms or dorm rooms)

| RECOMMENDED BY: | | CONTRACTING PARTIES: | |
|---|---|---|---|
| ARCHITECT/ENGINEER | DATE | CONTRACTOR | DATE |
| **APPROVALS:** | | | |
| **AHJ INSPECTOR** (IF APPLICABLE) | DATE | ACCS CHIEF FACILITIES OFFICER | DATE |
| ***A/E PEER REVIEWER**(IF APPLICABLE) | DATE | | |
| COLLEGE DESIGNATED REPRESENTATIVE | DATE | | |
| ACCS REGIONAL FACILITIES DIRECTOR | DATE | | |

*ACCS Colleges are required to provide an A/E Peer Reviewer to review the A/E of Record's project design and to perform construction inspections when AHJ is not present in city/town where project's work is taking place.

# FACILITIES DIVISION

**ACCS FORM 6-L**

# GENERAL CONTRACTOR'S ROOFING GUARANTEE

*• Do not staple this form and/or attachments; use clips. Print single-sided; do not submit double-side printed documents*

| | | | |
|---|---|---|---|
| **ACCS PROJECT#:** | | | |
| **PROJECT NAME:** | | | |
| Address: | | | |
| **PROJECT OWNER:** | | | |
| Address: | | | |
| **CONTRACTOR COMPANY:** | | | |
| Address: | | Phone: | |
| | | Email: | |

**EFFECTIVE DATES OF GUARANTEE**

| | | | |
|---|---|---|---|
| **DATE OF ACCEPTANCE:** | 12/18/25 | **DATE OF EXPIRATION:** | **12/19/25** |

**1.** The General Contractor does hereby certify that the roofing work included in this contract was installed in strict accordance with all requirements of the plans and specifications and in accordance with approved roofing manufacturers recommendations.

**2.** The General Contractor does hereby guarantee the roofing and associated work including but not limited to all flashing and counter flashing both composition and metal, roof decking and/or sheathing; all materials used as a roof substrate or insulation over which roof is applied; promenade decks or any other work on the surface of the roof; metal work; gravel stops and roof expansion joints to be absolutely watertight and free from all leaks, due to faulty or defective materials and workmanship for a period of five (5) years, starting on the date of substantial completion of the project. This guarantee does not include liability for damage to interior contents of building due to roof leaks, nor does it extend to any deficiency which was caused by the failure of work which the general contractor did not damage or did not accomplish or was not charged to accomplish.

**3.** Subject to the terms and conditions listed below, the General Contractor also guarantees that during the Guarantee Period he will, at his own cost and expense, make or cause to be made such repairs to, or replacements of said work, in accordance with the roofing manufacturers standards as are necessary to correct faulty and defective work and/or materials which may develop in the work including, but not limited to: blisters, delamination, exposed felts, ridges, wrinkles, splits, warped insulation and/or loose flashings, etc. in a manner pursuant to the total anticipated life of the roofing system and the best standards applicable to the particular roof type in value and in accordance with construction documents as are necessary to maintain said work in satisfactory condition, and further, to respond on or within three (3) calendar days upon proper notification or leaks or defects by the Owner or Architect.

**(a)** Specifically excluded from this Guarantee are damages to the work, other parts of the building and building contents caused by: (1) lightning, windstorm, hailstorm and other unusual phenomena of the elements; and (2) fire. When the work has been damaged by any of the foregoing causes, the Guarantee shall be null and void until such damage has been repaired by the General Contractor, and until the cost and expense thereof has been paid by the Owner or by the responsible party so designated.

**(b)** During the Guarantee Period, if the Owner allows alteration of the work by anyone other than the General Contractor, including cutting, patching and maintenance in connection with penetrations, and positioning of anything on the roof, this Guarantee shall become null and void upon the date of said alterations. If the owner engages the General Contractor to perform said alterations, the Guarantee shall not become null and void, unless the General Contractor, prior to proceeding with the said work, shall have notified the Owner in writing, showing reasonable cause for claim that said alterations would likely damage or deteriorate the work, thereby reasonably justifying a termination of this Guarantee.

**(c)** Future building additions will not void this guarantee, except for that portion of the future addition that might affect the work under this contract at the point of connection of the roof areas, and any damage caused by such addition. If this contract is for roofing of an addition to an existing building, then this guarantee covers the work involved at the point of connection with the existing roof.

**(d)** During the Guarantee period, if the original use of the roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray cooled surface, flooded basin, or other use of service more severe than originally specified, this Guarantee shall become null and void upon the date
of said change.

**(e)** The Owner shall promptly notify the General Contractor of observed, known or suspected leaks, defects or deterioration, and shall afford reasonable opportunity for the General Contractor to inspect the work, and to examine the evidence of such leaks, defects or deterioration.

**IN WITNESS THEREOF,** this instrument has been duly executed this _____ day of _____ _____

_____

GENERAL CONTRACTOR'S AUTHORIZED SIGNATURE

**BY:** _____

SIGNEE'S PRINTED NAME

**TITLE:** _____

SIGNEE'S TITLE

# FACILITIES DIVISION

**ACCS FORM 6-M**

## SAMPLE FORM OF ADVERTISEMENT FOR COMPLETION

### LEGAL NOTICE

In accordance with Chapter 1, Title 39, Code of Alabama, 1975, as amended, notice is hereby given that:

_____

(Contractor Company Name)

Contractor, has completed the Contract for:

◯ CONSTRUCTION ◯ RENOVATION ◯ ALTERATION ◯ EQUIPMENT ◯ IMPROVEMENT

of:

at:

for the State of Alabama and the (County) (City) of: _____ , Owner(s), and have made request for final settlement of said Contract. All persons having any claim for labor, materials, or otherwise in connection with this project should immediately notify:

_____

(Architect/Engineer)

**BUSINESS ADDRESS:**

_____

(Contractor)

**NOTE:** This notice must be run once a week for three successive weeks for projects exceeding $100,000. For projects of $100,000 or less, there is no requirement for Advertisement for Completion. A copy of the publisher's affidavit of publication (including a copy of the advertisement) shall be submitted by the Contractor to the Design Professional.

# FACILITIES DIVISION

**ACCS FORM 6-N**

## CONTRACTOR'S AFFIDAVIT OF PAYMENT OF DEBTS AND CLAIMS

| | | | |
|---|---|---|---|
| **ACCS PROJECT#:** | | | |
| **DATE OF THE CONSTRUCTION CONTRACT:** | | | |
| **PROJECT** (SAME AS APPEARS IN THE CONSTRUCTION CONTRACT)**:** | | | |
| **STATE OF:** | | **COUNTY OF:** | |

The undersigned hereby certifies that, except as listed below, payment has been made in full and all obligations have otherwise been satisfied for all materials and equipment furnished, for all work, labor and services performed, and for all known indebtedness and claims against the Contractor for damages arising in any manner in connection with the performance of the Construction Contract referenced above for which the Owner or Owner's property might in any way be held responsible or encumbered.

**EXCEPTIONS:**

**SUPPORTING DOCUMENTS ATTACHED HERETO**

**1.** Consent of Surety to Final Payment. Whenever Surety is involved, a Consent of Surety form is required.

**INDICATE ATTACHMENT:** ◯ YES ◯ NO

**THE FOLLOWING SUPPORTING DOCUMENT SHOULD BE ATTACHED HERETO IF REQUIRED BY THE OWNER:**

**1.** Contractor's Release of Waiver of Liens

**2.** Separate Releases or Waivers of Liens from Subcontractors and material and equipment supplies, to the extent required by the Owner, accompanied by the list thereof

**3.** Contractor's Affidavit of Release of Liens

_____

**CONTRACTOR**

**NAME :**

**ADDRESS :**

_____

SIGNATURE OF AUTHORIZED REPRESENTATIVE

**BY:** _____

SIGNEE'S PRINTED NAME

**TITLE:** _____

SIGNEE'S TITLE

Sworn to and subscribed before me this

_____ day of _____ ,

_____ .

_____

NOTARY PUBLIC'S SIGNATURE

My commission expires: _____

SEAL

# FACILITIES DIVISION

**ACCS FORM 6-P**

## CONTRACTOR'S AFFIDAVIT OF RELEASE OF LIENS

| | |
|---|---|
| **ACCS PROJECT#:** | |
| **DATE OF THE CONSTRUCTION CONTRACT:** | |
| **PROJECT** (SAME AS APPEARS IN THE CONSTRUCTION CONTRACT)**:** | |

| | | | |
|---|---|---|---|
| **STATE OF:** | | **COUNTY OF:** | |

The undersigned hereby certifies that, except as listed below, payment has been made in full and all obligations have otherwise been satisfied for all materials and equipment furnished, for all work, labor and services performed, and for all known indebtedness and claims against the Contractor for damages arising in any manner in connection with the performance of the Construction Contract referenced above for which the Owner or Owner's property might in any way be held responsible or encumbered.

**EXCEPTIONS:**

**SUPPORTING DOCUMENTS ATTACHED HERETO**

**1.** Contractor's Release of Waiver of Liens

**2.** Separate Releases or Waivers of Liens from Subcontractors and material and equipment supplies, to the extent required by the Owner, accompanied by the list thereof

**CONTRACTOR**

**NAME :**

**ADDRESS :**

SIGNATURE OF AUTHORIZED REPRESENTATIVE

**BY:** _____

SIGNEE'S PRINTED NAME

**TITLE:** _____

SIGNEE'S TITLE

Sworn to and subscribed before me this

_____ day of _____ ,

_____ .

NOTARY PUBLIC'S SIGNATURE

My commission expires: _____

SEAL

VER: 03282024

# FACILITIES MANAGEMENT

**ACCS FORM 6-Q**

## CONSENT OF SURETY TO FINAL PAYMENT

| | |
|---|---|
| **ACCS PROJECT#:** | |
| **DATE OF THE CONSTRUCTION CONTRACT:** | |
| **SURETY'S BOND NUMBER:** | |

**TO: OWNER** (THE ALABAMA COMMUNITY COLLEGE SYSTEM)

**PROJECT:** (SAME AS APPEARS IN THE CONSTRUCTION CONTRACT)

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above, the
**SURETY:**

on bond of
**CONTRACTOR:**

hereby approves of the final payment to the Contractor, and agrees that final payment to the Contractor shall not relieve the Surety of any of its obligations to the Owner.

as set forth in said Surety's bond.

**SIGNED AND SEALED** this _____ day of _____.

**SURETY:** _____ **SEAL:**

COMPANY NAME

**BY:** _____

SIGNATURE OF AUTRHORIZED REPRESENTATIVE

_____

PRINTED NAME AND TITLE

**Note:** Original Power of Attorney for the Surety's signatory shall be furnished with each original form.

# FACILITIES DIVISION

## ACCS FORM 7-E

## PRE-CLOSEOUT REVIEW CHECKLIST

| | | | | | |
|---|---|---|---|---|---|
| **PROJECT NAME:** | | | | | |
| **ACCS PROJECT #** | | **DATE:** | | **MEETING TIME:** | |
| **MEETING LOCATION:** | | | | | |

| NA | | | |
|---|---|---|---|
| | | **1. TIMELINE** | |
| ○ | ○ | **A.** | **Pre-Closeout Review - Minimum of 4 weeks prior to Substantial Completion** |
| ○ | ○ | **B.** | **Establish a Substantial Completion/Final Inspection date** |
| ○ | ○ | **C.** | **Final Punch List Items - completed and reinspected within 30 days of Pre-Closeout Review** |
| ○ | ○ | **D.** | **Closeout Meeting and Final Acceptance - within 45 days of Substantial Completion or possible Notice to Cure** |
| ○ | ○ | **E.** | **Advertisement of Completion - advertised immediately following Final Acceptance** |
| ○ | ○ | **F.** | **Final Payment for Contractor - 30 days after Advertisment of Completion has been posted for 3 weeks** |
| ○ | ○ | **G.** | **Final Payment for Design Professional - immediately following Final Payment for Contractor** |
| ○ | ○ | **H.** | **One-Year Inspection - scheduled 11 months after Date of Substantial Completion** |

| NA | | | |
|---|---|---|---|
| | | **2. REQUIREMENTS** | |
| ○ | ○ | **A.** | **Pre-Closeout Review** |
| ○ | ○ | **1.** | Work is very close to being substantially complete |
| ○ | ○ | **2.** | Final Punch List contains only items that can be completed and reinspected within 30 days so that the Owner can occupy without disruption or interference by the Contractor. Contractor has established a schedule of when punch list items will be completed. |
| ○ | ○ | **B.** | **Substantial Completion (ACCS Form 6-K)** |
| ○ | ○ | **1.** | Final building cleaning is completed and accepted according to General Conditions Article 48 B |
| ○ | ○ | **2.** | Pre-Closeout Review Checklist completed and executed with signatures |
| ○ | ○ | **3.** | All Change Orders are completed and executed. A Change Order Log is provided showing the execution dates. |
| ○ | ○ | **4.** | Life safety systems have been tested and certified |
| ○ | ○ | **5.** | Certificate of Occupancy |
| ○ | ○ | **6.** | Systems start up and Owner Training have been completed |
| ○ | ○ | **7.** | General Contractors 5-Year Warranty (ACCS Form 6-L) and other Roofing Warranties |
| ○ | ○ | **8.** | Certification of Structural Observations (ACCS Form 6-J) if project includes classrooms and dorms |
| ○ | ○ | **9.** | Lock cores have been changed from the contractor to the College cores and keys have been transferred |
| ○ | ○ | **10.** | Scheduled One-Year inspection |
| ○ | ○ | **C.** | **Closeout Meeting and Final Acceptance** |
| ○ | ○ | **1.** | Contractor's Affidavit of Payment of Debts and Claims (ACCS Form 6-N) |
| ○ | ○ | **2.** | Contractor's Affidavit of Release of Liens (ACCS Form 6-P) |
| ○ | ○ | **3.** | Release of Claims (if claim has been given by one or more Subcontractors) |
| ○ | ○ | **4.** | Contractor's One-Year Warranty (General Conditions Article 35) |
| ○ | ○ | **5.** | Other Warranties as required in the Project Manual |
| ○ | ○ | **6.** | As-Built Drawings |
| ○ | ○ | **a.** | Contractor to send to Architect within 10 days of Date of Substantial Completion |
| ○ | ○ | **b.** | Design Professional deliver to Owner one hard copy and one digital copy |
| ○ | ○ | **7.** | Owner Training Videos on building systems and maintenance items |
| ○ | ○ | **8.** | O&M Manuals (one hard copy and one digital copy) |
| ○ | ○ | **9.** | Reports and Tests delivered to Owner (Material, Product, Compatibility, Field) |

# ACCS FORM 7-E

| NA | 2. REQUIREMENTS ( CONTINUED) | |
|---|---|---|
| ○ | 10. | Approved Submittals and Shop Drawings |
| ○ | a. | Submittals due to Owner within 30 days of Date of Substantial Completion |
| ○ | 11. | Schedule of Attic Stock, spare parts and materials that include quantity, label and storage location |
| ○ | 12. | Notice of Intent to Close Permit (if ADEM project) |
| ○ | 13. | Owner acceptance of nonconforming work by Change Order |
| ○ | 14. | Letter from Architect/Engineer of Record certifying the work is complete. |
| ○ | 15. | Conformance documents delivered to Owner (digital copy) |
| ○ | D. | **Advertisement for Completion submitted by Contractor** |
| ○ | 1. | Closeout Meeting and Final Acceptance has occurred |
| ○ | E. | **Final Payment for Contractor** |
| ○ | 1. | 30 Days after the Advertisement for Completion has completed its public posting |
| ○ | 2. | Consent of Surety to Final Payment (ACCS Form 6-Q) |
| ○ | F. | **Final Payment for Design Professional** |
| ○ | 1. | Final Payment for Contractor has been executed |
| ○ | 2. | Amendment between Owner and Architect is executed for final costs of project. |
| ○ | G. | **Final Project Request Form submitted by the College after all payments have been finalized.** |

| ATTENDEE LIST | |
|---|---|
| **NAME:** | **COMPANY:** |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |

**APPROVALS**

**BY:** _____ **DATE:** _____
SIGNATURE OF ARCHITECHTURAL/ENGINEER OF RECORD

**BY:** _____ **DATE:** _____
SIGNATURE OF COLLEGE DESIGNATED REPRESENTATIVE

**BY:** _____ **DATE:** _____
SIGNATURE OF CONTRACTOR

**BY:** _____ **DATE:** _____
SIGNATURE OF REGIONAL FACILITIES DIRECTOR

# SECTION 01 1000
# SUMMARY

## PART 1 GENERAL

### 1.01 PROJECT

A. Owner's Project Number: **2026108 TSCC**

B. Project Site Physical Address: 2511 Fairlane Drive Montgomery, Al

C. Owner's Name: TSCC Executive Park Building E Renovation

D. Owners mailing Address: 1225 Air Base Boulevard, Montgomery, AL 36108 (Trenholm Air Base Campus)

E. Owners Representative: Alabama Community College System Chief Facilities Officer: Mark Salmon or other if given written direction by Owner. Office (334) 293-4610, mark.salmon@accs.edu
   1. Administrative Assistant : Shelia Smith 334-293-4672, shelia.smith@accs.edu
   2. System Facilities Manager: Matt Tice, 334-293-4577, matthew.tice@accs,edu
   3. Southwest Regional Facility Director: Harun Biswas, mobile . 470-848-3146, harun.biswas@accs.edu

F. President Trenholm State Community College: Dr. Kemba Chambers
   1. Trenholm Executive Vice President of Student Affairs and Insrtumental Services: Dr. Theresa Mays.
   2. Trenholm Director of Facilities: Louis R. Campbell III, Mobile, 334-799-6567, Email: lcampbell@trenholmstate.edu
   3. Regional Chief Financial Services: Brian Harrison
   4. Dean of Financial and Adminisrative Services: Chris Clark

G. Architect's Name: Seay, Seay, & Litchfield, PC. Kayee Cofer AIA, Project Manager. Office 334-263-5162 ext 112 kcofer@sslarch.com , 1115 South Court Street, Montgomery, Al 36104
   1. Assistant Project Manager: Olivia Smith ext. 310, Email: osmith@sslarch.com.
   2. Architect Principal in Charge: Jeff Bazzell, AIA , Email: Jbazzell@sslarch.com
   3. All architect's personal unless noted otherwise.

H. All persons listed above as noted unless notified in writing by the Owner or Architect.

I. **Contract Documents dated: Oct 16, 2026**
   1. Architect's Project Number: 25206
   2. ACCS number : 2026108 TSCC
   3. **Geotechnical Engineering : by Building and Earth dated 10/19/2026 is included as part of these Contract Documents.**
   4. **See Terracon Reports for Hazardous material, dated August 4th 2026 Technical Specifications for Removal of Asbestos Containing Materials , and Pre-Renovation Asbestos Inspection Report dated Jan. 26, 2023 included in these contract documents.**
   5. The Contractor shall provide a **Dual Obligee Rider** to the Montgomery Water Works and Sanitary Sewer Board to be attached and form as part of the Performance and Payment Bond. . Please see included example Form which is included for the Contractor's convience only. The actual Form must by one that is acceptable by the Montgomery Water and Sanitary Sewer Board, Montgomery, Alabama. Provide copies to the architect and owner on this Rider.

6. Traffic study may be required by the City of Montgomery during construction. The owner will be responsible for the cost of the traffic study, however the contractor will be responsible for coordinating with this study.

**1.02 CONTRACT DESCRIPTION**

A. Contract Type: Multiple prime contracts, each based on a Stipulated Price as described in Document 00 5000 - Contracting Forms and Supplements.

B. Contract Type:
1. Contract Type: A Single Prime Contract with Alabama Community College System - Construction Contract (ACCS Form 2-A)

C. Contract Time: Substantial Completion shall be no later than **August 2nd, 2027**
1. An intent to award will be issued 1-3 business days after the bid opening. When the intent to award letter is received, the contractor may proceed with submittals, scheduling, etc. No construction work shall begin on-site until the Notice to Proceed is issued. **The Notice to Proceed will be issued within 24 hours of the December 9th, 2026 ACCS Board Meeting.**

**1.03 DESCRIPTION OF ALTERATIONS WORK**

A. The scope of work for this project includes demolition as shown. Refer to each disicipline for more detail. Demolition will include structural, civil, plumbing, mechanical, fire protection and electrical systems. All interior non load bearing partitions will be removed. Patching of concrete floors due to partition removal shall be required. New partitions will be added as well as new finishes, civil, plumbing,mechanical, fire partitions, and electrical. The existing elevator car will be replaced with new finishes, with the elevator tracks and epuipment remaining as specified. The storefront and curtain wall will be replaced with new, as will the roof. Most of the one story portion of the building will be left for future build out. There will be a mechanical, data and electrical room in that space.The project will include a Perimeter Ornamental Fence and Gates around the sites as shown on the drawings. The Project includes noise control wall, ceiling, and door assemblies for the purpose of controlling noise in the areas of the Music rooms and adjacent rooms. Refer to Unit Prices, and Allowances for additional requirements.

B.

**1.04 OWNER OCCUPANCY**

A. Owner does not intend to ____ occupy ____ portions of the existing building during the entire construction period.

B. **Other portions of the campus may be still under construction. The owner will be occupying other Buildings and portions of the site. The contractor shall make every effort to not disrupt these activities with the construction work.**

C. Cooperate with Owner to minimize conflict and to facilitate Owner's operations.

D. Schedule the Work to accommodate Owner occupancy if required.

**1.05 CONTRACTOR USE OF SITE _____**

A. Provide access to and from site as required by law and by Owner:
1. Do not obstruct roadways, sidewalks, or other public ways without permit.

B. Existing building spaces may be used for storage if the owner gives written permission. .

C. Utility Outages and Shutdown:
1. Limit disruption of utility services to hours the building is unoccupied.

2. Do not disrupt or shut down life safety systems, including but not limited to fire alarm systems, without 7 days notice to Owner and authorities having jurisdiction.
3. Prevent accidental disruption of utility services to other facilities.

D. Existing Building: Repair and replace any damaged areas, surfaces, or equipment affected as a result of construction within a reasonable and owner accepted time limit.

**1.06 WORK RESTRICTIONS**

A. Tobacco use will not be permitted on the premises.

B. No Alcohol or mind affecting drugs or substances will be allowed on site.

C. Firearm possession will not be permitted on premises unless otherwise permitted by applicable laws. Comply with all owner security guidelines.

D. Noise, Vibration, and Odors: Obtain owners written permission .

E. Maintain Trenholm State Community College Campus Guidelines

F. Maintain guidelines for the Alabama Community College System.

**1.07 SPECIFICATION SECTIONS APPLICABLE TO ALL CONTRACTS**

A. Unless otherwise noted, all provisions of the sections listed below apply to all contracts. Specific items of work listed under individual contract descriptions constitute exceptions.

B. Section 01 2000 - Price and Payment Procedures.

C. Section 01 2100 - Allowances.

D. Section 01 2200 - Unit Prices.

E. Section 01 3000 - Administrative Requirements.

F. Section 01 4000 - Quality Requirements.

G. Section 01 4100 - Regulatory Requirements

H. Section 01 4217 - Definitions and Standards

I. Section 01 5000 - Temporary Facilities and Controls.

J. Section 01 5719 - Temporary Environmental Controls

K. Section 01 6000 - Product Requirements.

L. Section 01 7000 - Execution and Closeout Requirements.

M. Section 01 7400 - Warranties and Bonds

N. Section 01 7800 - Closeout Submittals.

**1.08 SECURITY PROCEDURES**

A. As required by governing laws including the City of Montgomery Police Department and the Trenholm State Security Office.

B. Trenholm State Community College and/or ACCS is not liable for any of the General Contractor's or Subcontractor's stolen or damaged property that occurs during this project. The General Contractor's Builder's Risk Insurance shall cover any stolen or damaged property. See ACCS General Conditions of the Contract.

**1.09 COORDINATION:**

A. If necessary, inform each party involved, in writing, of procedures required for coordination; include requirements for giving notice, submitting reports, and attending meetings. Conduct Owner, Architect, Contractor (OAC) meetings as necessary but no less than twice a month with owner, all subcontractors, and architect. Topics to include but not limited to: Schedule update , percentage of completion of work, pay request, action items, Request for information (RFI), submittals, construction quality discussion/issues construction questions to architect/owner.

**1.10 PROJECT EQUIPMENT COORDINATION**

A. Prior to ordering specified equipment, it shall be the contractor's responsibility to ensure that all equipment can be fitted, placed and installed into its specified location. Coordination shall include, but is not limited to, the manufacturer's component size, proper clearances, assembly, critical path scheduling, and coordination of all other trades. If required, the contractor shall be responsible for all necessary demolition and associated reparations to accomplish full equipment installation.

B. The contractor shall be responsible for all means, methods, sequencing of work, demolition, and reparations to the property and facilities as required to accomplish the work. This shall include but is not limited to the installation of all equipment, furnishings, and materials.

**1.11 PROJECT SUPERVISION**

A. ACCS Facilities Division

B. City of Montgomery Building and Inspections Departments.
   1. Mr. Kippy Harold Tate, Head Building Official.

C. City of Montgomery Fire Depatment

D. Alabama State Fire Marshall

E. Alabama Department of Environmental Management

F. Montgomery Water and Sewer Department

**1.12 PERMITS:**

A. Contractor shall provide all Local (City and County) , State, and Federal Permits required for the Construction of this project.

**END OF SECTION**

# SECTION 01 2100
# ALLOWANCES

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. General Contingency Allowance.

B. Undergound Landscape Lawn Sprinkler Contingency Allowance

C. Emergency Radio Responder System Contingency Allowance.

D. Security System Contingency Allowance

E. Utilize copies of Contingency Allowance Form.

### 1.02 RELATED REQUIREMENTS

A. Section 01 2000 - Price and Payment Procedures: Additional payment and modification procedures.

### 1.03 CONTINGENCY ALLOWANCE

A. Refer to Schedule of Allowances for Allowances and monetary amounts of each allowance to be included in the contractor's base bid.

B. The Contractor shall include in his bid proposal all costs of office, job supervision, overhead, profit, and bond on the Contingency Allowances listed in the Schedule of Allowances, because no such costs will be paid to Contractor for work performed under these Contingency Allowances. Only the direct costs of performing work under this provision shall be paid under and charged against the Contingency Allowance; such cost includes costs of materials and delivery, installation labor, payroll taxes and insurance, equipment expense, and the cost of subcontracted work (subcontractor's cost may include a maximum of 15% mark-up for overhead and profit).

C. The Contractor shall include a line item in the Schedule of Values entitled “Contingency Allowance” with values as scheduled below. The estimated value of work completed pursuant to fully executed Contingency Allowance Authorizations may be included in the Contractor’s monthly Applications for Payment. Payments under this Contingency Allowance shall not exceed the net, total of fully executed Contingency Allowance Authorizations.

1. When a contingency allowance includes multiple items of work, each item of work shall be listed as a separate line item in the schedule of values with the approximate percentage complete for each scope of work listed.

D. At closeout of Contract, funds remaining in Contingency Allowance will be credited to Owner by Change Order along with a credit for OH&P in accordance with Alabama Community Cl requirements. The owner may, at his discretion, transfer balance of any contingency to another allowance.

1. Credit for overhead and profit (OH&P) on unused contingency allowance shall be fair and reasonable, equal to the amount of OH&P that was applied to the contingency amounts for the purposes of bidding, and in no case less than 5%.

E. An accounting of the costs charged against this Contingency Allowance shall be mutually maintained by the Contractor, Architect, and Owner throughout the course of the project.

F. Contingency Allowances to be executed on the forms attached to this section.

**1.04 ALLOWANCES SCHEDULE**

A. General Contingency Allowance : Include the stipulated sum of $(250,000.00) as designated in this Section (without sales tax included) for purchase, delivery, & installation of:
   1. Unforeseen conditions or minor changes that are necessary for an allowance as noted for the designated categoriessupplement the work as detailed in the Contract Documents and as determined by the owner.

B. Landscape Underground Sprinkler System Contingency Allowance: Include the stipulated sum of $40,000 for purchase, delivery, and installation of For the design, as approved by the architect,and the installation of a complete underground lawn sprinkler system. . This system shall be designed to tie into the existing irrigation from Phase 3 construction. Refer to Civil for additional; information. Refer to Landscape drawings and the Specification Sections 32 8423 - Under Ground Sprinklers, 32 9223 - Sodding, and 32 9300 - Planting for additional information. **Note: Landscaping, Sodding, Seeding, the double check sprinkler back flow preventor and 4" diameter PVC conduits are in the Base Bid.**

C. [Emergency Radio Responder System] Contingency Allowance: Include a stipulated sum of [$100,000.00] for puchase and delivery of System Components, and complete installation of System Components and all associated items in System. Base bid shall include testing for the Emergency Radio Responder System. Refer to Electrical Drawing **E4.00.**

D. Security System: Include the stipulated sum of $$300,000.00 for purchase, delivery, and installation of all Site Security System Components.. This includes interior and exterior cameras, audio gateways, access control components, service & licensing agreement for 10 years, associated conduit, mounting, etc. at all locations and all associated labor and equipment rentals.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

**SECTION 01 2101.01**
**GENERAL CONTINGENCY ALLOWANCE AUTHORIZATION**

**TSCC EXECUTIVE PARK BUILDING E RENOVATIONS**

**SS&L PROJECT NO.25206 - ACCS PROJECT NO. 2026108 TSCC**

**CONTINGENCY ALLOWANCE AUTHORIZATION FORM**

**AUTHORIZATION NO. _____ DATE: _____**

In accordance with Specification Section 01 2100 - ALLOWANCES, the Contractor, _____, is hereby authorized to proceed with the changes in Work as are described below and is to be paid for the performance of these changes as provided in Specification Section 01 2100. This Authorization shall become effective when it is signed by the Contractor and the Owner's representative and it is understood and agreed that the amount(s) stipulated below constitute full compensation for these changes in Work.

TOTAL AMOUNT OF THIS AUTHORIZATION $ _____

ORIGINAL AMOUNT OF THE GENERAL CONTINGENCY ALLOWANCE _$_____
(sales tax is not included)

NET TOTAL OF PREVIOUS AUTHORIZATIONS $ _____

PREVIOUS REMAINING GENERAL CONTINGENCY ALLOWANCE $ _____

TOTAL AMOUNT OF THIS AUTHORIZATION $ _____

GENERAL CONTINGENCY ALLOWANCE REMAINING AFTER THIS AUTHORIZATION
$ _____

| **RECOMMENDED BY:** | **AUTHORIZED BY:** | **ACCEPTED BY:** |
|---|---|---|
| _____ | _____ | _____ |
| **KAYLEE COFER, SS&L REPRESENTAIVE** | **DESIGNATED CONTRACTOR** | **ACCS** |

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# SECTION 01 2200
# UNIT PRICE

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. List of unit prices, for use in preparing Bids.

B. Measurement and payment criteria applicable to Work performed under a unit price payment method.

### 1.02 COSTS INCLUDED

A. A unit price is an amount proposed by Bidders and stated on the Bid Form as a price per unit of measurement for materials or services that will be added to or deducted from the Contract Sum by Change Order in the event the estimated quantities of Work required by the Contract Documents are increased or decreased.

B. Unit Prices included on the Bid Form shall include full compensation for all required labor, products, tools, equipment, plant, transportation, services and incidentals; erection, application or installation of an item of the Work; overhead and profit.

C. Refer to individual Specification Sections for construction activities requiring the establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.

D. Schedule: A "Unit Price Schedule" is included at the end of this Section. Specification Sections referenced in the Schedule contain requirements for materials and methods described under each unit price.

E. Under the provisions of Article 19 of the General Conditions of the Contract, the Owner reserves the right to negotiate a lower rate at the time of use of a unit price to implement work defined or required under the unit price provisions.

F. The following items of work are anticipated during the performance of this contract; however the exact quantity of each work item may not be determinable prior to bidding. The Contractor shall therefore, include in his Lump Sum Base Bid, an allowance for the following items in the quantities indicated: Allowance Unit Prices include all charges for labor, materials and equipment, shoring, layout, supervision (field and home office), general expenses, insurance, overhead and profit, but not limited to, for the accomplishment of the Allowance item(s). Where quantities of same items of work are defined and are quantified in the bid documents, the allowance quantities indicated hereinafter shall be in addition to those that are indicated. (Example: If the site grading plan indicated new and existing grades, the bidder shall compute the quantity of earthwork required and include that quantity of work in the bid the same as if no "allowance" quantity were specified. If an additional allowance quantity of earthwork is stipulated that stipulated allowance quantity of work shall also be included in addition to the quantity computed from the bidders earthwork "takeoff").

G. The following Unit Prices Quoted are for increases or decreases in the above quantities included in the Lump Sum Base Bid. These Unit Prices include all charges for labor, materials and equipment, shoring, layout, supervision (field and home office), general expenses, insurance, overhead and profit, but not limited to, for the accomplishment of the Allowance item(s).

H. Clarification Note: The Unit Prices quoted by the Contractor shall apply to increases (additive change orders) and to decreases (deductive change orders). This requirement shall supplement the requirements of the General Conditions and Instructions to Bidders. Changes in the contract amount that are computed using the Stated Allowances and Unit Prices shall be figured at the same unit price whether additive or deductive.

**1.03 UNIT QUANTITIES SPECIFIED**

A. Quantities indicated in the Bid Form are for bidding and contract purposes only. Quantities and measurements of actual Work will determine the payment amount.

**1.04 MEASUREMENT OF QUANTITIES**

A. Take all measurements and compute quantities. Measurements and quantities will be verified by Architect.

B. Assist by providing necessary equipment, workers, and survey personnel as required.

C. Measurement by Volume: Measured by cubic dimension using mean length, width and height or thickness.

D. Measurement by Area: Measured by square dimension using mean length and width or radius.

E. Linear Measurement: Measured by linear dimension, at the item centerline or mean chord.

F. The Owner reserves the right to reject the Contractor's measurement of work-in-place that involves use of established unit prices, and will have this Work measured by the Owner's geotechnical consultant, owner's civil engineer, or owner's other representatives as appropiate to trade.

**1.05 PAYMENT**

A. Payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities of Work that is incorporated in or made necessary by the Work and accepted by the Architect, multiplied by the unit price.

**1.06 SCHEDULE OF UNIT PRICES**

**UNIT PRICE NO. 1**

1. **Removal of Unsuitable Soil and Replacement with Engineered Fill (Exterior Site Work)**: **In addition** to the most stringent requirements of removal and replacement indicated on the plans and the Geotechnical Report the contractor shall include in his base bid the cost **per cubic yard** of removal of unsuitable soil and replacement with Engineered fill as called for in Section 31 2210 Earthwork and as shown on drawings and Geotechnical Report by Building and Earth. Removal and replacement shall be per industry standard and in accordance with requirements of project conditions and geotechnical engineer. The Contractor shall provide a unit figure at a rate of **cost per cubic yard** of removal and replacement. The Contractor shall include in his base bid a cost of **150 cubic yards** for removal and replacement, not otherwise called for in the specifications or shown on the plans.
    a. If the actual cubic yards of removal and replacement in addition to that called for on the plans is more than ***150*** **cubic yards** as required by the Contract Documents an amount (dollar for dollar) will be added to the contract amount at this rate for any cubic yards in excess.
    b. If the actual cubic yards of removal and replacement in addition to that called for on the plans is less than **150 cubic yards** as required by the Contract Documents an amount (dollar for dollar) will be deducted from the contract amount at this rate for any cubic yards in deficiency.

c. The Contractor shall alert the Architect prior to this work being performed to apprise the Architect of estimated quantities. If the Architect does not receive prior notice, the work in place will not be quantified towards the volumes listed above.

**UNIT PRICE NO. 2**

1. **Tuckpointing of Masonry Walls**: **In addition** to tuckpointing shown on the drawings, the Contractor shall include in his base bid the cost per **square foot** of tuckpointing of Masonry Walls as called for in Section 04 5600 - Tuckpointng Masonry Walls and as shown on drawings. Tuckpointing shall be per industry standard and in accordance with requirements of project conditions. The Contractor shall include in his base bid a cost of **200 Square Feet** for tuckpointing masonry walls.
   a. If the actual **square footage** of tuckpointing is more than **200 square feet**, as required by the Contract Documents, an amount (dollar for dollar) will be added to the contract amount at this rate for any square feet in excess.
   b. If the actual **square footage** of tuckpointing of masonry walls, is less than **200 square feet**, as required by the Contract Documents, an amount (dollar for dollar) will be deducted from the contract amount at this rate for any square foot in deficiency.
   c. The Contractor shall alert the Architect prior to this work being performed to apprise the Architect of estimated quantities. If the Architect does not receive prior notice, the work in place will not be quantified towards the volumes listed above.

**UNIT PRICE NO. 3**

1. **Replacing missing or damaged brick and /or Removing, Cleaning, and Resetting Bricks: In addition** to any bricks shown to be removed, replaced, or reset on the drawings, the Contractor shall include in his base bid the cost of replacing missing/damaged or resetting loose (Reugular and Special Shaped) bricks **per each brick** of Masonry Walls as called for in Section 04 2000 Unit Masonry and as shown on drawings. This work shall be per industry standard and in accordance with requirements of project conditions. The Contractor shall include in his base bid a cost of **50 Brick** located on the buildings or the exterior landscape walls that are to remain. This unit price is in additon to any brick work shown on drawings.
   a. If the actual brick count is more than **50 brick**, as required by the Contract Documents, an amount (dollar for dollar) will be added to the contract amount at this rate for any brick count in excess.
   b. If the actual brick count is less than **50 brick** as required by the Contract Documents, an amount (dollar for dollar) will be deducted from the contract amount at this rate for any square foot in deficiency.
   c. The Contractor shall alert the Architect prior to this work being performed to apprise the Architect of estimated quantities. If the Architect does not receive prior notice, the work in place will not be quantified towards the volumes listed above.

**UNIT PRICE NO. 4**

1. **Additional Tonnage of Steel Structural Components**: **In addition** to the Structural Steel specified and shown on the drawings the Contractor shall include in his base bid a unit price for the cost per Ton to provide additional steel angles, channels, tubes,and/or other structural members as directed. Location shall be by the Structural Engineer as directed by the architect and in compliance with the contract documents. The Contractor shall provide a unit figure at a rate of cost per Ton for additional Steel. The Contractor shall include an amount for provision of **2 Ton** of additional Steel not shown on the drawings in his base bid. Refer to Specifications Section 05 1200 Structural Steel and Structural drawings and notes for additional information and requirements. The contractor's tonage price shall include all installation, high strength bolts, fasteners, welding , and necessary accessories for a complete and structurally stable installation.
   a. If the actual weight of additional steel tonage being provided in addition to that called for on the plans is more than **2 Ton**, an amount (dollar for dollar) will be added to the contract amount at this rate for tonage in excess.
   b. If the actual weight of additional steel tonage being provided in addition to that called for on the plans is less than **2 Ton** an amount (dollar for dollar) will be deducted from the contract amount at this same rate.
   c. The Contractor shall alert the Architect prior to this work being performed to apprise the Architect of estimated quantities. If the Architect does not receive prior notice, the work in place will not be quantified towards the volumes listed above.

A. **UNIT PRICE NO. 5**

1. **Removal of Unsuitable Soil and Replacement with Engineered Fill (Interior Trenching): In addition** to the most stringent requirements of removal and replacement indicated on the plans and the Geotechnical Report the contractor shall include in his base bid the cost **per cubic yard** of removal of unsuitable soil and replacement with Engineered fill as called for in Section 31 2210 Earthwork and as shown on drawings and Geotechnical Report by Building and Earth. Removal and replacement shall be per industry standard and in accordance with requirements of project conditions and geotechnical engineer. The Contractor shall provide a unit figure at a rate of **cost per cubic yard** of removal and replacement. The Contractor shall include in his base bid a cost of **150 cubic yards** for removal and replacement, not otherwise called for in the specifications or shown on the plans. This price shall not include concrete removal and replacement, which is in the base bid.
   a. If the actual cubic yards of removal and replacement in addition to that called for on the plans is more than **150 cubic yards** as required by the Contract Documents an amount (dollar for dollar) will be added to the contract amount at this rate for any cubic yards in excess.
   b. If the actual cubic yards of removal and replacement in addition to that called for on the plans is less than **150 cubic yards** as required by the Contract Documents an amount (dollar for dollar) will be deducted from the contract amount at this rate for any cubic yards in deficiency.
   c. The Contractor shall alert the Architect prior to this work being performed to apprise the Architect of estimated quantities. If the Architect does not receive prior notice, the work in place will not be quantified towards the volumes listed above.

**UNIT PRICE NO. 6**

1. **Floor Vapor Proofing** : The Contractor shall provide a unit figure at a rate of cost per **square foot** of floor vapor proofing as specified in section 03 5400 Self-Leving Cast Underlayment. The contractor shall include in his base bid **500 square feet** of floor vapor proofing in addition to that called out on the plans and specifications.
2. If the actual **sqaure feet** of area in addition to that called for on the plans is more than **500 square feet** as required by the Contract Documents, an amount (dollar for dollar) will be added to the contract amount at this rate for any **square feet** in excess.
3. If the actual **square feet** of wall or ceiling demolition in addition to that called for on the plans is less than **500 square feet** as required by the Contract Documents, an amount (dollar for dollar) will be deducted from the contract amount at this rate for any square feet in deficiency.
4. The contractor shall alert the architect prior to this work being performed to apprise the architect of estimated quantities. If the architect does not receive prior notice, the work in place will not be quantified towards the **500 square feet.**

**UNIT PRICE NO. 7**

1. **Removal & Replacement of Exterior Metal Studs and Replacement with 6" wide 16 gauge Cold Formed Metal Framing**: **In addition** to cold formed metal studs removal and replacement shown in the Contract Documents, the Contractor shall add a unit price for additional cold-formed metal stud framing. Refer to specification section 05 4000 Cold-Formed Metal Framing for additional requirements.
2. The Contractor shall provide a unit figure at a rate of cost per **linear feet** of removal and replacement. The Contractor shall include in his base bid a cost of **250 linear feet** for removal and replacement. If the actual linear feet of removal and replacement in addition to that called for on the plans is more than **250 linear feet** as required by the Contract Documents, an amount (dollar for dollar) will be added to the contract amount at this rate for any linear feet in excess. If the actual linear feet of removal and replacement in addition to that called for on the plans is less than **250 linear feet** as required by the Contract Documents, an amount (dollar for dollar) will be deducted from the contract amount at this rate for any linear feet in deficiency. The Contractor shall alert the Architect prior to this work being performed to apprise the Architect of estimated quantities. If the Architect does not receive prior notice, the work in place will not be quantified towards the volumes listed above.

**UNIT PRICE NO. 8**

1. **Removal of failed asphalt pavement with Full depth asphalt pavement replacement:** The Contractor shall include in his base bid the cost per **square yard** of removing the thickness of the failed existing asphalt pavement including base and subgrade as necessary and replacement with full depth asphalt pavement per detail " full depth ashalt replacement Section" on cilvil sheet C6.1 and geo-technical report.
2. The Contractor shall provide a unit figure at a rate of cost per **square yard** of removal and replacement. The Contractor shall include in his base bid a cost of **1,250 square yards** for removal and replacement. If the actual **square yards** of removal and replacement is more than as required by the Contract Documents, an amount (dollar for dollar) will be added to the contract amount at this rate for any **square yards** in excess. If the actual **square yards** of removal and replacement is less than **1,250 square yards** as required by the Contract Documents, an amount (dollar for dollar) will be deducted from the contract amount at this rate for any **square yards** in deficiency. The Contractor shall alert the Architect prior to this work being performed to apprise the Architect of estimated quantities. If the Architect does not receive prior notice, the work in place will not be quantified towards the volumes listed above.

**UNIT PRICE NO. 9**

1. **Removal Damaged or Deteriorated Metal Roof Decking and Replacement with New Metal Roof Decking**: (Buliding E and Existing Maintenance Garage). The Contractor shall include in his base bid the cost per square foot of removal of damaged or deteriorated metal roof decking and replacement with new metal roof decking as called for in the Specifications Section 05 3100 Metal Decking and as shown on drawings. Replacement **shall match existing metal deck Gauge** and be per industry standards and in accordance with requirements of project conditions and all applicable codes. The Contractor shall provide a unit figure at a rate of cost per **square foot** of removal and replacement. The Contractor shall include in his base bid a cost of **9000 square feet** for removal and replacement, not otherwise called for in the specifications or shown on the plans.
2. If the actual square footage of removal and replacement is more than **9000 square feet** as required by the Contract Documents an amount (dollar for dollar) will be added to the contract amount at this rate for any square feet in excess.
3. If the actual square footage of removal and replacement is less than **9000 square feet** as required by the Contract Documents an amount (dollar for dollar) will be deducted from the contract amount at this rate for any square feet in deficiency.
4. At the Owners Option, quantities will be verified by the Owner's representative and - or the architect and will be based on the measurement of the volume of the void, resulting from the removal of the damaged or deteriorated metal roof decking. The contractor shall notify the Architect after removal and receive confirmation of his measurements prior to beginning replacement, otherwise no consideration will be given on account of this unit price.
5. The Contractor shall alert the Architect prior to this work being performed to notify the Architect of estimated quantities. If the Architect does not receive prior notice, the work in place will not be quantified towards the volumes listed above.

**UNIT PRICE NO. 10**

A. **Milling, 1.5" Asphalt Overlay + Striping:In addition** to the asphalt overlay and striping indicated on the plans and specified in section 32 1217 Asphalt Concrete Paving and section 32 1723.13 Painted Pavement Markings, the Contractor shall include in his base bid a unit price for the **cost per square yard** of aspahlt overlay and striping to provide additional asphalt overlay and striping. Location shall be as directed by the Architect. The Contractor shall provide a unit figure at a rate of cost per **square yard** for aspahlt overlay and striping. The Contractor shall include in his base bid an amount for provision of **250 square yards** of aspahlt overlay and striping.

B. If the actual square yards of aspahlt overlay and striping being provided to that called for on the plans is more than **250 square yards**, an amount (dollar for dollar) will be added to the contract amount at this rate for any square yards in excess of **250 square yards**.

C. If the actual **square yards** of aspahlt overlay and striping to that called for on the plans is less than **250 square yards**, an amount (dollar for dollar) will be deducted from the contract amount at this same rate.

D. The Architect shall verify all quantities.

**UNIT PRICE NO. 11**

A. **Removal and Replacement of Concrete Curb and Gutter:**The Contractor shall include in his base bid the **cost per linear foot** of 24" wide concrete curb and gutter. See Civil details. The Contractor shall provide a unit figure at a rate of **cost per linear foot** for the Contractor to remove existing unsuitable curb and gutter and replace with new concrete curb and gutter. The contraator shall include in his base bid a cost of **650 linear feet** fof removal and replacement.

B. If the actual **linear feet** of removal and replacement of concrete curb and gutter is more than **650 linear feet**, an amount (dollar for dollar) will be added to the contract amount at this rate for any linear feet in excess.

C. If the actual **linear feet** of of removal and replacement of concrete curb and gutter is less than **650 linear feet** , an amount (dollar for dollar) will be deducted from the contract amount at this rate for any **linear feet** in deficiency.

D. The Contractor shall alert the Architect prior to this work being performed to notify the Architect of estimated quantities. If the Architect does not receive prior notice, the work in place will not be quantified towards the volumes listed above.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

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# SECTION 01 3000
# ADMINISTRATIVE REQUIREMENTS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Electronic document submittal service. Procore , refer to Section 01 3150 - Project Management Communications

B. Preconstruction meeting.

C. Progress meetings.

D. Construction progress schedule.

E. Progress photographs. Procore

F. General Coordination Procedures.

G. Coordination drawings.

H. Submittals for review, information, and project closeout. Procore

I. Number of copies of submittals.

J. Submittal procedures. Procore

### 1.02 RELATED REQUIREMENTS

A. Section 01 1000 - Summary:

B. Section 01 3150 - Project Management Communications

C. Section 01 6000 - Product Requirements: General product requirements.

D. Section 01 7000 - Execution and Closeout Requirements: Additional coordination requirements.

E. Section 01 7800 - Closeout Submittals: Project record documents; operation and maintenance data; warranties and bonds.

F. Special Conditions of the Contract.

### 1.03 PROJECT COORDINATOR

A. Project Coordinator: The Contractor's project manager shall in conjunction with the contractor's project superintendent be responsible for all of the project coordination.

B. Make the following types of submittals to Architect through the Project Coordinator:
   1. Correction Punch List and Final Correction Punch List for Final Acceptance.

### 1.04 SUPERVISORY PERSONNEL REQUIREMENTS:

A. As outlined under Section 6 in the ACCS Contractor Pre-Qualification Application, the Bidder shall present to the Owner satisfactory evidence with its bid response that the Bidder’s construction management and supervisory personnel are skilled and experienced in the work to be undertaken on the project. Failure to provide materials suggested below could result in a determination that a bid or bidder is not responsive and/or responsible for this Project’s purposes.

B. The following minimum skills and experience shall be used to evaluate bid responses in light of the requirements set out in Section 6 of the ACCS Contractor Pre-Qualification Application:

1. Construction scheduling, sequencing, and supervision is the sole responsibility of the Contractor. The Contractor shall provide on-site, and off-site, staff as required to successfully complete all work required by the contract documents within the specified contract time. The following are minimum requirements/expectations of the owner for job supervision.
    a. Project Manager
        1) The Contractor shall employ at least one full-time, off-site project manager assigned to the project.
        2) The Contractor's project manager must be an employee of the General Contractor. Third-party project management will not be acceptable for the project.
        3) The Contractor shall provide a project manager with minimum of five years' experience serving as a project manager on projects of similar size, scope and complexity, and cost. Submission of a resume of the project manager with bid responses for evaluation purposes as set forth in Section 6 is strongly encouraged.
    b. Construction Superintendent
        1) In addition to the project manager, the Contractor shall assign an on-site project superintendent who is dedicated fulltime to the project.
        2) The construction superintendent must be an employee of the General Contractor. Third-party construction superintendents will not be acceptable for the project.
        3) The construction superintendent must be on site at all times that any work is being performed by the General Contractor's personnel or any personnel from a subcontractor.
        4) The Contractor may assign additional on-site superintendents as deemed necessary for successful completion of the work.
        5) The construction superintendent shall have a minimum of five years' experience serving as a construction superintendent on projects of similar size, scope, complexity and cost. Submission of a resume of the construction superintendent with bid responses for evaluation purposes as set forth in Section 6 is strongly encouraged.
    c. Quality Control (QC) Manager
        1) The Contractor shall employ a full-time, on-site, staff member to serve as the overall quality control manager for the project.
        2) The QC Manager must meet the following requirements:
            (a) The QC Manager must have documented experience serving in a quality control role for a minimum of 5 years .
            (b) The QC Manager must have served as the QC Manager on projects of similar size and complexity. An individual with experience on projects of similar size and complexity is defined as an individual meeting the following criteria: Served as construction superintendent or quality control manager for at least three projects exceeding $7,000,000 in construction cost.
            (c) The QC Manger must have experience in implementing and managing quality assurance (QA) and a quality control (QC) on projects of similar size and complexity.

3) The QC Manager may serve as an alternate superintendent for up to 5 consecutive calendar days upon either a planned or unexpected absence of one of the primary construction superintendents. If the primary superintendent absence overlaps or exceeds 5 consecutive calendar days, the Contractor shall assign a qualified individual to assume the role of the absent primary superintendent.
4) Submission of a resume of the QC manager with bid responses for evaluation purposes as set forth in Section 6 is strongly encouraged.

d. Site Safety Manager
1) In addition to the required construction superintendent and Site QC Manger, the General Contractor shall provide one or more Site Safety Mangers(s).
2) The role of site safety manager can be filled by the QC Manger or the Construction Superintendent.
(a) If the construction superintendent is intended to fill the role of Site Safety Manager, the required construction superintendent must meet the required OSHA credential below and shall serve as Site Safety Manger for the respective project scope.
(b) Alternatively, the QC Manager may serve as an overall Site Safety Manger.
3) The individual fulfilling the Site Safety Manager responsibility must have completed required OSHA training and be a holder, in good standing, of a current OSHA 30-Hour Card.
4) Submission of a copy of the Site Safety Manger's current OSHA 30-Hour Card with bid responses for evaluation purposes as set forth in Section 6 is strongly encouraged.

**1.05 CONTRACTOR'S QUALITY CONTROL (CQC) PLAN:**

A. Prior to start of work, submit a comprehensive plan describing how contract deliverables will be produced. Tailor CQC plan to specific requirements of the project. Include the following information:
1. Management Structure: Identify personnel responsible for quality. Include a chart showing lines of authority.
a. Include qualifications (in resume form), duties, responsibilities of each person assigned to CQC function.

B. Management Approach: Define, describe, and include in the plan specific methodologies used in executing the work.
1. Management and control of documents and records relating to quality.
2. Communications.
3. Coordination procedures.
4. Resource management.
5. Process control.
6. Inspection and testing procedures and scheduling.
7. Control of noncomplying work.
8. Tracking deficiencies from identification, through acceptable corrective action, and verification.
9. Control of testing and measuring equipment.
10. Project materials certification.
11. Managerial continuity and flexibility.

C. Owner will not make a separate payment for providing and maintaining a Quality Control Plan. Include associated costs in Bid price.

D. Acceptance of the plan is required prior to start of construction activities not including mobilization work. Owner's acceptance of the plan will be conditional and predicated on continuing satisfactory adherence to the plan. Owner reserves the right to require Contractor to make changes to the plan and operations, including removal of personnel, as necessary, to obtain specified quality of work results.

E. The required Quality Control Manager shall implement and manage the Contractor's Quality Control Plan for the entire duration of the project.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION**

**3.01 GENERAL COORDINATION PROCEDURES**

A. Coordination: Coordinate construction operations included in different Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations included in different Sections that depend on each other for proper installation, connection, and operation.
   1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
   2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
   3. Make adequate provisions to accommodate items scheduled for later installation.

B. Prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
   1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.

C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
   1. Preparation of Contractor's construction schedule.
   2. Preparation of the schedule of values.
   3. Installation and removal of temporary facilities and controls.
   4. Delivery and processing of submittals.
   5. Progress meetings.
   6. Preinstallation conferences.
   7. Project closeout activities.
   8. Startup and adjustment of systems.

**3.02 COORDINATION DRAWINGS**

A. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely indicated on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
   1. Approved trade shop drawings shall be utilized as the basis for the coordination drawings. Do not base Coordination Drawings on reproduction of Contract Documents or standard printed data.

2. Coordination drawings shall be submitted within 45 days after approval of Trade Shop Drawings.
3. Coordination drawings shall utilize electronic means of analyzing the work of each trade in spatial relationship with other trades. Locations of conflicts between trades, and the proposed resolution for each conflict, shall be noted on the coordination drawings submitted. The intent is for the various trades to force themselves to each provide layout of their own Work on plans, review each other's layouts, and then make necessary modifications to their own respective Work until any potential conflicts are resolved.
4. No work shall be fabricated and/or installed prior to receipt by the Contractor of approved trade shop drawings and approved coordination drawings without specific written authorization from the Architect. No change orders will be approved or design assistance provided for remedial field coordination activities for work fabricated and/or installed prior to receipt by the Contractor of approved trade shop drawings and approved coordination drawings.
5. Submitted Coordination Drawings are for information only and typically will not be returned to the Contractor. Architect will not take any action, but may define coordination conflicts or problems and inform the Contractor of such conflicts or problems.
6. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
    a. Show sequencing and spatial relationship of separate units of work that must function in a restricted manner to fit in the space provided, or function as indicated.
    b. Indicate dimensions shown on Contract Drawings and make specific note of dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Architect for resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
    c. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
    d. Coordinate the addition of trade-specific information to coordination drawings in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
    e. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
    f. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
    g. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
    h. Indicate required installation sequences.
    i. Indicate dimensions shown on Drawings. Specifically note dimensions that appear to be in conflict with submitted equipment and minimum clearance requirements. Provide alternative sketches to Architect indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
7. Format:
    a. a. Coordination is to be done in 30 and presented for review in 20.
    b. b. Coordination Drawings shall be drawn to a scale of not smaller than 1/4" = 1'-0".
    c. Provide drawings on electronic media in REVIT 2016 (.dwg) format.

d. Provide layering system separate from wall outline and unique to each consulting Discipline.
e. In addition to plan view, provide sections as required to clarify congested situations and verify vertical clearances.
f. One set of digital data files of Drawings for use in preparing coordination digital data files will be provided by the Architect.
    1) Base drawings in AutoCAD (.dwg) format
    2) A set of models in Revit (.rvt) format - for reference only
g. The Architect makes no representations as to the accuracy or completeness of digital files as they relate to Drawings.
h. The Contractor shall execute a data licensing agreement in the form of Agreement included in this Project Manual.

B. Coordination Drawing Organization: Organize coordination drawings as follows:
1. Contractor is responsible for coordinating all items noted below with all building components to prevent collisions and maintain code clearance requirements. Avoiding collisions is the responsibility of the contractor.
2. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
3. Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within plenums to accommodate layout of light fixtures and other components indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
4. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
5. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
6. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
7. Review: Architect will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Architect determines that coordination drawings are not being prepared in sufficient scope or detail. or are otherwise deficient, Architect or Construction Manager will so inform Contractor, who shall make changes as directed and resubmit.
8. Coordination Drawing Prints: Prepare coordination drawing prints according to requirements in Submittal Procedures.
9. HVAC Shop Drawings: Begin database as HVAC shop drawings, indicating all ductwork, piping, equipment, and location of mechanical room floor drains and electrical connections to motors. Indicate elevations and sizes of all ductwork piping.
    a. Show the following:
        1) Runs of vertical and horizontal piping 1-1/4 inches (32 mm) in diameter and larger.
        2) Sizes, shapes, and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
        3) Major components, such as dampers, valves, diffusers, access doors, cleanouts, mechanical equipment and electrical distribution equipment.

4) Fire-rated enclosures around ductwork.
5) All clearances above or around equipment

b. Upon completion of HVAC shop drawings, transmit electronic database to plumbing subcontractor.

10. Plumbing Shop Drawings: Plumbing subcontractor shall add all pluming piping, controls and valves, and fixtures to database.
    a. Upon completion of Plumbing shop drawings, transmit electronic database to fire protection
11. Fire Protection Shop Drawings: Fire Protection subcontractor shall add all fire protection equipment, piping, sprinkler heads, and other elements to database.
    a. Show the following:
        1) Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
        2) All equipment, panels, and pumps and required clearances
    b. Upon completion of Fire Protection shop drawings, transmit electronic database to electrical subcontractor.
12. Electrical Shop Drawings: Electrical subcontractor shall add all electrical fixtures, conduit, and equipment to database.
    a. Show the following:
        1) Runs of vertical and horizontal conduit 1-1/4 inches (32 mm) in diameter and larger; two or more conduits running together requiring a rack
        2) Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
        3) Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
        4) Location of pull boxes and junction boxes, dimensioned from column center lines.
        5) All clearances above or around equipment
    b. Upon completion of Electrical shop drawings, transmit electronic database to General Contractor for final coordination.
13. General Contractor's Final Coordination: General Contractor shall thoroughly review shop drawings, adding additional building elements where appropriate, and shall resolve conflicts, coordinate with the Architect, and various subcontractors.
14. Submit Coordination Shop Drawings: Upon completion of the final coordination, General Contractor shall approve coordinate shop drawings and transmit 3 sets of hard copies and electronic files on CD's to Architect.
15. The Architect will not process sheet metal or fire protection shop drawings until such time as the coordination drawings have been sufficiently completed and conflicts resolved. This may be done on a floor-by-floor basis as a minimum.
16. No work shall be fabricated and/or installed prior to receipt by the Contractor of approved coordination drawings and trade shop drawings without specific written authorization from the Architect. No change orders will be approved or design assistance provided for remedial field coordination activities for work fabricated and/or installed prior to receipt by the Contractor of approved coordination drawings and approved trade shop drawings.

C. Record Drawings: Contractor shall provide and maintain a record set of Contract Documents in the Contractor's site office. The Contractor will update this record set on a weekly basis at a minimum, and review with the Owner's Construction Project Manager prior to issuance of a monthly certificate for payment to the Contractor. This record set shall include, but not be limited to the following:

1. Known and intended conditions of the Work (Contract Documents) inclusive of Addenda 2. Revisions due to:
   a. Post-bid Negotiations b. Field Orders
   b. Architect's Supplemental Instructions or Directives
   c. Items reported and noted by Contractor, Owner, Architect or Project Manager
2. Verified conditions which differ from surveys, documents, records, etc.

### 3.03 ELECTRONIC DOCUMENT SUBMITTAL SERVICE

A. All documents transmitted for purposes of administration of the contract are to be in electronic (PDF, MS Word, or MS Excel) format, as appropriate to the document, and transmitted via an Internet-based submittal service that receives, logs and stores documents, provides electronic stamping and signatures, and notifies addressees via email.
   1. Besides submittals for review, information, and closeout, this procedure applies to Requests for Interpretation (RFIs), progress documentation, contract modification documents (e.g. supplementary instructions, change proposals, change orders), applications for payment, field reports and meeting minutes, Contractor's correction punchlist, and any other document any participant wishes to make part of the project record.
   2. Contractor and Architect are required to use this service.
   3. It is Contractor's responsibility to submit documents in allowable format.
   4. Subcontractors, suppliers, and Architect's consultants will be permitted to use the service at no extra charge.
   5. Users of the service need an email address, internet access, and PDF review software that includes ability to mark up and apply electronic stamps (such as Adobe Acrobat, www.adobe.com, or Bluebeam PDF Revu, www.bluebeam.com), unless such software capability is provided by the service provider.
   6. Paper document transmittals will not be reviewed; emailed electronic documents will not be reviewed.
   7. All other specified submittal and document transmission procedures apply, except that electronic document requirements do not apply to samples or color selection charts.

B. Submittal Service: The selected service is:
   1. e Builder, refer to Section 01 3150 Project Mangaement Communications.

C. Project Closeout: Architect will determine when to terminate the service for the project and is responsible for obtaining archive copies of files for Owner.

### 3.04 PRECONSTRUCTION MEETING

A. Architect will schedule a meeting after notice to proceed.

B. Attendance Required:
   1. Owner.
   2. Architect.
   3. Contractor.
   4. All major sub contractors and suppliers.
   5. Alabama Community College System's Representative and Owner's Representative from Trenholm State Community College.
   6. City of Montgomery Inspectors as required by City.

C. Agenda:
   1. As outlined in the Alabama Community College System's Facilities Manual of Procedures

D. Architect will record minutes and distribute copies promptly after meeting to participants, with copies to the Contractor, Owner, participants, and those affected by decisions made

**3.05 PROGRESS MEETINGS**

A. Project Coordinator will make arrangements for meetings, prepare agenda with copies for participants, preside at meetings.

B. Attendance Required:
   1. Contractor. - Project Manager
   2. Owner.
   3. Architect.
   4. Contractor's superintendent.
   5. Major subcontractors.

C. Attendance Required: Job superintendent, Contractor's Project Manager, Owner, Architect, and major Subcontractors/Suppliers when necessary/requested by the Owner/Architect/Contractor.

D. Agenda:
   1. Review minutes of previous meetings.
   2. Review of work progress.
   3. Field observations, problems, and decisions.
   4. Identification of problems that impede, or will impede, planned progress.
   5. Review of submittals schedule and status of submittals.
   6. Maintenance of progress schedule.
   7. Corrective measures to regain projected schedules.
   8. Planned progress during succeeding work period.
   9. Maintenance of quality and work standards.
   10. Effect of proposed changes on progress schedule and coordination.
   11. Review of modifications to project record documents documenting changes made on site since previous progress meeting.
   12. Other business relating to work.

E. Architect will record minutes and distribute copies promptly after meeting to participants, with copies to Architect and Owner. Contractor will be responsible for distributing minutes to suppliers/SubContractor and those affected by decisions made.

**3.06 CONSTRUCTION PROGRESS SCHEDULE -**

A. Submit proposed project schedule as outlined in the General Conditions of the Contract for Construction.

B. General Requirements:
   1. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Substantial Completion to date of Final Completion.
   2. Activities: Treat each separate area as a separate numbered activity for each principal element of the Work. Comply with the following:
      a. Activity Duration: Define activities so no activity is longer than twenty days, unless specifically allowed by Architect.
      b. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 60 days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.

c. Submittal Review Time: Include review and resubmittal times indicated in Division 1 Section "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
d. Startup and Testing Time: Include not less than seven days for startup and testing.
e. Final Completion: Indicate completion in advance of date established for Final Completion, and allow time for Architect's administrative procedures necessary for certification of Final Completion.

3. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule, and show how the sequence of the Work is affected.
   a. Phasing: Arrange list of activities on schedule by phase.
   b. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
   c. Products Ordered in Advance: Include a separate activity for each product. Include delivery date indicated in Division 1 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
   d. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Division 1 Section "Summary." Delivery dates indicated stipulate the earliest possible delivery date.
   e. Work Restrictions: Show the effect of the following items on the schedule:
      1) Coordination with existing construction.
      2) Limitations of continued occupancies.
      3) Uninterruptible services.
      4) Partial occupancy before Final Completion.
      5) Use of premises restrictions.
      6) Provisions for future construction.
      7) Seasonal variations.
      8) Environmental control.
4. Milestones: Include milestones indicated in the Contract Documents in schedule, including, but not limited to, the Notice to Proceed, review inspections by review agencies, and Final Completion.
5. Cost Correlation: At the head of schedule, provide a cost correlation line, indicating planned and actual costs. On the line, show dollar volume of the Work performed as of dates used for preparation of payment requests.
   a. Refer to Division 1 Section "Payment Procedures" for cost reporting and payment procedures.
6. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using fragnets to demonstrate the effect of the proposed change on the overall project schedule.

C. Gantt-Chart Schedule:
1. Submit a comprehensive, fully developed, horizontal Gantt-chart-type, Contractor's Construction Schedule within thirty days of date established from the Notice to Proceed. Base schedule on the Preliminary Construction Schedule and whatever updating and feedback was received since the start of Project.
2. Preparation: Indicate each significant construction activity separately. Identify first workday of each week with a continuous vertical line.
   a. For construction activities that require 3 months or longer to complete, indicate an estimated completion percentage in ten percent increments within time bar.

D. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule one week before each regularly scheduled progress meeting.
   1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
   2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
   3. As the Work progresses, indicate Actual Completion percentage for each activity.

E. Distribution: Distribute copies of approved schedule to Architect, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
   1. Post copies in Project meeting rooms and temporary field offices.
   2. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.

**3.07 REPORTS**

A. Daily Construction Reports: Prepare a daily construction report and email to all required parties by noon of the following work day, recording the following information concerning events at Project site: Utilize procore.
   1. List of subcontractors at Project site.
   2. List of separate contractors at Project site.
   3. Approximate count of personnel at Project site.
   4. High and low temperatures and general weather conditions.
   5. Accidents.
   6. Meetings and significant decisions.
   7. Unusual events (refer to special reports).
   8. Stoppages, delays, shortages, and losses.
   9. Orders and requests of authorities having jurisdiction.
   10. Applicable photographs, noting location and condition.

**3.08 PRE-CONSTRUCTION PHOTOGRAPHS**

A. Before starting construction, take one hundred color photographs and digital video recording of Project site and affected City right-of-ways and surrounding properties and interior existing photos of affected areas from different vantage points, as directed by Architect. Show existing conditions adjacent to property. Utilize Procore

**3.09 PROGRESS PHOTOGRAPHS**

A. Submit photographs with each application for payment, taken not more than 3 days prior to submission of application for payment. Utilize Procore

B. Provide photographs of site and construction throughout progress of Work produced by an experienced photographer, who can also be an employee of the contractor, acceptable to Architect.

C. In addition to periodic, recurring views, take photographs of each of the following events: Notate location of photograghs.
   1. Completion of site clearing site
   2. Excavations in progress.

3. Foundations in progress and upon completion.
4. Structural framing in progress and upon completion.
5. Enclosure of building, upon completion.
6. Final completion, minimum of ten (10) photos.

D. Views:
1. Provide non-aerial photographs from four cardinal views at each specified time, until Date of Final Completion.
2. Consult with Architect for instructions on views required.
3. Provide factual presentation.
4. Provide correct exposure and focus, high resolution and sharpness, maximum depth of field, and minimum distortion.

E. Digital Photographs: 24 bit color, minimum resolution of 1024 by 768, in JPG format; provide files unaltered by photo editing software.
1. Delivery Medium: Via email. or Procore as determined by architect.
2. File Naming: Include project identification, date and time of view, and view identification.
3. PDF File: Assemble all photos into printable pages in PDF format, with 2 to 3 photos per page, each photo labeled with file name; one PDF file per submittal.
4. Hard Copy: Printed hardcopy (grayscale) of PDF file and point of view sketch.

## 3.10 SUBMITTALS FOR REVIEW

A. When the following are specified in individual sections, submit them for review:
1. Product data.
2. Design data.
3. Shop drawings.
4. Samples for selection.
5. Samples for verification.
6. utilize Procore

B. Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

C. Samples will be reviewed for aesthetic, color, or finish selection.

D. After review, provide copies and distribute in accordance with SUBMITTAL PROCEDURES article below and for record documents purposes described in Section 01 7700 - Project Closeout and 01 7813 - Project Closeout Check List

E. The Owner, Architect, and Contractor may decide to do submittals electronically as an option to using hard copy submittals.

## 3.11 SUBMITTALS FOR INFORMATION

A. When the following are specified in individual sections, submit them for information:
1. Certificates.
2. Test reports.
3. Inspection reports.
4. Manufacturer's instructions.
5. Manufacturer's field reports.
6. Other types indicated.

B. Submit for Architect's knowledge as contract administrator or for Owner.

### 3.12 SUBMITTALS FOR PROJECT CLOSEOUT

A. Submit Correction Punch List for Substantial Completion.

B. Submit Final Correction Punch List for Substantial Completion.

C. When the following are specified in individual sections, submit them at project closeout in conformance to requirements of Section 01 7800 - Closeout Submittals:

D. Submit for Owner's benefit during and after project completion.

### 3.13 NUMBER OF COPIES OF SUBMITTALS

A. Electronic Documents: Submit one electronic copy in PDF format; an electronically-marked up file will be returned. Create PDFs at native size and right-side up; illegible files will be rejected. Utilize eBuil

B. Samples: Submit the number specified in individual specification sections; one of which will be retained by Architect.
   1. After review, produce duplicates.
   2. Retained samples will not be returned to Contractor unless specifically so stated.

### 3.14 SUBMITTAL PROCEDURES

A. General Requirements: utilize Procore

B. Shop Drawing Procedures:
   1. Prepare accurate, drawn-to-scale, original shop drawing documentation by interpreting the Contract Documents and coordinating related Work.
   2. Generic, non-project specific information submitted as shop drawings do not meet the requirements for shop drawings.

C. Transmit each submittal with a copy of approved submittal form.

D. Sequentially number the transmittal form. Revise submittals with original number and a sequential alphabetic suffix.

E. Identify Project, Contractor, Subcontractor or supplier; pertinent drawing and detail number, and specification section number, as appropriate on each copy.

F. Apply Contractor's stamp, signed or initialed certifying that review, approval, verification of Products required, field dimensions, adjacent construction Work, and coordination of information is in accordance with the requirements of the Work and Contract Documents. Submittals not including the Contractor's stamp will be returned without review.

G. Schedule submittals to expedite the Project, and coordinate submission of related items.

H. For each submittal for review, allow a minimum of 15 days excluding delivery time to and from the Contractor. Complicated submittals, and those submittals requiring review by architect's consultants or coordination with other trades may required additional review time. Contractor shall provide submittals in sufficient time to allow for review without impacting construction schedule. Contractor to advise Architect when review of submittal by certain dates is critical to the project schedule.

I. Identify variations from Contract Documents and Product or system limitations that may be detrimental to successful performance of the completed Work. Refer to General Conditions of the Contract for Construction regarding variations from Contract Documents.

J. Provide space for Contractor and Architect review stamps.

K. When revised for resubmission, identify all changes made since previous submission.

L. Distribute reviewed submittals as appropriate. Instruct parties to promptly report any inability to comply with requirements.

M. Submittals not requested will not be recognized or processed.

**END OF SECTION**

# SECTION 01 3150
# PROJECT MANAGEMENT COMMUNICATIONS

## PART 1 GENERAL

### 1.01 RELATED DOCUMENTS

A. Attention is directed to the Contract, General Conditions, SPECIAL CONDITIONS and all Sections within Division 1 – GENERAL REQUIREMENTS, which are hereby made a part of this Section.

B. Refer to specification SECTION 01300 - SUBMITTALS for additional information.

### 1.02 SUMMARY

A. Project Management Communications: The Contractor whose project shall use the Internet web based project management communications tool, **Procore** software and protocols included in that software during this project. The use of project management communications as herein described does not replace or change any contractual responsibilities of the participants.
   1. Project management communications shall be available through **Procore**
   2. The project communications database shall be on-line and fully functional. User registration, fees, electronic and computer equipment, and Internet connections are the responsibility of each project participant. The sharing of user accounts is prohibited.

B. Training: **Procore** provides on line training resources if needed.

C. Support: **Procore** will provide on-going support through on-line help files.

D. Copyrights and Ownership: Nothing in this specification or the subsequent communications supersedes the parties' obligations and rights for copyright or document ownership as established by the Contract Documents. The use of CAD files, processes or design information distributed in this system is intended only for the project specified herein.

E. Purpose: The intent of using **Procore** is to improve project work efforts by promoting timely initial communications and responses. Secondly, to reduce the number of paper documents while providing improved record keeping by creation of electronic document files.

F. Requirements and Cost: The Owner and his representatives, the Architect and his consultants, and the General Contractor shall use the Internet based project communications system and database hereafter referred to as **Procore** during construction of this project until twelve (12) months after the date of Substantial Completion.
   1. **The General Contractor shall purchase (2) Procore user licenses for the Contractor's own use (one for the on site superintendent and one for the contractor's project manager.**
      a. **Additional user licences may be purchased as needed by the contractor.**
   2. **The General Conractor shall purchase (1) user license of Procore for use by the Architect. This is in addition to the General Contractor user licenses.**
   3. The General Contractor shall obtain user licenses within 15 days commencing the execution of the Owner Contractor Agreement.
   4. User licenses shall be renewed each year until twelve (12) months after substantial completion. Payment for renewal of user licenses shall be made directly to **Procore** in a form satisfactory to them.

G. Authorized Users: Access to the web site will be by individuals who are licensed users.
   1. Individuals may use the User Application included in these specifications or may request the User Application.
   2. The Contractor's **Procore** adminisrator shall add users to their account for the Project.

3. The user shall receive an e-mail from **Procore** for payment to det up their account.
4. Individuals shall be responsible for the proper use of their passwords and access to data as agents of the company in which they are employed.

H. Administrative Users: Administrative users have access and control of user licenses and all posted items. DO NOT POST PRIVATE OR COMPANY CONFIDENTIAL ITEMS IN THE DATABASE! Improper or abusive language toward any party or repeated posting of items intended to deceive or disrupt the work of the project will not be tolerated and will result in deletion of the offensive items and revocation of user license at the sole discretion of the Administrative User(s).

I. Communications: The use of fax, email and courier communication for this project is discouraged in favor of using **Procore** to send messages. Communication functions shall be as follows:
   1. Document Integrity and Revisions:
      a. Documents, comments, drawings and other records posted to the system shall remain for the project record. The authorship time and date shall be recorded for each document submitted to the system. Submitting a new document or record with a unique ID, authorship, and time stamp shall be the method used to make modifications or corrections.
      b. The system shall make it easy to identify revised or superseded documents and their predecessors.
      c. Server or Client side software enhancements during the life of the project shall not alter or restrict the content of data published by the system. System upgrades shall not affect access to older documents or software.
   2. Document Security:
      a. The system shall provide a method for communication of documents. Documents shall allow security group assignment to respect the contractual parties' communication except for Administrative Users. DO NOT POST PRIVATE OR COMPANY CONFIDENTIAL ITEMS IN THE DATABASE!
   3. Document Integration:
      a. Documents of various types shall be logically related to one another and discoverable. For example, requests for information, daily field reports, supplemental sketches and photographs shall be capable of reference as related records.
      b. Reporting:
      c. The system shall be capable of generating reports for work in progress, and logs for each document type. Summary reports generated by the system shall be available for team members.
   4. Notifications and Distribution:
      a. Document distribution to project members shall be accomplished both within the extranet system and via email as appropriate. Project document distribution to parties outside of the project communication system shall be accomplished by secure email of outgoing documents and attachments, readable by a standard email client.
   5. Required Document Types:
      a. RFI, Request for Information.
      b. Submittals, including record numbering by drawing and specification section.
      c. Transmittals, including record of documents and materials delivered in hard copy.
      d. Meeting Minutes.
      e. Application for Payments.
      f. Review Comments.
      g. Daily Field Reports.

h. Construction Photographs.
i. Drawings.
j. Supplemental Sketches.
k. Schedules.
l. Specifications.
m. Close-Out Documents.

J. Record Keeping: Except for paper documents, which require original signatures and large format documents (greater than 11 x 17 inches), all other documents shall be submitted by transmission in electronic form to the **Procore** web site by licensed users.
   a. The Owner and his representatives, the Architect and his consultants, the General Contractor, and his sub-contractors shall respond to documents received in electronic form on the web site, and consider them as if received in paper document form.
   b. The Owner and his representatives, the Architect and his consultants, General Contractor and his sub-contractors reserves the right to and shall reply or respond by transmissions in electronic form on the web site to documents actually received in paper document form.
   c. The Owner and his representatives, the Architect and his consultants, the General Contractor and his sub-contractors reserves the right to and shall copy any paper document into electronic form and make same available on the web site.
   d. The following are some but not all of the paper documents which require original signature or DocuSign as noted below:
      1) Contract, DocuSign perACCS
      2) Change Orders, DocuSign per ACCS
      3) Application & Certificates for Payment, Email wit
      4) Request for Proposals, Procore
         (a) Minimum Equipment and Internet Connection: In addition to other requirements specified in this Section, the Owner and his representatives, the Program Manager and his representatives, the Architect and his consultants, the General Contractor and his sub-contractors required to have a user license(s) shall be responsible for the following:
2. Providing suitable computer systems for each licensed user at the users normal work location with high-speed Internet access, i.e. DSL, local cable company's Internet connection, or T1 connection.
3. Each of the above referenced computer systems shall have the following minimum system1 and software requirements:
   a. Desktop configuration (Laptop configurations are similar and should be equal to or exceed desktop system.
      1) PC System intel core i5 or equivalent AMD processor (Minimum)
      2) 8 GB Ram (minimum)
      3) Display LCD 1920 x 1080 full HD
      4) 101 Keys on a Key  Board
      5) Mouse or other pointing Device
   b. Operating system and software shall be properly licensed.
   c. Windows 11 Pro Operating System
      1) Microsoft Edge or other browser (current version is a free distribution for download). This specification is not intended to restrict the host server or client computers provided that industry standard HTTP clients may access the published content.
      2) Adobe Acrobat Reader (current version is a free distribution for download).

3) Or, users intending to scan and upload to the documents area of TeamBuilder® should have Adobe Acrobat (current version must be purchased).
4) Users should have the standard Microsoft Office Suite (current version must be purchased) or the equivalent.

**PART 2 PRODUCTS (NOT APPLICABLE.)**

**PART 3 EXECUTION (NOT APPLICABLE.)**

**3.01 USER APPLICATION FORM FOLLOWS THIS PAGE**

**END OF SECTION**

# SECTION 01 4000
# QUALITY REQUIREMENTS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Submittals.

B. Quality assurance.

C. References and standards.

D. Testing and inspection agencies and services.

E. Control of installation.

F. Mock-ups.

G. Manufacturers' field services.

H. Defect Assessment.

### 1.02 RELATED REQUIREMENTS

A. Section 01 3000 - Administrative Requirements: Submittal procedures.

B. Section 01 4216 - Definitions.

C. Section 01 6000 - Product Requirements: Requirements for material and product quality.

### 1.03 REFERENCE STANDARDS

A. ASTM C1077 - Standard Practice for Agencies Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Testing Agency Evaluation; 2026.

B. ASTM E329 - Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection; 2026.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Design Data: Submit for Architect's knowledge as contract administrator for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents, or for Owner's information.

C. Report/Inspection Data: Written reports of each inspection, test or similar service shall include, but not be limited to:
   1. Date of issue.
   2. Project title and number.
   3. Name, address and telephone number of testing agency.
   4. Dates and locations of samples and tests or inspections.
   5. Names of individuals making the inspection or test.
   6. Designation of the Work and test method.
   7. Identification of product and Specification Section.
   8. Complete inspection or test data.
   9. Test results and an interpretation of test results.
   10. Ambient conditions at the time of sample-taking and testing.
   11. Comments or professional opinion as to whether inspected or tested Work complies with Contract Document requirements.
   12. Name and signature of laboratory inspector.
   13. Recommendations on retesting.

14. **The independent testing agency shall submit a certified written report of each inspection, test or similar service, to the Architect, in duplicate, unless the Contractor is responsible for the service**. If the Contractor is responsible for the service, submit a certified written report of each inspection, test or similar service through the Contractor, in duplicate.
15. Submit additional copies of each written report directly to the governing authority, when the authority so directs.

D. Certificates: When specified in individual specification sections, submit certification by the manufacturer and Contractor or installation/application subcontractor to Architect, in quantities specified for Product Data.
1. Indicate material or product conforms to or exceeds specified requirements. Submit supporting reference data, affidavits, and certifications as appropriate.
2. Certificates may be recent or previous test results on material or product, but must be acceptable to Architect.

E. Manufacturer's Instructions: When specified in individual specification sections, submit printed instructions for delivery, storage, assembly, installation, start-up, adjusting, and finishing, for the Owner's information. Indicate special procedures, perimeter conditions requiring special attention, and special environmental criteria required for application or installation.

F. Manufacturer's Field Reports: Submit reports for Architect's benefit as contract administrator or for Owner.
1. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

G. Erection Drawings: Submit drawings for Architect's benefit as contract administrator or for Owner.
1. Submit for information for the limited purpose of assessing conformance with information given and the design concept expressed in the contract documents.

## 1.05 QUALITY ASSURANCE

A. Testing Agency Qualifications: Refer to individual Specification Sections for additional information and requirements of the testing.

## 1.06 REFERENCES AND STANDARDS

A. For products and workmanship specified by reference to a document or documents not included in the Project Manual, also referred to as reference standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. Conform to reference standard of date of issue current on date of Contract Documents, except where a specific date is established by applicable code.

C. Obtain copies of standards where required by product specification sections.

D. Maintain copy at project site during submittals, planning, and progress of the specific work, until Substantial Completion.

E. Should specified reference standards conflict with Contract Documents, request clarification from Architect before proceeding.

F. Neither the contractual relationships, duties, or responsibilities of the parties in Contract nor those of Architect shall be altered from the Contract Documents by mention or inference otherwise in any reference document.

### 1.07 TESTING AND INSPECTION AGENCIES AND SERVICES

A. Contractor Responsibilities: **The Contractor shall provide inspections, tests and similar quality control services, specified in individual Specification Sections and required by governing authorities, except where they are specifically indicated to be the Owner's responsibility, or are provided by another identified entity; these services include those specified to be performed by an independent agency and not by the Contractor. Costs for these services shall be included in the Contract Sum.**

B. The Contractor shall employ and pay a separate, designated, experienced quality control person, to perform full time on site construction quality control services.

C. Retesting: The Contractor is responsible for retesting where results of required inspections, tests or similar services prove unsatisfactory and do not indicate compliance with Contract Document requirements, regardless of whether the original test was the Contractor's responsibility.
   1. Cost of retesting construction revised or replaced by the Contractor is the Contractor's responsibility, where required tests were performed on original construction.

D. Associated Services: The Contractor shall cooperate with agencies performing required inspections, tests and similar services and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include but are not limited to:
   1. Providing access to the Work and furnishing incidental labor and facilities necessary to facilitate inspections and tests.
   2. Taking adequate quantities of representative samples of materials that require testing or assisting the agency in taking samples.
   3. Providing facilities for storage and curing of test samples, and delivery of samples to testing laboratories.
   4. Providing the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.
   5. Security and protection of samples and test equipment at the Project site.

E. Responsibilities: The Contractor will employ and pay for the services of an independent agency, testing laboratory or other qualified firm to perform services which are specifically noted as the Contractor's responsibility. If not specifically noted as the Owner’s responsibility, the Contractor shall provide these services.

F. Coordination: The Contractor and each agency engaged to perform inspections, tests and similar services shall coordinate the sequence of activities to accommodate required services with a minimum of delay. In addition the Contractor and each agency shall coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.

G. The Contractor is responsible for scheduling times for inspections, tests, taking samples and similar activities.

## PART 2 EXECUTION

### 2.01 CONTROL OF INSTALLATION

A. Monitor quality control over suppliers, manufacturers, products, services, site conditions, and workmanship, to produce Work of specified quality.

B. Comply with manufacturers' instructions, including each step in sequence.

C. Should manufacturers' instructions conflict with Contract Documents, request clarification from Architect before proceeding.

D. Comply with specified standards as minimum quality for the Work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.

E. Have Work performed by persons qualified to produce required and specified quality.

F. Verify that field measurements are as indicated on shop drawings or as instructed by the manufacturer.

G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, and disfigurement.

## 2.02 TESTING AND INSPECTION

A. Testing Agency Duties:
   1. Provide qualified personnel at site. Cooperate with Architect and Contractor in performance of services.
   2. Perform specified sampling and testing of products in accordance with specified standards.
   3. Ascertain compliance of materials and mixes with requirements of Contract Documents.
   4. Promptly notify Architect and Contractor of observed irregularities or non-conformance of Work or products.
   5. Perform additional tests and inspections required by Architect.
   6. Submit reports of all tests/inspections specified.

B. Limits on Testing/Inspection Agency Authority:
   1. Agency may not release, revoke, alter, or enlarge on requirements of Contract Documents.
   2. Agency may not approve or accept any portion of the Work.
   3. Agency may not assume any duties of Contractor.
   4. Agency has no authority to stop the Work.

C. Contractor Responsibilities:
   1. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.
   2. Provide incidental labor and facilities:
      a. To provide access to Work to be tested/inspected.
      b. To obtain and handle samples at the site or at source of Products to be tested/inspected.
      c. To facilitate tests/inspections.
      d. To provide storage and curing of test samples.
   3. Notify Architect and laboratory 24 hours prior to expected time for operations requiring testing/inspection services.
   4. When required, employ services of an independent qualified testing laboratory and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.
   5. When required, arrange with Owner's agency and pay for additional samples, tests, and inspections required by Contractor beyond specified requirements.

D. Re-testing required because of non-conformance to specified requirements shall be performed by the same agency on instructions by Architect.

E. Re-testing required because of non-conformance to specified requirements shall be paid for by Contractor.

### 2.03 MANUFACTURERS' FIELD SERVICES

A. When specified in individual specification sections, require material or product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.

B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

### 2.04 DEFECT ASSESSMENT

A. Replace Work or portions of the Work not conforming to specified requirements.

**END OF SECTION**

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# SECTION 01 4100
# REGULATORY REQUIREMENTS

## PART 1 GENERAL

### 0.01 SUMMARY OF REFERENCE STANDARDS

A. Regulatory requirements applicable to this project are the following:
   1. These codes adopted by the City of Montgomery, AL, Ordinace section 5-71 of City of Montgomery

B. ANSI - A117.1; 2017.

C. 29 CFR 1910 - Occupational Safety and Health Standards; current edition.

D. ICC (IFC) - International Fire Code; 2021

E. ICC (IBC) - International Building Code; 2024.

F. ICC (IPC) - International Plumbing Code; 2024

G. ICC (IMC) - International Mechanical Code; 2024.

H. ICC (IFGC) - International Fuel Gas Code; 2024.

I. NFPA 70 - (NEC) National Electrical Code; 2026.

J. **NFPA 72 - National Electrical Code and 2021 IFC.**

K. **City of Montgomery - IECC for Energy**

L. **AL Department of Construction Management - Ashrae 90.1 for energy adopted edition**

M. **ICC Technical Code 2024**

N. ANSI/ASHRAE/IESNA Standard 90.1 - Energy Standard for Buildings Except Low-Rise Residential.

O. **Should conflicts occur on which edition of codes may apply in this project, City Adopted Codes shall ab applicable**

P. **Contractor shall stay current on all updates to all Codes accepted by Montgomery City latest Ordinances.**

### 0.02 RELATED REQUIREMENTS

A. Section 01 4000 - Quality Requirements.

## PART 2 PRODUCTS - NOT USED

## PART 3 EXECUTION - NOT USED

**END OF SECTION**

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# SECTION 01 4217
# DEFINITIONS AND STANDARDS

## PART 1 - GENERAL

### 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.

### 1.02 DEFINITIONS

A. General: Basic Contract definitions are included in the General Conditions.

B. Indicated refers to graphic representations, notes or schedules on the Drawings, or other Paragraphs or Schedules in Specifications, and similar requirements in Contract Documents. Where terms such as "shown," "noted," "scheduled," and "specified" are used, it is to help locate the reference; no limitation on location is intended except as specifically noted.

C. Directed: Terms such as "directed", "requested", "authorized", "selected", "approved", "required", and "permitted" mean "directed by the Architect", "requested by the Architect", and similar phrases. However, no implied meaning shall be interpreted to extend the Architect's responsibility into the Contractor's area of construction supervision.

D. A.D.A.--American Disabilities Act of 2010 and all revisions to date.

E. Approve: The term "approved," where used in conjunction with the Architect's action on the Contractor's submittals, applications, and requests, is limited to the duties and responsibilities of the Architect as stated in General and Supplementary Conditions. Such approval shall not release the Contractor from responsibility to fulfill Contract requirements unless otherwise provided in the Contract Documents.

F. Furnish: The term "furnish" is used to mean "supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations."

G. Install: The term "install" is used to describe operations at project site including the actual "unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations."

H. Provide: The term "provide" means "to furnish and install, complete and ready for the intended use."

I. Installer: An "Installer" is the Contractor or an entity engaged by the Contractor, either as an employee, subcontractor, or sub-subcontractor for performance of a particular construction activity, including installation, erection, application, and similar operations. Installers are required to be experienced in the operations they are engaged to perform.

J. The term "experienced," when used with the term "Installer" means having a minimum of 5 previous Projects similar in size and scope to this Project, being familiar with the precautions required, and having complied with requirements of the authority having jurisdiction.

K. Project Site is the space available to the Contractor for performance of construction activities, either exclusively or in conjunction with others performing other construction activities as part of the Project. The extent of the Project Site is shown on the Drawings and may or may not be identical with the description of the land upon which the Project is to be built.

L. Testing Laboratories: A "testing laboratory" is an independent entity engaged to perform specific inspections or tests, either at the Project Site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

### 1.03 SPECIFICATION FORMAT AND CONTENT EXPLANATION

A. Specification Format: These Specifications are organized into Divisions and Sections based on the Construction Specifications Institute's format and MASTERFORMAT numbering system.

B. Specification Content: This Specification uses certain conventions in the use of language and the intended meaning of certain terms, words, and phrases when used in particular situations or circumstances. These conventions are explained as follows:

C. Abbreviated Language: Language used in the Specifications and other Contract Documents is the abbreviated type. Implied words and meanings will be appropriately interpreted. Singular words will be interpreted as plural and plural words interpreted as singular where applicable and where the full context of the Contract Documents so indicates.

D. Imperative and streamlined language is used generally in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the text, for clarity, subjective language is used to describe responsibilities that must be fulfilled indirectly by the Contractor, or by others when so noted.

### 1.04 INDUSTRY STANDARDS

A. Applicability of Standards: Except where the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents. Such standards are made a part of the Contract Documents by reference.

B. Conflicting Requirements: Where compliance with two or more standards is specified, and they establish different or conflicting requirements for minimum quantities or quality levels, the most stringent requirement will be enforced, unless the Contract Documents indicate otherwise. Refer requirements that are different, but apparently equal, and uncertainties as to which quality level is more stringent to the Architect for a decision before proceeding

C. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where such acronyms or abbreviations are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards generating organization, authority having jurisdiction, or other entity applicable to the context of the text provision. Refer to the "Encyclopedia of Associations," published by Gale Research Co., available in most libraries.

**END OF SECTION**

# SECTION 01 4500
# CUTTING AND PATCHING

## 1. GENERAL

### 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section.

### 1.02 SUMMARY

A. This Section specifies administrative and procedural requirements for cutting and patching.

B. Refer to other Sections for specific requirements and limitations applicable to cutting and patching individual parts of the Work.

1. Requirements of this Section apply but not limited to mechanical and electrical installations. Refer to Division-15 and Division-16 Sections for other requirements and limitations applicable to cutting and patching mechanical and electrical installations.

### 1.03 SUBMITTALS

A. Cutting and Patching Proposal: Where approval of procedures and/or phasing for cutting and patching is required before proceeding, submit a proposal describing procedures well in advance of the time cutting and patching will be performed and request approval to proceed. Include the following information, as applicable, in the proposal:

B. Describe the extent of cutting and patching required and how it is to be performed; indicate why it cannot be avoided.

C. Describe anticipated results in terms of changes to existing construction; include changes to structural elements and operating components as well as changes in the building's appearance and other significant visual elements.

D. List products to be used and firms or entities that will perform Work.

E. Indicate dates when cutting and patching is to be performed.

F. List utilities that will be disturbed or affected, including those that will be relocated and those that will be temporarily out-of-service. Indicate how long service will be disrupted.

G. Where cutting and patching involves addition of reinforcement to structural elements, submit details and engineering calculations to show how reinforcement is integrated with the original structure.

H. Approval by the owner's representative to proceed with cutting and patching does not waive the owner's right to later require complete removal and replacement of a part of the Work found to be unsatisfactory.

### 1.04 QUALITY ASSURANCE

A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would reduce their load-carrying capacity or load-deflection ratio.

B. Obtain approval of the cutting and patching proposal before cutting and patching the following structural elements:

1. Foundation construction.
2. Bearing and retaining walls.
3. Structural concrete.
4. Structural steel.
5. Lintels.

6. Timber and primary wood framing.
7. Structural decking.
8. Stair systems.
9. Miscellaneous structural metals.
10. Exterior curtain wall construction.
11. Equipment supports.
12. Piping, ductwork, vessels and equipment.
13. Structural systems of special construction in Division-13.

C. Operational and Safety Limitations: Do not cut and patch operating elements or safety related components in a manner that would result in reducing their capacity to perform as intended, or result in increased maintenance, or decreased operational life or safety.
   1. Obtain approval of the cutting and patching proposal before cutting and patching the following operating elements or safety related systems:
      a. Primary operational systems and equipment.
      b. Membranes and flashings.
      c. Fire protection systems.
      d. Communication systems.
      e. Electrical wiring systems.

## PART 2 PRODUCTS

### 2.01 MATERIALS

A. Use materials that are identical to existing materials. If identical materials are not available or cannot be used where exposed surfaces are involved, use materials that match existing adjacent surfaces to the fullest extent possible with regard to visual effect. Use materials whose installed performance will equal or surpass that of existing materials.

## PART 3 EXECUTION

### 3.01 INSPECTION

A. Before cutting existing surfaces, examine surfaces to be cut and patched and conditions under which cutting and patching is to be performed. Take corrective action before proceeding, if unsafe or unsatisfactory conditions are encountered.
   1. Before proceeding, meet at the site with parties involved in cutting and patching, including mechanical and electrical trades. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

### 3.02 PREPARATION

A. Temporary Support: Provide temporary support of Work to be cut.

B. 3.2.2 Protection: Protect existing construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of the Project that might be exposed during cutting and patching operations.

C. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.

D. Take all precautions necessary to avoid cutting existing pipe, conduit or ductwork serving the building, but scheduled to be removed or relocated until provisions have been made to bypass them.

### 3.03 PERFORMANCE

A. General: Employ skilled workmen to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time and complete without delay.

1. Cut existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.

B. Cutting: Cut existing construction using methods least likely to damage elements to be retained or adjoining construction. Where possible review proposed procedures with the original installer; comply with the original installer's recommendations.
   1. In general, where cutting is required use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots neatly to size required with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
   2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
   3. Cut through concrete and masonry using a cutting machine such as a carborundum saw or diamond core drill.
   4. Comply with requirements of applicable Sections of Division-2 where cutting and patching requires excavating and backfilling.
   5. By-pass utility services such as pipe or conduit, before cutting, where services are shown or required to be removed, relocated or abandoned. Cut-off pipe or conduit in walls or partitions to be removed. Cap, valve or plug and seal the remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after by-passing and cutting.

C. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.
   1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
   2. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
   3. Where removal of walls or partitions extends one finished area into another, patch and repair floor and wall surfaces in the new space to provide an even surface of uniform color and appearance. Remove existing floor and wall coverings and replace with new materials, if necessary to achieve uniform color and appearance.
      a. Where patching occurs in a smooth painted surface, extend final paint coat over entire unbroken containing the patch, after the patched area has received primer and second coat.
   4. Patch, repair or rehang existing ceilings as necessary to provide an even plane surface of uniform appearance.

**3.04 CLEANING**

A. Thoroughly clean areas and spaces where cutting and patching is performed or used as access. Remove completely paint, mortar, oils, putty and items of similar nature. Thoroughly clean piping, conduit and similar features before painting or other finishing is applied. Restore damaged pipe covering to its original condition.

**END OF SECTION**

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# SECTION 01 5000
# TEMPORARY FACILITIES AND CONTROLS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Temporary utilities.

B. Temporary telecommunications services.

C. Temporary sanitary facilities.

D. Temporary Controls: Barriers, enclosures, and fencing.

E. Security requirements.

F. Vehicular access and parking.

G. Waste removal facilities and services.

### 1.02 RELATED REQUIREMENTS

A. All current and applicable standards associated with the Code of Federal Regulations and the Occupational Safety and Health Standards.

### 1.03 REFERENCE STANDARDS

A. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.

B. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2023.

### 1.04 TEMPORARY UTILITIES

A. **General Contractor to provide and coordinate temporary water and electric power with the Water Works & Sewer Board, and Alabama Power during the construction of thuis project.**

### 1.05 TELECOMMUNICATIONS SERVICES

A. Provide, maintain, and pay for telecommunications services to field office at time of project mobilization thru completion of the project.

B. Telecommunications services shall include:
   1. Full unlimited high speed internet service.
   2. Email: Account/address reserved for project use.
   3. Job Telephone: Mobile phone to be acceptable.
   4. Job printer capable of printing 11x17 format prints.

### 1.06 TEMPORARY SANITARY FACILITIES

A. Provide and maintain required facilities and enclosures. Provide at time of project mobilization.

B. Maintain daily in clean and sanitary condition.

### 1.07 BARRIERS

A. Provide barriers to prevent unauthorized entry to construction areas, to prevent access to areas that could be hazardous to workers or the public and to protect existing facilities and adjacent properties from damage from construction operations and demolition.

B. Coordinate with Owner's security program.

**1.08 VEHICULAR ACCESS AND PARKING**

A. Comply with all regulations and laws relating to use of streets and sidewalks, access to emergency facilities, and access for emergency vehicles. Comply with all Owner requirements, to include owners security department, for use of parking, hauling routes, etc.

B. Coordinate access and haul routes with governing authorities and Owner.

C. Provide and maintain access to fire hydrants, free of obstructions.

D. Provide means of removing mud from vehicle wheels before entering streets.

E. Provide temporary parking areas to accommodate construction personnel. When site space is not adequate, provide additional off-site parking.

F. Provide one parking space for Owner use.

G. Provide one parking space for Architect use.

H. Provide one parking space for Construction Manager.

I. Any damage/harm done to the owners property/personal or facility users property/personal as a result of construction of this project due to the fault of the contractor or his employees/subcontractors shall be the responsibility of the Contractor and the Contractor shall be rectify such problems and take corrective action within a reasonable time acceptable to the owner.

**1.09 WASTE REMOVAL**

A. Provide waste removal facilities and services as required to maintain the site in clean and orderly condition.

B. Provide containers with lids. Remove trash from site periodically.

C. Open free-fall chutes are not permitted. Terminate closed chutes into appropriate containers with lids.

**1.10 PROJECT SIGNS**

A. Refer to requirements of the General Conditions of the Contract for Construction per artice 51. **in accordance with the ACCS guidelines.**

**1.11 FIELD OFFICES**

A. **Field offices, including conference room table and restrooms will be provided by the Contractor. The location of the office must be approved by the owner and contractor.** Field office furnishings provided by the contractor.

B. Provide space for Project meetings, with table and chairs to accommodate 10 persons.

C. The Contractor shall be responsible for all code compliant utility hook ups to the Field Office to any of the owner provided utilities.

**1.12 SECURITY VIDEO CAMERAS**

A. The use of cameras is the decision of the contractor, but the locations must be approved by the owner prior to installations.

**PART 2 PRODUCTS - NOT USED**

**PART 3 EXECUTION - NOT USED**

**END OF SECTION**

# SECTION 01 5500
# VEHICULAR ACCESS AND PARKING

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Access roads.

B. Parking.

C. Construction parking controls.

D. Flag persons.

E. Haul routes.

F. Maintenance.

G. Mud from site vehicles.

### 1.02 RELATED REQUIREMENTS

A. Section 01 1000 - Summary: For access to site, work sequence, and occupancy.

## PART 2 PRODUCTS

### 2.01 MATERIALS

A. Temporary Construction: Contractor's option.

B. Materials for Permanent Construction: As specified in product specification sections, including earthwork, paving base, and topping.

## PART 3 EXECUTION

### 3.01 PREPARATION

A. Clear areas, provide surface and storm drainage of road, parking, area premises, and adjacent areas.

### 3.02 ACCESS ROADS

A. Use of existing on-site streets and driveways for construction traffic is permitted.

B. Tracked vehicles not allowed on paved areas.

C. Provide unimpeded access for emergency vehicles. Maintain 20 foot (6 m) width driveways with turning space between and around combustible materials.

D. Provide and maintain access to fire hydrants free of obstructions.

### 3.03 PARKING

A. Arrange for temporary parking areas to accommodate use of construction personnel.

B. When site space is not adequate, provide additional off-site parking.

C. Locate as approved by Architect.

D. Protect existing parking areas to remain.

### 3.04 PERMANENT PAVEMENTS AND PARKING FACILITIES

A. Prior to Substantial Completion the base for permanent roads and parking areas may be used for construction traffic.

B. Avoid traffic loading beyond paving design capacity. Tracked vehicles not allowed.

### 3.05 CONSTRUCTION PARKING CONTROL

A. Control vehicular parking to prevent interference with public traffic and parking, access by emergency vehicles, and Owner's operations.

B. Prevent parking on or adjacent to access roads or in non-designated areas.

### 3.06 FLAG PERSONS

A. Provide trained and equipped flag persons to regulate traffic when construction operations or traffic encroach on public traffic lanes.

### 3.07 HAUL ROUTES

A. Confine construction traffic to designated haul routes.

B. Provide traffic control at critical areas of haul routes to regulate traffic, to minimize interference with public traffic.

### 3.08 MAINTENANCE

A. Maintain traffic and parking areas in a sound condition free of excavated material, construction equipment, products, mud, snow, and ice.

B. Maintain existing paved areas used for construction; promptly repair breaks, potholes, low areas, standing water, and other deficiencies, to maintain paving and drainage in original, or specified, condition.

### 3.09 MUD FROM SITE VEHICLES

A. Provide means of removing mud from vehicle wheels before entering streets.

**END OF SECTION**

# SECTION 01 6000
# PRODUCT REQUIREMENTS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. General product requirements.

B. Re-use of existing products.

C. Transportation, handling, storage and protection.

D. Product option requirements.

E. Substitution limitations.

F. Procedures for Owner-supplied products.

G. Maintenance materials, including extra materials, spare parts, tools, and software.

### 1.02 RELATED REQUIREMENTS

A. Section 01 1000 - Summary

B. Section 01 4000 - Quality Requirements: Product quality monitoring.

C. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions: Requirements for VOC-restricted product categories.

### 1.03 REFERENCE STANDARDS

A. EN 15804 - Sustainability of construction works - Environmental product declarations - Core rules for the product category of construction products; 2012.

B. NFPA 70 - National Electrical Code; Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

### 1.04 SUBMITTALS

A. Product Data Submittals: Submit manufacturer's standard published data. Mark each copy to identify applicable products, models, options, and other data. Supplement manufacturers' standard data to provide information specific to this Project.

B. Shop Drawing Submittals: Prepared specifically for this Project; indicate utility and electrical characteristics, utility connection requirements, and location of utility outlets for service for functional equipment and appliances.

C. Sample Submittals: Illustrate functional and aesthetic characteristics of the product, with integral parts and attachment devices. Coordinate sample submittals for interfacing work.
   1. For selection from standard finishes, submit samples of the full range of the manufacturer's standard colors, textures, and patterns.

### 1.05 SUBMITTAL SCHEDULE

A. At the beginning of the project, generate list of products requirements submittals by the specifications.

B. In the schedule, include the following information for each product:
   1. Specification section for the product.
   2. Type of submittal (i.e. shop drawings, product data, samples, mock-up)
   3. Date submitted (to be filled in during construction)
   4. Action taken by Architect (to be filled in during construction)
   5. Date Approved (to be filled in during construction)

6. Comments
7. Critical Relationships

C. **Coordinate** product submittal schedule with project construction schedule **with Construction Manager and Architect..**

D. Submit schedule to Architect for review within 15 days of Notice to Proceed.

E. If necessary, revise schedule as requested by Architect.

F. Schedule will be utilized at each progress meeting to review status of required submittals and coordination with project construction schedule.
   1. Update submittal schedule and submit to Owner and Architect 48 hours prior to each scheduled progress meeting.

**1.06 QUALITY ASSURANCE**

A. Source Limitations: To the fullest extent possible, provide products of the same kind, from a single source.

B. Each prime Contractor is responsible for providing products and construction methods that are compatible with products and construction methods of other prime or separate Contractors.

C. If a dispute arises between prime Contractors over concurrently selectable, but incompatible products, the Architect will determine which products shall be retained and which are incompatible and must be replaced.

D. Nameplates: Except for required labels and operating data, do not attach or imprint manufacturer's or producer's nameplates or trademarks on exposed surfaces of products which will be exposed to view in occupied spaces or on the exterior.

E. Labels: Locate required product labels and stamps on a concealed surface or, where required for observation after installation, on an accessible surface that is not conspicuous.

**PART 2 PRODUCTS**

**2.01 EXISTING PRODUCTS**

A. Do not use materials and equipment removed from existing premises unless specifically required or permitted by the Contract Documents.

B. Existing materials and equipment indicated to be removed, but not to be re-used, relocated, reinstalled, delivered to the Owner, or otherwise indicated as to remain the property of the Owner, become the property of the Contractor; remove from site.

C. Specific Products to be Reused: The reuse of certain materials and equipment already existing on the project site is required.
   1. See Section 01 1000 for list of items required to be salvaged for reuse and relocation.

**2.02 NEW PRODUCTS**

A. Provide new products unless specifically required or permitted by the Contract Documents.

B. DO NOT USE products having any of the following characteristics:
   1. Made using or containing CFC's or HCFC's.
   2. Made of wood from newly cut old growth timber.

C. Where all other criteria are met, Contractor shall give preference to products that:
   1. Have longer documented life span under normal use.
   2. Result in less construction waste.
   3. Are made of recycled materials.
   4. Are Cradle-to-Cradle Certified.

## 2.03 PRODUCT SELECTION

A. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, unused at the time of installation.

B. Provide products complete with all accessories, trim, finish, safety guards and other devices and details needed for a complete installation and for the intended use and effect.

C. Standard Products: Where available, provide standard products of types that have been produced and used successfully in similar situations on other projects.

D. Product Selection Procedures: Product selection is governed by the Contract Documents and governing regulations, not by previous Project experience. Procedures governing product selection include the following:

E. **Where products or manufacturers are specified by name, accompanied by the term "or equal," or "or approved equal" comply with the Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product, unless noted otherwise in specific specification section.**

F. **Non-Proprietary Specifications: When the Specifications list products or manufacturers that are available and may be incorporated in the Work, but do not restrict the Contractor to use of these products only, the Contractor may propose any available product that complies with Contract requirements. Comply with Contract Document provisions concerning "substitutions" to obtain approval for use of an unnamed product.**

G. Descriptive Specification Requirements: Where Specifications describe a product or assembly, listing exact characteristics required, with or without use of a brand or trade name, provide a product or assembly that provides the characteristics and otherwise complies with Contract requirements.

H. Compliance with Standards, Codes and Regulations: Where the Specifications only require compliance with an imposed code, standard or regulation, select a product that complies with the standards, codes or regulations specified.

I. Visual Matching: Where Specifications require matching an established Sample, the Architect's decision will be final on whether a proposed product matches satisfactorily.

J. Where no product available within the specified category matches satisfactorily and also complies with other specified requirements, comply with provisions of the Contract Documents concerning "substitutions" for selection of a matching product in another product category, or for noncompliance with specified requirements.

K. Visual Selection: Where specified product requirements include the phrase "...as selected from manufacturer's standard colors, patterns, textures..." or a similar phrase, select a product and manufacturer that complies with other specified requirements. The Architect will select the color, pattern and texture from the product line selected.

## 2.04 PRODUCT OPTIONS

A. Products Specified by Naming One or More Manufacturers with a Provision for Substitutions: Submit a request for substitution for any manufacturer not named.

B. Compatibility of Options: When the Contractor is given the option of selecting between two or more products for use on the Project, the product selected shall be compatible with products previously selected, even if previously selected products were also options.

## 2.05 MAINTENANCE MATERIALS

A. Furnish extra materials, spare parts, tools, and software of types and in quantities specified in individual specification sections.

B. Deliver to Project site; obtain receipt prior to final payment.

## PART 3 EXECUTION

### 3.01 SUBSTITUTION LIMITATIONS

A. Refer to Instructions to Bidders 7. Substitutions.

B. Additional Instructions to Bidders specifies time restrictions for submitting requests for substitutions during the bidding period and the documents required.

C. Architect will consider requests for substitutions only within 30 days after date established in notice to proceed, unless noted otherwise.
   1. Substitutions received after this time period may be considered or rejected at the discretion of the Architect.

D. Substitutions will be considered when a product, through no fault of the Contractor, becomes unavailable or unsuitable due to regulatory change.

E. Document each request with complete data substantiating compliance of proposed substitution with Contract Documents.

F. A request for substitution constitutes a representation that the submitter:
   1. Has investigated proposed product and determined that it meets or exceeds the quality level of the specified product.
   2. Agrees to provide the same warranty for the substitution as for the specified product.
   3. Agrees to coordinate installation and make changes to other Work that may be required for the Work to be complete with no additional cost to Owner.
   4. Waives claims for additional costs or time extension that may subsequently become apparent.
   5. Agrees to reimburse Owner and Architect for review or redesign services associated with re-approval by authorities.

G. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals, without separate written request, or when acceptance will require revision to the Contract Documents.

H. Substitution Submittal Procedure (after contract award):
   1. Submit three copies of request for substitution for consideration. Limit each request to one proposed substitution.
   2. Submit shop drawings, product data, and certified test results attesting to the proposed product equivalence. Burden of proof is on proposer.
   3. Architect will notify Contractor in writing of decision to accept or reject request.

I. Conditions: The Contractor's substitution request will be received and considered by the Architect only when one or more of the following conditions are satisfied, as determined by the Architect; otherwise requests will be returned without action except to record noncompliance with these requirements.
   1. Extensive revisions to Contract Documents are not required.
   2. Proposed changes are in keeping with the general intent of Contract Documents.
   3. The request is timely, fully documented and properly submitted.
   4. The request is directly related to an "or equal" clause or similar language in the Contract Documents.
   5. The specified product or method of construction cannot receive necessary approval by a governing authority, and the requested substitution can be approved.
   6. A substantial advantage is offered the Owner, in terms of cost, time, energy conservation or other considerations of merit

7. The specified product or method of construction cannot be provided in a manner that is compatible with other materials, and where the Contractor certifies that the substitution will overcome the incompatibility.
8. The specified product or method of construction cannot be coordinated with other materials, and where the Contractor certifies that the proposed substitution can be coordinated.
9. The specified product or method of construction cannot provide a warranty required by the Contract Documents and where the Contractor certifies that the proposed substitution provide the required warranty.

J. The Owner reserves the right to reject any substitutions.

**3.02 TRANSPORTATION AND HANDLING**

A. Package products for shipment in manner to prevent damage; for equipment, package to avoid loss of factory calibration.

B. If special precautions are required, attach instructions prominently and legibly on outside of packaging.

C. Coordinate schedule of product delivery to designated prepared areas in order to minimize site storage time and potential damage to stored materials.

D. Transport and handle products in accordance with manufacturer's instructions.

E. Transport materials in covered trucks to prevent contamination of product and littering of surrounding areas.

F. Promptly inspect shipments to ensure that products comply with requirements, quantities are correct, and products are undamaged.

G. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement, or damage, and to minimize handling.

H. Arrange for the return of packing materials, such as wood pallets, where economically feasible.

**3.03 STORAGE AND PROTECTION**

A. Designate receiving/storage areas for incoming products so that they are delivered according to installation schedule and placed convenient to work area in order to minimize waste due to excessive materials handling and misapplication.

B. Store and protect products in accordance with manufacturers' instructions.

C. Store with seals and labels intact and legible.

D. Store sensitive products in weather tight, climate controlled, enclosures in an environment favorable to product.

E. For exterior storage of fabricated products, place on sloped supports above ground.

F. If approved by Owner, provide bonded off-site storage and protection when site does not permit on-site storage or protection.

G. Protect products from damage or deterioration due to construction operations, weather, precipitation, humidity, temperature, sunlight and ultraviolet light, dirt, dust, and other contaminants.

H. Comply with manufacturer's warranty conditions, if any.

I. Do not store products directly on the ground.

J. Cover products subject to deterioration with impervious sheet covering. Provide ventilation to prevent condensation and degradation of products.

K. Store loose granular materials on solid flat surfaces in a well-drained area. Prevent mixing with foreign matter.

L. Prevent contact with material that may cause corrosion, discoloration, or staining.

M. Provide equipment and personnel to store products by methods to prevent soiling, disfigurement, or damage.

N. Arrange storage of products to permit access for inspection. Periodically inspect to verify products are undamaged and are maintained in acceptable condition.

O. Store heavy materials away from the Project structure in a manner that will not endanger the supporting construction.

P. Schedule delivery to minimize long-term storage at the site and to prevent overcrowding of construction spaces.

Q. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft and other losses.

R. Store heavy materials away from the Project structure in a manner that will not endanger the supporting construction.

**END OF SECTION**

# SECTION 01 6116
# VOLATILE ORGANIC COMPOUND (VOC) CONTENT RESTRICTIONS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. VOC restrictions for product categories listed below under "DEFINITIONS."

B. All products of each category that are installed in the project must comply; Owner's project goals do not allow for partial compliance.

### 1.02 RELATED REQUIREMENTS

A. Section 01 3000 - Administrative Requirements: Submittal procedures.

B. Section 01 4000 - Quality Requirements: Procedures for testing and certifications.

C. Section 01 6000 - Product Requirements: Fundamental product requirements, substitutions and product options, delivery, storage, and handling.

### 1.03 DEFINITIONS

A. VOC-Restricted Products: All products of each of the following categories when installed or applied on-site in the building interior:
   1. Adhesives, sealants, and sealer coatings.
   2. Carpet.
   3. Carpet tile.
   4. Resilient floor coverings and base.
   5. Paints and coatings.
   6. Insulation.
   7. Gypsum board.
   8. Acoustical ceilings and panels.
   9. Cabinet and Casework
   10. Composite wood and agrifiber products used either alone or as part of another product.

B. Interior of Building: Anywhere inside the exterior weather barrier.

C. Adhesives: All gunnable, trowelable, liquid-applied, and aerosol adhesives, whether specified or not; including flooring adhesives, resilient base adhesives, and pipe jointing adhesives.

D. Sealants: All gunnable, trowelable, and liquid-applied joint sealants and sealant primers, whether specified or not; including firestopping sealants and duct joint sealers.

### 1.04 REFERENCE STANDARDS

A. ASTM D3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings; 2005 (Reapproved 2013).

B. GreenSeal GS-36 - Commercial Adhesives; 2011.

C. SCAQMD 1168 - Adhesive and Sealant Applications; 1989, with Amendment (2022).

### 1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Evidence of Compliance: Submit for each different product in each applicable category.

C. Product Data: For each VOC-restricted product used in the project, submit evidence of compliance.

### 1.06 QUALITY ASSURANCE

A. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

## PART 2 PRODUCTS

### 2.01 MATERIALS

A. All Products: Comply with the most stringent of federal, State, and local requirements, or these specifications.

B. Adhesives and Joint Sealants: Provide only products having volatile organic compound (VOC) content not greater than required by South Coast Air Quality Management District Rule No.1168.
   1. Evidence of Compliance: Acceptable types of evidence are:
      a. Report of laboratory testing performed in accordance with requirements.

C. Aerosol Adhesives: Provide only products having volatile organic compound (VOC) content not greater than required by GreenSeal GS-36.
   1. Evidence of Compliance: Acceptable types of evidence are:
      a. Current GreenSeal Certification.

D. Carpet Tile and Vinyl Tile flooring and Adhesive: Provide products having VOC content as specified in Section 09 6813.

E. Composite Wood and Agrifiber Products and Adhesives Used for Laminating Them: Provide products having no added urea-formaldehyde resins.
   1. Evidence of Compliance: Acceptable types of evidence are:
      a. Published product data showing compliance with requirements.

## PART 3 EXECUTION

### 3.01 FIELD QUALITY CONTROL

A. Owner reserves the right to reject non-compliant products, whether installed or not, and require their removal and replacement with compliant products at no extra cost to Owner.

B. Additional costs to restore indoor air quality due to installation of non-compliant products will be borne by Contractor.

**END OF SECTION**

# SECTION 01 7000
# EXECUTION AND CLOSEOUT REQUIREMENTS

## T 1 GENERAL

### 1.01 SECTION INCLUDES

A. Examination, preparation, and general installation procedures.

B. Pre-installation meetings.

C. Cleaning and protection.

D. Starting of systems and equipment.

E. Demonstration and instruction of Owner personnel.

F. Closeout procedures, including Contractor's Correction Punch List, except payment procedures.

G. General requirements for maintenance service.

### 1.02 RELATED REQUIREMENTS

A. Section 01 1000 - Summary: Limitations on working in existing building; continued occupancy; work sequence; identification of salvaged and relocated materials.

B. Section 01 3000 - Administrative Requirements: Submittals procedures.

C. Section 01 4000 - Quality Requirements: Testing and inspection procedures.

D. Section 01 4500 - Cutting and Patching

E. Section 01 7419 - Construction Waste Management and Disposal: Additional procedures for trash/waste removal, recycling, salvage, and reuse.

F. Section 01 7800 - Closeout Submittals: Project record documents, operation and maintenance data, warranties and bonds.

### 1.03 REFERENCE STANDARDS

A. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2013.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Demolition Plan: Submit demolition plan as specified by OSHA and local authorities.

1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences. Include design drawings and calculations for bracing and shoring.
2. Identify demolition firm and submit qualifications.
3. Include a summary of safety procedures.

### 1.05 QUALIFICATIONS

A. For design of temporary shoring and bracing, employ a Professional Engineer experienced in design of this type of work and licensed in the State in which the Project is located.

### 1.06 PROJECT CONDITIONS

A. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

B. Dust Control: Execute work by methods to minimize raising dust from construction operations. Provide positive means to prevent air-borne dust from dispersing into atmosphere and over adjacent property.

C. Noise Control: Provide methods, means, and facilities to minimize noise produced by construction operations.

D. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and atmosphere from discharge of noxious, toxic substances, and pollutants produced by construction operations. Comply with federal, state, and local regulations.

## PART 2 PRODUCTS

### 2.01 PATCHING MATERIALS

A. New Materials: As specified in product sections; match existing products and work for patching and extending work.

B. Type and Quality of Existing Products: Determine by inspecting and testing products where necessary, referring to existing work as a standard.

C. Product Substitution: For any proposed change in materials, submit request for substitution described in Section 01 6000 - Product Requirements.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Start of work means acceptance of existing conditions.

B. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.

C. Examine and verify specific conditions described in individual specification sections.

D. Take field measurements before confirming product orders or beginning fabrication, to minimize waste due to over-ordering or misfabrication.

E. Verify that utility services are available, of the correct characteristics, and in the correct locations.

F. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

### 3.02 PREPARATION

A. Clean substrate surfaces prior to applying next material or substance.

B. Seal cracks or openings of substrate prior to applying next material or substance.

C. Apply manufacturer required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

### 3.03 PREINSTALLATION MEETINGS

A. When required in individual specification sections, convene a preinstallation meeting at the site prior to commencing work of the section.

B. Require attendance of parties directly affecting, or affected by, work of the specific section.

C. Notify Architect and Construction Manager four days in advance of meeting date.

D. Prepare agenda and preside at meeting:

1. Review conditions of examination, preparation and installation procedures.
2. Review coordination with related work.

E. Record minutes and distribute copies within two days after meeting to participants, with two copies to Architect, Construction Manager , Owner, participants, and those affected by decisions made.

**3.04 GENERAL INSTALLATION REQUIREMENTS**

A. Install products as specified in individual sections, in accordance with manufacturer's instructions and recommendations, and so as to avoid waste due to necessity for replacement.

B. Make vertical elements plumb and horizontal elements level, unless otherwise indicated.

C. Install equipment and fittings plumb and level, neatly aligned with adjacent vertical and horizontal lines, unless otherwise indicated.

D. Make consistent texture on surfaces, with seamless transitions, unless otherwise indicated.

E. Make neat transitions between different surfaces, maintaining texture and appearance.

**3.05 ALTERATIONS**

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
1. Verify that construction and utility arrangements are as indicated.
2. Report discrepancies to Architect before disturbing existing installation.
3. Beginning of alterations work constitutes acceptance of existing conditions.

B. Keep areas in which alterations are being conducted separated from other areas that are still occupied.

C. Maintain weatherproof exterior building enclosure except for interruptions required for replacement or modifications; take care to prevent water and humidity damage.
1. Where openings in exterior enclosure exist, provide construction to make exterior enclosure weatherproof.
2. Insulate existing ducts or pipes that are exposed to outdoor ambient temperatures by alterations work.

D. Remove existing work as indicated and as required to accomplish new work.
1. Remove items indicated on drawings.
2. Relocate items indicated on drawings.
3. Where new surface finishes are to be applied to existing work, perform removals, patch, and prepare existing surfaces as required to receive new finish; remove existing finish if necessary for successful application of new finish.
4. Where new surface finishes are not specified or indicated, patch holes and damaged surfaces to match adjacent finished surfaces as closely as possible.

E. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, Telecommunications, and _____): Remove, relocate, and extend existing systems to accommodate new construction.
1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components; if necessary, modify installation to allow access or provide access panel.
2. Where existing systems or equipment are not active and Contract Documents require reactivation, put back into operational condition; repair supply, distribution, and equipment as required.

3. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
    a. Disable existing systems only to make switchovers and connections; minimize duration of outages.
    b. See Section 01 1000 for other limitations on outages and required notifications.
    c. Provide temporary connections as required to maintain existing systems in service.
4. Verify that abandoned services serve only abandoned facilities.
5. Remove abandoned pipe, ducts, conduits, and equipment , including those above accessible ceilings; remove back to source of supply where possible, otherwise cap stub and tag with identification; patch holes left by removal using materials specified for new construction.

F. Protect existing work to remain.
1. Prevent movement of structure; provide shoring and bracing if necessary.
2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
3. Repair adjacent construction and finishes damaged during removal work.

G. Adapt existing work to fit new work: Make as neat and smooth transition as possible.
1. When existing finished surfaces are cut so that a smooth transition with new work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendation to Architect.
2. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.
3. Where a change of plane of 1/4 inch (6 mm) or more occurs in existing work, submit recommendation for providing a smooth transition for Architect review and request instructions.

H. Patching: Where the existing surface is not indicated to be refinished, patch to match the surface finish that existed prior to cutting. Where the surface is indicated to be refinished, patch so that the substrate is ready for the new finish.

I. Refinish existing surfaces as indicated:
1. Where rooms or spaces are indicated to be refinished, refinish all visible existing surfaces to remain to the specified condition for each material, with a neat transition to adjacent finishes.
2. If mechanical or electrical work is exposed accidentally during the work, re-cover and refinish to match.

J. Clean existing systems and equipment.

K. Remove demolition debris and abandoned items from alterations areas and dispose of off-site; do not burn or bury.

L. Do not begin new construction in alterations areas before demolition is complete.

M. Comply with all other applicable requirements of this section.

### 3.06 CUTTING AND PATCHING

A. Whenever possible, execute the work by methods that avoid cutting or patching.

B. See Alterations article above for additional requirements.

C. Perform whatever cutting and patching is necessary to:
1. Complete the work.
2. Fit products together to integrate with other work.

3. Provide openings for penetration of mechanical, electrical, and other services.
4. Match work that has been cut to adjacent work.
5. Repair areas adjacent to cuts to required condition.
6. Repair new work damaged by subsequent work.
7. Remove samples of installed work for testing when requested.
8. Remove and replace defective and non-conforming work.

D. Execute work by methods that avoid damage to other work and that will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original condition.

E. Cut rigid materials using masonry saw or core drill. Pneumatic tools not allowed without prior approval.

F. Restore work with new products in accordance with requirements of Contract Documents.

G. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.

H. At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 8400 and all governing authorities., to full thickness of the penetrated element.

I. Patching:
1. Finish patched surfaces to match finish that existed prior to patching. On continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.
2. Match color, texture, and appearance.
3. Repair patched surfaces that are damaged, lifted, discolored, or showing other imperfections due to patching work. If defects are due to condition of substrate, repair substrate prior to repairing finish.

**3.07 PROGRESS CLEANING**

A. Maintain areas free of waste materials, debris, and rubbish. Maintain site in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.

C. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust. **This is to include all areas and levels of the building.**

D. Collect and remove waste materials, debris, and trash/rubbish from site periodically and dispose off-site; do not burn or bury.

**3.08 PROTECTION OF INSTALLED WORK**

A. Protect installed work from damage by construction operations.

B. Provide special protection where specified in individual specification sections.

C. Provide temporary and removable protection for installed products. Control activity in immediate work area to prevent damage.

D. Provide protective coverings at walls, projections, jambs, sills, and soffits of openings.

E. Protect finished floors, stairs, and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials.

F. Prohibit traffic or storage upon waterproofed or roofed surfaces. If traffic or activity is necessary, obtain recommendations for protection from waterproofing or roofing material manufacturer.

G. Remove protective coverings when no longer needed; reuse or recycle coverings if possible.

**3.09 SYSTEM STARTUP**

A. Coordinate schedule for start-up of various equipment and systems.

B. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, control sequence, and for conditions that may cause damage.

C. Verify tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.

D. Verify that wiring and support components for equipment are complete and tested.

E. Execute start-up under supervision of applicable Contractor personnel and manufacturer's representative in accordance with manufacturers' instructions.

F. Submit a written report that equipment or system has been properly installed and is functioning correctly.

**3.10 DEMONSTRATION AND INSTRUCTION**

A. Demonstrate start-up, operation, control, adjustment, trouble-shooting, servicing, maintenance, and shutdown of each item of equipment at scheduled time, at equipment location.

B. For equipment or systems requiring seasonal operation, perform demonstration for other season within six months.

**3.11 ADJUSTING**

A. Adjust operating products and equipment to ensure smooth and unhindered operation.

**3.12 FINAL CLEANING**

A. Use cleaning materials that are nonhazardous.

B. Clean interior and exterior glass, surfaces exposed to view; remove temporary labels, stains and foreign substances, polish transparent and glossy surfaces, vacuum carpeted and soft surfaces.

C. Remove all labels that are not permanent. Do not paint or otherwise cover fire test labels or nameplates on mechanical and electrical equipment.

D. Clean equipment and fixtures to a sanitary condition with cleaning materials appropriate to the surface and material being cleaned.

E. Clean filters of operating equipment.

F. Clean debris from roofs, gutters, downspouts, scuppers, overflow drains, area drains, drainage systems, and _____.

G. Clean site; sweep paved areas, rake clean landscaped surfaces.

H. Remove waste, surplus materials, trash/rubbish, and construction facilities from the site; dispose of in legal manner; do not burn or bury.

I. Clean Owner-occupied areas of work that are in need of cleaning as a result of construction.

J. **Clean all areas and levels of the building.**

### 3.13 CLOSEOUT PROCEDURES

A. Make submittals that are required by governing or other authorities to include but not limited to the **Alabama Community College System** and applicable local authorities..

B. Accompany Project Coordinator on preliminary inspection to determine items to be listed for completion or correction in the Contractor's Correction Punch List for Contractor's Notice of Substantial Completion.

C. Notify Architect and Construction Maager when work is considered ready for Architect's Substantial Completion inspection.

D. Submit written certification containing Contractor's Correction Punch List, that Contract Documents have been reviewed, work has been inspected, and that work is complete in accordance with Contract Documents and ready for Architect's Substantial Completion inspection.

E. Owner will occupy _____ the building as specified in Section 01 1000.

F. Conduct Substantial Completion inspection and create Final Correction Punch List containing Architect's and Contractor's comprehensive list of items identified to be completed or corrected and submit to Architect.

G. Correct items of work listed in Final Correction Punch List and comply with requirements for access to Owner-occupied areas.

H. Notify Architect when work is considered finally complete and ready for Architect's and **ACCS's/AHJ project inspector** Substantial Completion inspection.

I. Complete items of work determined by Architect listed in executed Certificate of Substantial Completion.

### 3.14 MAINTENANCE

A. Provide service and maintenance of components indicated in specification sections.

B. Maintenance Period: As indicated in specification sections or, if not indicated, not less than one year from the Date of Substantial Completion or the length of the specified warranty, whichever is longer.

C. Examine system components at a frequency consistent with reliable operation. Clean, adjust, and lubricate as required.

D. Include systematic examination, adjustment, and lubrication of components. Repair or replace parts whenever required. Use parts produced by the manufacturer of the original component.

E. Maintenance service shall not be assigned or transferred to any agent or subcontractor without prior written consent of the Owner.

**END OF SECTION**

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# SECTION 01 7400
# WARRANTIES AND BONDS

## 1. GENERAL

### 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Division-1 Specification Sections, apply to this Section. Where conflicts occur between this section and other provisions or requirements of the Work, the more stringent requirement shall govern.

B. Refer to 07 7833 - Special Projects Warranties

### 1.02 SUMMARY

A. This Section specifies general administrative and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturers standard warranties on products and special warranties.
   1. Provide Owner with a one year warranty on all materials and workmanship unless specified elsewhere.
   2. General closeout requirements are included in Section "Project Closeout."
   3. Specific requirements for warranties for the Work and products and installations that are specified to be warranted, are included in the individual Sections of Divisions-2 through -33.
   4. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.

B. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

### 1.03 DEFINITIONS

A. Standard Product Warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.

B. Special Warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner.

### 1.04 WARRANTY REQUIREMENTS

A. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.

B. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

C. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.

D. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.
   1. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.

E. The Owner reserves the right to refuse to accept Work for the Project where a special warranty, certification, or similar commitment is required on such Work or part of the Work, until evidence is presented that entities required to countersign such commitments are willing to do so.

**1.05 SUBMITTALS**

A. Submit written warranties to the Architect prior to the date certified for Substantial Completion. If the Architect's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Architect.
   1. 1.5.1.1 When a designated portion of the Work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Architect within fifteen days of completion of that designated portion of the Work.

B. When a special warranty is required to be executed by the Contractor, or the Contractor and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner through the Architect for approval prior to final execution.
   1. Refer to individual Sections of Divisions-2 through -33 for specific content requirements, and particular requirements for submittal of special warranties.

C. Form of Submittal: At Final Completion compile number of copies **as required by Alabama Community College Systems Facilities Manual of Procedures** Section 11 of each required warranty and bond properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.

D. Bind warranties and bonds in heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2" by 11" paper.
   1. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address and telephone number of the installer.
   2. Identify each binder on the front and the spine with the typed or printed title "WARRANTIES AND BONDS, the Project title or name, and the name of the Contractor.

**2. PRODUCTS (NOT APPLICABLE).**

**EXECUTION (NOT APPLICABLE).**

**END OF SECTION**

# SECTION 01 7419
# CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

## PART 1 GENERAL

### 1.01 WASTE MANAGEMENT REQUIREMENTS

A. Employ processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors.

B. Minimize trash/waste disposal in landfills; reuse, salvage, or recycle as much waste as economically feasible.

C. **Comply with reqiurements of hazardous material abatement project requirements.**

D. Contractor shall submit periodic Waste Disposal Reports; all landfill disposal, incineration, recycling, salvage, and reuse must be reported regardless of to whom the cost or savings accrues; use the same units of measure on all reports.

E. Contractor shall develop and follow a Waste Management Plan designed to implement these requirements.

F. Methods of trash/waste disposal that are not acceptable are:
   1. Burning on the project site.
   2. Burying on the project site.
   3. Dumping or burying on other property, public or private.
   4. Other illegal dumping or burying.

G. Regulatory Requirements: Contractor is responsible for knowing and complying with regulatory requirements, including but not limited to Federal, state and local requirements, pertaining to legal disposal of all construction and demolition waste materials.

### 1.02 RELATED REQUIREMENTS

A. Section 01 1000 - Summary: List of items to be salvaged from the existing building for relocation in project or for Owner.

B. Section 01 3000 - Administrative Requirements: Additional requirements for project meetings, reports, submittal procedures, and project documentation.

C. Section 01 5000 - Temporary Facilities and Controls: Additional requirements related to trash/waste collection and removal facilities and services.

D. Section 01 6000 - Product Requirements: Waste prevention requirements related to delivery, storage, and handling.

E. Section 01 7000 - Execution and Closeout Requirements: Trash/waste prevention procedures related to demolition, cutting and patching, installation, protection, and cleaning.

### 1.03 DEFINITIONS

A. Clean: Untreated and unpainted; not contaminated with oils, solvents, caulk, or the like.

B. Construction and Demolition Waste: Solid wastes typically including building materials, packaging, trash, debris, and rubble resulting from construction, remodeling, repair and demolition operations.

C. Hazardous: Exhibiting the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity or reactivity.

D. Nonhazardous: Exhibiting none of the characteristics of hazardous substances, i.e., ignitibility, corrosivity, toxicity, or reactivity.

E. Nontoxic: Neither immediately poisonous to humans nor poisonous after a long period of exposure.

F. Recyclable: The ability of a product or material to be recovered at the end of its life cycle and remanufactured into a new product for reuse by others.

G. Recycle: To remove a waste material from the project site to another site for remanufacture into a new product for reuse by others.

H. Recycling: The process of sorting, cleansing, treating and reconstituting solid waste and other discarded materials for the purpose of using the altered form. Recycling does not include burning, incinerating, or thermally destroying waste.

I. Return: To give back reusable items or unused products to vendors for credit.

J. Reuse: To reuse a construction waste material in some manner on the project site.

K. Salvage: To remove a waste material from the project site to another site for resale or reuse by others.

L. Sediment: Soil and other debris that has been eroded and transported by storm or well production run-off water.

M. Source Separation: The act of keeping different types of waste materials separate beginning from the first time they become waste.

N. Toxic: Poisonous to humans either immediately or after a long period of exposure.

O. Trash: Any product or material unable to be reused, returned, recycled, or salvaged.

P. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable, and reusable material.

**1.04 SUBMITTALS**

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Waste Management Plan: Include the following information:
   1. Analysis of the trash and waste projected to be generated during the entire project construction cycle, including types and quantities.
   2. Landfill Options: The name, address, and telephone number of the landfill(s) where trash/waste will be disposed of, the applicable landfill tipping fee(s), and the projected cost of disposing of all project trash/waste in the landfill(s).
   3. Landfill Alternatives: List all waste materials that will be diverted from landfills by reuse, salvage, or recycling.
   4. Meetings: Describe regular meetings to be held to address waste prevention, reduction, recycling, salvage, reuse, and disposal.
   5. Materials Handling Procedures: Describe the means by which materials to be diverted from landfills will be protected from contamination and prepared for acceptance by designated facilities; include separation procedures for recyclables, storage, and packaging.
   6. Transportation: Identify the destination and means of transportation of materials to be recycled; i.e. whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler.

## PART 2 PRODUCTS - NOT USED

## PART 3 EXECUTION

### 3.01 WASTE MANAGEMENT PROCEDURES

A. See Section 01 3000 for additional requirements for project meetings, reports, submittal procedures, and project documentation.

### 3.02 WASTE MANAGEMENT PLAN IMPLEMENTATION

A. Manager: Designate an on-site person or persons responsible for instructing workers and overseeing and documenting results of the Waste Management Plan.

B. Communication: Distribute copies of the Waste Management Plan to job site foreman, each subcontractor, Owner, and Architect.

C. Instruction: Provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the project.

D. Meetings: Discuss trash/waste management goals and issues at project meetings.
   1. Pre-bid meeting.
   2. Pre-construction meeting.
   3. Regular job-site meetings.

E. Facilities: Provide specific facilities for separation and storage of materials for recycling, salvage, reuse, return, and trash disposal, for use by all contractors and installers.
   1. Provide containers as required.
   2. Provide adequate space for pick-up and delivery and convenience to subcontractors.
   3. Keep recycling and trash/waste bin areas neat and clean and clearly marked in order to avoid contamination of materials.

F. Hazardous Wastes: Separate, store, and dispose of hazardous wastes according to applicable regulations.

G. Recycling: Separate, store, protect, and handle at the site identified recyclable waste products in order to prevent contamination of materials and to maximize recyclability of identified materials. Arrange for timely pickups from the site or deliveries to recycling facility in order to prevent contamination of recyclable materials.

H. Reuse of Materials On-Site: Set aside, sort, and protect separated products in preparation for reuse.

I. Salvage: Set aside, sort, and protect products to be salvaged for reuse off-site.

**END OF SECTION**

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# SECTION 01 7800
# CLOSEOUT SUBMITTALS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Project Record Documents.

B. Operation and Maintenance Data.

C. Warranties and bonds.

### 1.02 RELATED REQUIREMENTS

A. Section 01 3000 - Administrative Requirements: Submittals procedures, shop drawings, product data, and samples.

B. Section 01 7000 - Execution and Closeout Requirements: Contract closeout procedures.

C. Individual Product Sections: Specific requirements for operation and maintenance data.

D. Individual Product Sections: Warranties required for specific products or Work.

### 1.03 SUBMITTALS

A. Project Record Documents: Submit documents to Architect after substantial completion but prior to final application for payment..

B. Operation and Maintenance Data:
   1. Submit two copies of preliminary draft or proposed formats and outlines of contents before start of Work. Architect will review draft and return one copy with comments.
   2. For equipment, or component parts of equipment put into service during construction and operated by Owner, submit completed documents within ten days after acceptance.
   3. Submit one copy of completed documents 15 days prior to final inspection. This copy will be reviewed and returned after final inspection, with Architect comments. Revise content of all document sets as required prior to final submission.
   4. Submit two sets of revised final documents in final form within 10 days after final inspection.

C. Warranties and Bonds:
   1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within 10 days after acceptance.
   2. Make other submittals within 10 days after Date of Substantial Completion, prior to final Application for Payment.
   3. For items of Work for which acceptance is delayed beyond Date of Substantial Completion, submit within 10 days after acceptance, listing the date of acceptance as the beginning of the warranty period.

## PART 2 PRODUCTS - NOT USED

## PART 3 EXECUTION

### 3.01 PROJECT RECORD DOCUMENTS

A. Maintain on site one set of the following record documents; record actual revisions to the Work:
   1. Drawings.
   2. Specifications.
   3. Addenda.
   4. Change Orders and other modifications to the Contract.
   5. Reviewed shop drawings, product data, and samples.

6. Manufacturer's instruction for assembly, installation, and adjusting.

B. Ensure entries are complete and accurate, enabling future reference by Owner.

C. Store record documents separate from documents used for construction.

D. Record information concurrent with construction progress.
   1. Architect will review record documents with Contractor's project manager after each progress meeting, or at intervals appropriate to the project, to ensure record documents are being kept accurate and up to date with the progress of the project.

E. Specifications: Legibly mark and record at each product section description of actual products installed, including the following:
   1. Manufacturer's name and product model and number.
   2. Product substitutions or alternates utilized.
   3. Changes made by Addenda and modifications.

F. Record Drawings and Shop Drawings: Legibly mark each item to record actual construction including:

G. Record Drawings: Contractor to provide one paper copy and one digital copy PDF format on compact disc. All noted changes to be clouded.

**3.02 OPERATION AND MAINTENANCE DATA**

A. Product Data: Mark each sheet to clearly identify specific products and component parts, and data applicable to installation. Delete inapplicable information.

B. Drawings: Supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams. Do not use Project Record Documents as maintenance drawings.

C. Typed Text: As required to supplement product data. Provide logical sequence of instructions for each procedure, incorporating manufacturer's instructions.

**3.03 OPERATION AND MAINTENANCE DATA FOR MATERIALS AND FINISHES**

A. For Each Product, Applied Material, and Finish:
   1. Product data, with catalog number, size, composition, and color and texture designations.
   2. Information for re-ordering custom manufactured products.

B. Instructions for Care and Maintenance: Manufacturer's recommendations for cleaning agents and methods, precautions against detrimental cleaning agents and methods, and recommended schedule for cleaning and maintenance.

C. Moisture protection and weather-exposed products: Include product data listing applicable reference standards, chemical composition, and details of installation. Provide recommendations for inspections, maintenance, and repair.

D. Additional information as specified in individual product specification sections.

E. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

F. Provide a listing in Table of Contents for design data, with tabbed fly sheet and space for insertion of data.

**3.04 OPERATION AND MAINTENANCE DATA FOR EQUIPMENT AND SYSTEMS**

A. For Each Item of Equipment and Each System:
   1. Description of unit or system, and component parts.

2. Identify function, normal operating characteristics, and limiting conditions.
3. Include performance curves, with engineering data and tests.
4. Complete nomenclature and model number of replaceable parts.

B. Where additional instructions are required, beyond the manufacturer's standard printed instructions, have instructions prepared by personnel experienced in the operation and maintenance of the specific products.

C. Operating Procedures: Include start-up, break-in, and routine normal operating instructions and sequences. Include regulation, control, stopping, shut-down, and emergency instructions. Include summer, winter, and any special operating instructions.

D. Maintenance Requirements: Include routine procedures and guide for preventative maintenance and trouble shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.

E. Provide servicing and lubrication schedule, and list of lubricants required.

F. Include manufacturer's printed operation and maintenance instructions.

G. Include sequence of operation by controls manufacturer.

H. Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.

I. Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.

J. Include test and balancing reports.

K. Additional Requirements: As specified in individual product specification sections.

**3.05 ASSEMBLY OF OPERATION AND MAINTENANCE MANUALS**

A. Assemble operation and maintenance data into durable manuals for Owner's personnel use, with data arranged in the same sequence as, and identified by, the specification sections.

B. Where systems involve more than one specification section, provide separate tabbed divider for each system.

C. Prepare instructions and data by personnel experienced in maintenance and operation of described products.

D. Prepare data in the form of an instructional manual.

E. Binders: Commercial quality, 8-1/2 by 11 inch (216 by 280 mm) three D side ring binders with durable plastic covers; 4 inch (____ mm) maximum ring size. When multiple binders are used, correlate data into related consistent groupings.

F. Cover: Identify each binder with typed or printed title OPERATION AND MAINTENANCE INSTRUCTIONS; identify title of Project; identify subject matter of contents.

G. Project Directory: Title and address of Project; names, addresses, and telephone numbers of Architect, Consultants, Contractor and subcontractors, with names of responsible parties.

H. Tables of Contents: List every item separated by a divider, using the same identification as on the divider tab; where multiple volumes are required, include all volumes Tables of Contents in each volume, with the current volume clearly identified.

I. Dividers: Provide tabbed dividers for each separate product and system; identify the contents on the divider tab; immediately following the divider tab include a description of product and major component parts of equipment.

J. Text: Manufacturer's printed data, or typewritten data on 24 pound paper.

K. Drawings: Provide with reinforced punched binder tab. Bind in with text; fold larger drawings to size of text pages.

L. Arrange content by systems under section numbers and sequence of Table of Contents of this Project Manual.

M. Contents: Prepare a Table of Contents for each volume, with each product or system description identified, in three parts as follows:
   1. Part 1: Directory, listing names, addresses, and telephone numbers of Architect, Contractor, Subcontractors, and major equipment suppliers.
   2. Part 2: Operation and maintenance instructions, arranged by system and subdivided by specification section. For each category, identify names, addresses, and telephone numbers of Subcontractors and suppliers. Identify the following:
      a. Significant design criteria.
      b. List of equipment.
      c. Parts list for each component.
      d. Operating instructions.
      e. Maintenance instructions for equipment and systems.
      f. Maintenance instructions for special finishes, including recommended cleaning methods and materials, and special precautions identifying detrimental agents.
   3. Part 3: Project documents and certificates, including the following:
      a. Shop drawings and product data.

N. Table of Contents: Provide title of Project; names, addresses, and telephone numbers of Architect , Consultants, and Contractor with name of responsible parties; schedule of products and systems, indexed to content of the volume.

### 3.06 WARRANTIES AND BONDS

A. Obtain warranties and bonds, executed in duplicate by responsible Subcontractors, suppliers, and manufacturers, within 10 days after completion of the applicable item of work. Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial completion is determined.

B. Verify that documents are in proper form, contain full information, and are notarized.

C. Co-execute submittals when required.

D. Retain warranties and bonds until time specified for submittal.

E. Manual: Bind in commercial quality 8-1/2 by 11 inch (216 by 279 mm) three D side ring binders with durable plastic covers.

F. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of Contractor and equipment supplier; and name of responsible company principal.

G. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of product or work item.

H. Separate each warranty or bond with index tab sheets keyed to the Table of Contents listing. Provide full information, using separate typed sheets as necessary. List Subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.

I. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

J. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.

K. Owner's Recourse: Written warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law, nor shall warranty periods be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.

**END OF SECTION**

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# SECTION 01 7833
# SPECIAL PROJECT WARRANTIES

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. General administrative and procedural requirements for preparation and submission of Special Project Warranties required by the Contract Documents, **in addition to manufacturer's warranties on products specified within individual specification sections.**
   1. Project Waterproofing Warranty
   2. General Contractor's Roofing Guarantee

### 1.02 RELATED REQUIREMENTS

A. Construction Drawings, Technical Specifications, Addenda, and general provisions of the Contract, including Contract General Conditions and Supplementary General Conditions and other Division 1 Specification Sections, apply to this section.

B. Section 07 2616 - Intergrally-Bonded Underslab Vapor Retarder

C. Section 07 2726 - Fluid-Applied Membrane Air Barriers

D. Section 07 6526 - Self Adhered Sheet Flashing

E. Section 07 6200 - Sheet Metal Flashing and Trim

### 1.03 DEFINITIONS

A. Warranty: Assurance to the Owner by Contractor, installer, supplier, manufacturer or other party responsible as warrantor, for the quantity, quality, performance and other representations of a product, system service of the work, in whole or in part, for the duration of the specified period of time.

B. Guaranty: Assurance to the Owner by Contractor or product manufacturer or other specified party, as guarantor, that the specified warranty will be fulfilled by the guarantor in the event of default by the warrantor.

C. Product Warranty: Written warranty published by product manufacturer for particular products and specifically endorsed by the manufacturer to the Owner.

D. Special Project Warranty: Written warranty required by or incorporated into Contract Documents, to extend time limits provided by standard warranty or to provide a greater right for the Owner.

### 1.04 SPECIAL PROJECT WARRANTIES AND GUARANTIES

A. **Project Waterproofing Warranty**
   1. A form for the Project Waterproofing Warranty is included at the end of this specification. Prior to Notice of Substantial Completion, the Contractor shall submit a fully executed warranty to the Architect, with a copy to the Owner's Representative, for final review and acceptance.
   2. See attached warranty form for a list of individual specification sections covered under this warranty.

B. **General Contractor's Roofing Guarantee**
   1. A form for the Project Waterproofing Warranty is included at the end of this specification. Prior to Notice of Substantial Completion, Contractor shall submit a fully executed warranty to the Architect, with a copy to the Owner's Representative, for final review and acceptance.

2. See attached warranty form for a list of individual specification sections covered under this warranty or guarantee.
3.

**1.05 PREPARATION OF WARRANTIES AND GUARANTIES**

A. Signatures: Signatures shall be by person authorized to sign warranties, guaranties on behalf of entity providing such warranty or guaranty.

B. Co-Singature: All installer's warranties shall be co-signed by Contractor(s) noted on the signature lines.

C. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

**PART 2 PRODUCTS**

**PART 3 EXECUTION**

### 3.01 PROJECT WATERPROOFING WARRANTY

Name Name & Address:

_____

Project Owner(s) & Address:

_____

General Contractor's Name, Address, & Telephone Number:

_____

**Effective Dates of Warranty or Guarantee:**

Date of Acceptance:_____

Date of Expiration:_____

1. The waterproofing contractor and general contractor do hereby certify that the waterproofing of the above note underslab vapor barrier, and weather barrier work as specified in the following sections and as included in this contract was installed in strict accordance with all requirements of the plans, specifications, and in accordance with approved manufacturer's recommendations for all specified warranty requirements. (See individual Sections for additional required warranties.)
   **Section 07 2616 - Intergrally-Bonded Underslab Vapor Retarder**
   **Section 07 2726 - Fluid-Applied Membrane Air Barriers**
   **Section 07 6526 - Self Adhered Sheet Flashing**
2. The waterproofing contractor and general contractor hereby guarantee the waterproofing of the above noted specification sections and associated work including but not limited to all underground vertical and horizontal waterproofing to be water tight and free from all leaks and moister intrusion, due to faulty or defective materials and workmanship for a period of **ten (10) years**, starting on the date of substantial completion of the project.
3. Subject to the terms and general contractor conditions listed below, the waterproofing contractor shall so guarantee that during the guarantee period he will, at his own cost and expense, make or cause to be made such repairs to, or replacements of said work, in accordance with the waterproofing manufacturers recommendations as are necessary to correct faulty and defective work and/or materials which may develop in the work including. Anticipated life of the above noted specification sections for the waterproofing systems and the best standards applicable to the particular waterproofing type in value and in accordance with construction documents as are necessary to maintain said work in watertight conditions, and further, to respond on or within seven (7) calendar days upon proper notification of leaks or defects by the owner.
   a. During the Guarantee Period, if the Owner allows alteration of the work by anyone other than the Waterproofing Contractor or General Contractor, including cutting, patching and maintenance in connection with penetrations, and positioning of anything effecting the below grade waterproofing, this Guarantee shall become null and void upon the date of said alterations.
   b. Future building additions will not void this Guarantee, except for that portion of the future addition that might affect the work under this contract at the point of connection of the waterproofed areas, and any damage caused by such addition.
   c. The Owner shall promptly notify the Waterproofing Contractor and the General Contractor of observed, known or suspected leaks, defects or deterioration, and shall afford reasonable opportunity for the Waterproofing Contractor to inspect the work, and to examine the evidence of such leaks, defects or deterioration.

4. Included in the warranty are all required repairs and reconstituting of physical facility to the project as a result of damage to the facility due to failure of the above noted systems at no additional cost to owner.
5. Warranty Signatures:

IN WITNESS THEREOF, this instrument has been duly executed this_____day of _____, 20_____.

_____
Waterproofing Contractor's Authorized Signature

_____
Company Name & Address

_____
General Contractor's Authorized Signature

_____
Company Name & Address

_____
Notary Public - State of Alabama

### 3.02 GENERAL CONTRACTOR'S ROOFING GUARANTEE

Project Name & Address:

_____

Project Owner(s) & Address:

_____

General Contractor's Name, Address, & Telephone Number:

_____

**Effective Dates of Guarantee**

Date of Acceptance: _____

Date of Expiration: _____

1. The General Contractor does hereby certify that the roofing work as specified in the following specification sections and included in this contract was installed in strict accordance with all requirements of the plans and specifications and in accordance with approved roofing manufacturers recommendations. (See individual Sections for additional required warranties.)

   **Section 07 6200 - Sheet Metal Flashing and Trim**

   a. **Section 07 9500 - Joint Sealants**

2. Subject to the terms and conditions listed below, the General Contractor also guarantees that during the Guarantee Period of **Tenyears(10)** contractor will, at his own cost and expense, make or cause to be made such repairs to, or replacements of said work, in accordance with the roofing manufacturers standards as are necessary to correct faulty and defective work and/or materials which may develop in the work including, but not limited to: blisters, delamination, exposed felts, ridges, wrinkles, splits, warped insulation and/or loose flashings, etc. in a manner pursuant to the total anticipated life of the roofing system and the best standards applicable to the particular roof type in value and in accordance with construction documents as are necessary to maintain said work in satisfactory condition, and further, to respond on or within three (3) calendar days upon proper notification or leaks or defects by the Owner or Architect.
3. Specifically excluded from this Guarantee are damages to the work, other parts of the building and building contents caused by: (1) lightning, windstorm, hailstorm and other unusual phenomena of the elements; and (2) fire. When the work has been damaged by any of the foregoing causes, the Guarantee shall be null and void until such damage has been repaired by the General Contractor, and until the cost and expense thereof has been paid by the Owner or by the responsible party so designated.
4. During the Guarantee Period, if the Owner allows alteration of the work by anyone other than the General Contractor, including cutting, patching and maintenance in connection with penetrations, and positioning of anything on the roof, this Guarantee shall become null and void upon the date of said alterations. If the owner engages the General Contractor to perform said alterations, the Guarantee shall not become null and void, unless the General Contractor, prior to proceeding with the said work, shall have notified the Owner in writing, showing reasonable cause for claim that said alterations would likely damage or deteriorate the work, thereby reasonably justifying a termination of this Guarantee.

5. Future building additions will not void this guarantee, except for that portion of the future addition that might affect the work under this contract at the point of connection of the roof areas, and any damage caused by such addition. If this contract is for roofing of an addition to an existing building, then this guarantee covers the work involved at the point of connection with the existing roof.
6. During the Guarantee period, if the original use of the roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray cooled surface, flooded basin, or other use of service more severe than originally specified, this Guarantee shall become null and void upon the date of said change.
7. The Owner shall promptly notify the General Contractor of observed, known or suspected leaks, defects or deterioration, and shall afford reasonable opportunity for the General Contractor to inspect the work, and to examine the evidence of such leaks, defects or deterioration.
    a. Warranty Signatures:

IN WITNESS THEREOF, this instrument has been duly executed this _____ day of _____, 20 _____.

_____
General Contractor's Authorized Signature

_____
Type Name and Tile

_____
Notary Public - State of Alabama

_____

Notary Public - State of Alabama

**END OF SECTION**

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# SECTION 02 4100
# DEMOLITION

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Building demolition excluding removal of hazardous materials and toxic substances. **Refer to Terracon's document for removal of hazardous materials.**

B. Selective demolition of built site elements.

C. Abandonment and removal of existing utilities and utility structures.

### 1.02 RELATED REQUIREMENTS

A. Section 01 2200 - Unit Prices

B. Section 01 5000 - Temporary Facilities and Controls: Site fences, security, protective barriers, and waste removal.

C. Section 01 5713 - Temporary Erosion and Sediment Control.

D. Section 01 6000 - Product Requirements: Handling and storage of items removed for salvage and relocation.

E. Section 01 7000 - Execution and Closeout Requirements: Project conditions; protection of bench marks, survey control points, and existing construction to remain; reinstallation of removed products; temporary bracing and shoring.

F. Section 31 1000 - Site Clearing: Vegetation and existing debris removal.

### 1.03 REFERENCE STANDARDS

A. 29 CFR 1926 - U.S. Occupational Safety and Health Standards; current edition.

B. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations; 2013.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Site Plan: Showing:
   1. Vegetation that is to remain is to be protected.
   2. Areas for temporary construction and field offices.

C. Demolition Plan: Submit demolition plan to governing authorities as specified by OSHA and local authorities.
   1. Indicate extent of demolition, removal sequence, bracing and shoring, and location and construction of barricades and fences.
   2. Identify demolition firm and submit qualifications.
   3. Include a summary of safety procedures.

D. Project Record Documents: Accurately record actual locations of capped and active utilities and subsurface construction.

## PART 2 PRODUCTS -- NOT USED

## PART 3 EXECUTION

### 3.01 SCOPE

A. Remove existing site elements, refer to Civil Drawings.Plumbing , mechanical and electrical.
   1. see drawings.

2. Remove paving and curbs as required to accomplish new work.

B. Visit site prior to bid and verify all existing conditions, existing structures, finishes, and location of work area.

### 3.02 GENERAL PROCEDURES AND PROJECT CONDITIONS

A. Comply with other requirements specified in Section 01 7000.

B. Comply with applicable codes and regulations for demolition operations and safety of adjacent structures and the public.
   1. Obtain required permits.
   2. Use of explosives is not permitted.
   3. Take precautions to prevent catastrophic or uncontrolled collapse of structures to be removed; do not allow worker or public access within range of potential collapse of unstable structures.
   4. Provide, erect, and maintain temporary barriers and security devices.
   5. Use physical barriers to prevent access to areas that could be hazardous to workers or the public.
   6. Conduct operations to minimize effects on and interference with adjacent structures and occupants.
   7. Do not close or obstruct roadways or sidewalks without permit.
   8. Conduct operations to minimize obstruction of public and private entrances and exits; do not obstruct required exits at any time; protect persons using entrances and exits from removal operations.
   9. Obtain written permission from owners of adjacent properties when demolition equipment will traverse, infringe upon or limit access to their property.
   10. Buildings Occupancy: The adjacent buildings will be occupied. Work may be accomplished during normal hours. Notify the owner 48 hours in advance if any demolition will result in excessive noise or vibration which may be sensed in the area. Contractor to seal off all work areas and maintain fire exiting for the building.

C. Do not begin removal until receipt of notification to proceed from Owner.

D. Protect existing structures and other elements that are not to be removed (including adjacent buildings).
   1. Provide bracing and shoring.
   2. Prevent movement or settlement of adjacent structures.
   3. Stop work immediately if adjacent structures appear to be in danger.

E. Minimize production of dust due to demolition operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

F. Partial Removal of Paving and Curbs: Neatly saw cut at right angle to surface

### 3.03 EXISTING UTILITIES

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Do not close, shut off, or disrupt existing life safety systems that are in use without at least 7 days prior written notification to Owner.

E. Do not close, shut off, or disrupt existing utility branches or take-offs that are in use without at least 3 days prior written notification to Owner.

F. Locate and mark utilities to remain; mark using highly visible tags or flags, with identification of utility type; protect from damage due to subsequent construction, using substantial barricades if necessary.

G. Remove exposed piping, valves, meters, equipment, supports, and foundations of disconnected and abandoned utilities.

H. Existing Data Duct Bank:
   1. It shall be the contractors responsibility to locate and verify this feature prior to any work. Locations shown on drawings are approximate.
   2. Contractor shall take extreme measures to protect the existing data duct bank.

**3.04 SELECTIVE DEMOLITION FOR ALTERATIONS**

A. Drawings showing existing construction and utilities are based on casual field observation and existing record documents only.
   1. Verify that construction and utility arrangements are as indicated.
   2. Report discrepancies to Architect before disturbing existing installation.
   3. Beginning of demolition work constitutes acceptance of existing conditions that would be apparent upon examination prior to starting demolition.

B. Remove existing building and site elements as indicated and as required to accomplish new work.

C. Services (Including but not limited to HVAC, Plumbing, Fire Protection, Electrical, and Telecommunications): Remove existing systems and equipment as indicated.
   1. Maintain existing active systems that are to remain in operation; maintain access to equipment and operational components.
   2. Where existing active systems serve occupied facilities but are to be replaced with new services, maintain existing systems in service until new systems are complete and ready for service.
   3. Verify that abandoned services serve only abandoned facilities before removal.

D. Protect existing work to remain.
   1. Prevent movement of structure; provide shoring and bracing if necessary.
   2. Perform cutting to accomplish removals neatly and as specified for cutting new work.
   3. Repair adjacent construction and finishes damaged during removal work.
   4. Patch as specified for patching new work.

**3.05 DEBRIS AND WASTE REMOVAL**

A. Remove debris, junk, and trash from site.

B. Leave site in clean condition, ready for subsequent work.

C. Clean up spillage and wind-blown debris from public and private lands.

D. All demolished materials shall become the property of the Contractor and shall be removed from the site by the Contractor unless noted otherwise in Contract Documents.

E. The Contractor shall select haul routes, obtain required approval of local authorities, and conduct its operations in such manner as to insure minimum interference with roads, street, sidewalks, and neighboring buildings and facilities and so that there is no interference with the normal operations of the building.

F. The Contractor shall obtain all necessary permits and comply with all statutes, ordinances, codes and regulations applicable to the work to be performed.

G. The Contractor shall take all precautions necessary to assure that the work will be performed in a manner that will not endanger the public, any workman, or any property in the vicinity of the work.

H. The Contractor shall take such actions as shall be necessary to assure that members of the public will have safe passage on the public streets around the area of demolition, and construct such fencing, barricades and obstacles as will prevent unauthorized entry to the work site.

**END OF SECTION**

# Technical Specifications for Removal of Asbestos-Containing Materials

## Building E

## 2511 Fairlane Drive

## Montgomery, AL 36116

August 4, 2026 | Project Number: E1227393

**Prepared for:**

Alabama Community College System
135 South Union Street
Montgomery, Alabama 36130

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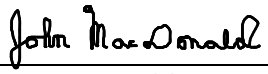
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| ***Project Title:*** | Technical Specifications for Removal of Asbestos-Containing Materials<br><br>Building E<br>2511 Fairlane Drive<br>Montgomery, AL 36116 |
| ***Prepared for:*** | Alabama Community College System<br>135 South Union Street<br>Montgomery, Alabama 36130 |
| ***General Contractor:*** | TBD |
| ***Terracon Project Number:*** | E1227393 |

***Work Plan Prepared by:***



John MacDonald
Senior Staff Industrial Hygienist

***Work Plan Reviewed by:***



Stephen Howard
Alabama Asbestos Project Designer
Certification No. APD0525159469
Exp. 5/14/2027

# TECHNICAL SPECIFICATIONS

## SECTION 01043

## PROJECT COORDINATION

### 1.01 GENERAL

A. The scope of this project includes the abatement of asbestos-containing materials (ACM) prior to renovations activities associated with the structure located at 2511 Fairlane Drive in Montgomery, Alabama (Building E). Building E comprises a 1-story section and a 2-story section totaling approximately 26,300 square feet.

B. Throughout this Technical Specifications for Removal of Asbestos-Containing Materials (Technical Specifications) the use of "Alabama Community College System" and "Owner" shall be considered synonymous. The term "Designer" refers to Terracon Consultants, Inc. The term "Asbestos Abatement Contractor" will be used throughout and refers to the contractor performing asbestos abatement. The use of "General Contractor" or "GC" shall be considered synonymous.

C. These entire Technical Specifications and related appendices apply to the Asbestos Abatement Contractor.

D. Related Documents - Additional information regarding regulated materials is provided in the following document: Terracon *Pre-Renovation Asbestos Inspection Report* dated January 26, 2003. The scope of work is not contained in the report. The report is provided in Appendix C and is for informational purposes only.

1. The Asbestos Abatement Contractor is required to read the entire reports and keep a copy on site at all times during abatement.

2. In addition, other contractors whose work may impact ACM or assumed ACM will be required to read and maintain a copy of the report on-site during construction activities.

E. The Asbestos Abatement Contractor will be a licensed general contractor by the State of Alabama and must have a minimum of five (5) years of significant experience similar to this project.

F. The Asbestos Abatement Contractor shall be responsible for inspecting the site prior to pricing the project to confirm the scope of the work. Any quantities listed by the Designer (Terracon Consultants, Inc.) in the plans, specifications, survey,

or other related documents are done so as estimations. The Asbestos Abatement Contractor is responsible for measurements and quantifying the asbestos-containing materials to be removed.

G. The Asbestos Abatement Contractor shall furnish and is responsible for all costs including, but not limited to permit fees, containment preparation, scaffolding, labor, materials, services, insurance, and equipment necessary to conduct the abatement operations. All work including abatement and disposal of asbestos material will be in accordance with the plans and specifications, applicable Environmental Protection Agency (EPA) and Occupational Safety and Health Administration (OSHA) regulations, and any other applicable state and local government regulations.

H. The Asbestos Abatement Contractor/employer has and assumes the responsibility of proceeding in such a manner that he offers his employees a workplace free of recognized hazards causing or likely to cause death or serious injury. The Asbestos Abatement Contractor shall be responsible for performing this abatement and disposal so that airborne asbestos fiber levels do not exceed the established levels of the personal protective equipment provided to employees.

I. The Asbestos Abatement Contractor will be responsible for all costs associated with employee monitoring to meet the OSHA requirements.

J. The Asbestos Abatement Contractor is responsible for all costs, including additional visits, should the Designer and/or the air monitoring firm determine that the Asbestos Abatement Contractor failed a final inspection. Notification and scheduling of the final inspection during the project is the responsibility of the Asbestos Abatement Contractor. The Asbestos Abatement Contractor will allow a minimum notice of twenty-four (24) hours unless the Designer and the Asbestos Abatement Contractor agree upon a different time frame.

K. Asbestos Abatement Contractor shall coordinate all asbestos removal activities with Owner, GC, and the Designer. Owner shall have continuous use of areas not included in the scope of this project.

L. The Asbestos Abatement Contractor shall be responsible to adhere to any and all security requirements imposed by the Owner and GC.

## 1.02 PERSONNEL

A. Supervisor

1. All supervisors shall be accredited by the University of Alabama Safe State Program (UASSP).

2. All supervisors on the project shall have a minimum of two years' experience in the administration and supervision of asbestos abatement projects including work practices, protective measures for building and personnel, disposal procedures, etc.

3. One supervisor shall be provided for every 10 workers inside each containment. A minimum of one supervisor shall be provided per asbestos abatement work area.

4. The Asbestos Abatement Contractor shall have at least one employee on the job site in either a foreman or supervisor position that is bilingual in the appropriate languages when employing workers who do not speak fluent English.

5. A minimum of one supervisor per company shall have attended and successfully completed a 24-hour respiratory protection course.

B. Worker

1. All workers shall be accredited by the UASSP.

2. The Asbestos Abatement Contractor is responsible for supplying the required number of workers to complete the project within the designated project schedule.

C. Competent Person

1. A competent person, as defined in the OSHA asbestos standard 29 CFR 1926.1101, employed by the Asbestos Abatement Contractor must be outside each work area during removal cleaning activities to monitor activity, ensure containment security, provide information to visitors, and provide access to the work area.
2. The competent person, employed by the Asbestos Abatement Contractor, shall be bilingual in the appropriate languages when employing workers who do not speak fluent English.

D. Employees

1. The Asbestos Abatement Contractor is responsible for the behavior of workers within his employment. If at any time during the contracted work, any of his employees are judged to exhibit behavior unfitting for the area or judged to be a nuisance by the Owner, GC, or the Designer, the Asbestos Abatement Contractor shall remove them immediately from the project.

2. The Asbestos Abatement Contractor shall be responsible for compliance with the following concerning employee behavior:

   a. Under no circumstances are alcohol, drugs, or any other type of controlled substances permitted on the property.

   b. Firearms are not permitted on the property.

   c. All workers are restricted to the construction project site only.

   d. All workers must conform to the following basic dress code when in public areas of the project confines: long pants, shirts, no tank tops, no shorts, no bare backs.

   e. The Asbestos Abatement Contractor is responsible for disposal of all trash brought on the property by his employees; including drink cans, bottles or other food containers and wrappers.

   f. Eating, drinking, and smoking are not allowed in the containment area(s).

3. Failure to adhere to these rules could result in criminal prosecution and/or removal from the property.

## 1.03 MEETINGS

A. Pre-bid

1. A pre-bid meeting will be held by the Designer and GC at a to-be-determined time. **All Asbestos Contractors submitting a bid are required to attend this meeting, visit the site, and ask questions concerning the plans and specifications.**

2. The Designer and GC will review the plans and specifications, and present required techniques and safeguards for the removal of the asbestos.

3. Any minutes, new points, or clarifications raised during the meeting will be addressed by issuing an addendum seven (7) calendar days prior to bids.

## 1.04 PRE-JOB SUBMITTALS

A. Submit one (1) complete, bound set of pre-job submittals to the Designer at least five (5) working days prior to start of work. Work is prohibited until the submittal package has been reviewed and approved by the Designer. A copy of the submittals shall be kept in a three-ring binder (project log) by the Asbestos Abatement Contractor at the project site.

1. Notifications: Provide copies of the State of Alabama, Department of Environmental Management (ADEM) – Notice of Demolition and/or Asbestos Removal (ADEM Form 496), which provide written notice to all required agencies ten (10) working days prior to commencement of abatement activities.

2. Employee List: Provide copies of lists of supervisors and workers, along with their accreditation, to be utilized on the project.

3. Permits: Provide copies of approval of a waste disposal site in compliance with 40 CFR 61.154.

4. Medical: Include individually signed forms by each worker to be utilized on the project documenting that each is actively involved in a company employee medical surveillance program.

5. Respirator Training: Copies of most recent fit testing records, individually signed for each worker to be utilized on the project. Include individually signed statements from each employee that they have received training in compliance with 29 CFR 1910.134.

6. Project Schedule: Time schedule for the project, outlining the proposed start, setup, clearances, etc. for the various phases of the project.

7. Initial Exposure Assessment: As required by the OSHA construction asbestos standard 29 CFR 1926.1101.

8. Any other programs or training as outlined by the OSHA and EPA standards.

## 1.05 POST-JOB SUBMITTALS

A. Submit One (1) complete, bound set of post-job submittals to the Designer following the final completion of the work. Requests for final payment will not be approved until the submittal package has been reviewed and approved by the Designer.

1. Affidavits: Asbestos Abatement Contractor's affidavit of payment of debts and claims, affidavit of release of liens, and consent of surety company to final payment.

2. Manifest: Asbestos waste shipment record receipt from landfill operator which acknowledges the Asbestos Abatement Contractor's delivery(s) of waste material. Include date, quantity of material delivered, and signature of authorized representative of landfill. Also, include name of waste transporter.

3. Daily Supervisor Log: A notarized copy of all daily logs showing the following: name, date, entering and leaving time, company or agency represented, reason for entry for all persons entering the work area, employee's daily air monitoring data as required by the OSHA standard, and written comments by inspectors, industrial hygienists, Designers and visitors.

4. Workers: Copies of Alabama Safe State asbestos accreditation cards, asbestos training certification forms, and respirator training and fit test documentation of all new employees hired during the project.

5. Special Reports: All documents generated under Section 01043.1.06.

## 1.06 SPECIAL REPORTS

A. General: Except as otherwise indicated, **submit special reports to Designer within one (1) day of occurrence requiring special report**, with copies to others affected by occurrence. Also keep a copy in the project logbook.

B. Reporting Unusual Events: When an event of unusual and significant nature occurs at site (examples: failure of negative pressure system, rupture of temporary enclosures), prepare and submit a special report to the Designer immediately, listing chain of events, persons participating, response by Asbestos Abatement Contractor's personnel, evaluation of results or effects, and similar pertinent information. When such events are known or predictable in advance, advise Designer in advance at earliest possible date.

C. Reporting Accidents: Prepare and submit reports of significant accidents, at site and anywhere else work is in progress. **A complete copy of the accident report shall**

**be provided to the Owner, GC, and Designer within 24-hours of the accident occurrence.** Record and document date and actions; comply with industry standards for reporting accidents. For this purpose, a significant accident is defined to include events where personal injury is sustained, or property loss of substance is sustained, or where the event posed a significant threat of loss or personal injury.

## 1.07 CONTINGENCY PLAN

A. Contingency Plan: Prepare a site-specific contingency plan for emergencies including; fire, accident, power failure, negative pressure system failure, supplied air system failure (if applicable), evacuation of injured persons for both life threatening and non-life threatening, or any other event that may require modification or abridgment of decontamination or work area isolation procedures. Include in this plan specific procedures for decontamination or work area isolation. Note that nothing in this specification should impede safe exiting or providing adequate medical attention in the event of an emergency. The plan will be completed prior to beginning any on-site work and shall be kept on-site at all times.

B. The Asbestos Abatement Contractor shall post outside/in clean room of Personnel Decontamination Unit:

1. Telephone numbers and locations of emergency services including but not limited to fire, ambulance, hospital, police, power company, telephone company and the Jefferson County Department of Health, Air and Radiation Protection Division.

2. A copy of Safety Data Sheets (SDS) for any chemicals used during the asbestos project.

3. The Asbestos Abatement Contractor shall post asbestos signs in each appropriate language as per the OSHA 29 CFR 1926.1101 standard.

# SECTION 01092

# CODES AND REGULATIONS

## 1.01 REFERENCE SPECIFICATIONS

The Asbestos Abatement Contractor shall assume full responsibility and liability for compliance with all applicable federal, state and local regulations pertaining to work practices, hauling, disposal, and protection of workers, visitors to the site, and persons occupying areas adjacent to the site.

Unless modified by this project specification, all specifications for stripping, removal, repair, and disposal of asbestos-containing materials shall conform to the following specifications and standards, as applicable, as if completely reproduced herein.

A. The following regulations published by the Environmental Protection Agency (EPA):

1. "National Emissions Standards for Hazardous Air Pollutants Asbestos," 40 CFR Part 61, Subpart M.

2. "General Provisions," 40 CFR Part 61, Subpart A.

3. "Asbestos-Containing Materials in Schools," 40 CFR Part 763, Subpart E including appendices.

B. The following regulations published by the U.S. Department of Labor, OSHA:

1. "Occupational Exposure to Asbestos, Tremolite, Anthophyllite, and Actinolite; Final Rules," Title 29, Part 1910, Section 1001 and Part 1926, Section 1101 of the Code of Federal Regulations.

2. "Respiratory Protection," Title 29, Part 1910, Section 134 of the Code of Federal Regulations.

3. Construction Industry, Title 29, Part 1926, of the Code of Federal Regulations.

4. "Access to Employee Exposure and Medical Records," Title 29, Part 1910, Section 20 of the Code of Federal Regulations.

5. "Hazard Communication," Title 29, Part 1926, Section 59 of the Code of Federal Regulations.

6. "Specifications for Accident Prevention Signs and Tags," Title 29, Part 1910, Section 145 of the Code of Federal Regulations.

C. The following regulations published by Alabama state agencies:

1. Alabama Department of Environmental Management, Air Division-Air Pollution Control Program, Chapter 335-3-11 and 335-13-4.

D. The following documents published by the American National Standards Institute:

1. "Fundamentals Governing the Design and Operation of Local Exhaust Systems," Z9.2-1979.

2. "American National Standard for Respiratory Protection Respiratory Use - Physical Qualifications for Personnel," Z88.6-1984.

3. "Practices for Respiratory Protection," Z88.2-1992.

E. The following document published by the Environmental Information Association:

1. "Managing Asbestos In Buildings: A Guide for Owners and Managers, A Revision to the United States Environmental Protection Agency 1985 document Guidance for Controlling Asbestos-Containing Materials in Buildings (EPA 560/5-85-024) Known as the Purple Book," – 2015.

## 1.02 NOTICES

A. The Asbestos Abatement Contractor shall notify the following offices in writing within the time frame specified by the NESHAP regulations prior to beginning any asbestos removal operations.

1. Alabama Department of Environmental Management (ADEM)
   Air Division
   Attn: Mr. Don Barron
   Phone: 334-271-7879
   Fax: 334-279-3044
   Email: asbestosmail@adem.alabama.gov

| P.O. Box: | Street Address: |
|---|---|
| P.O. Box 301463<br>Montgomery, AL 36130-1463 | 1400 Coliseum Boulevard<br>Montgomery, AL 36110-2059 |

Holidays that fall between Monday and Friday count as "working days." Saturdays and Sundays do not count as working days.

2. Emergency Departments

   Notify the local emergency medical services, police and fire departments in writing of the type and scope of work being performed.

B. Licenses

1. Maintain current licenses for Asbestos Abatement Contractor and accreditation for workers and supervisors as required by applicable State or local jurisdictions for the removal, transporting, disposal or other regulated activity related to the work of this contract.

C. Asbestos Abatement Contractor is responsible for payment of all permit fees required for this project.

# SECTION 01410

# AIR MONITORING - AIR MONITORING FIRM

## 1.01 GENERAL

A. If requested by the Owner, the Designer and/or Asbestos Abatement Contractor shall be responsible for the coordination and execution of air monitoring services.

B. Air monitoring, if requested, shall be done under the direct supervision of an American Board of Industrial Hygiene (ABIH) Certified Industrial Hygienist (CIH), except for sampling performed by the Asbestos Abatement Contractor to satisfy OSHA requirements.

## 1.02 DESCRIPTION OF WORK

A. The air monitoring firm shall offer expertise to Asbestos Abatement Contractor but is not directly responsible for the performance of the job.

B. At the job site, the air monitoring firm is expected to observe, be aware, and comment on general worksite conditions and activities as they relate to the specifications and profession of industrial hygiene.

C. The air monitoring firm shall furnish the Asbestos Abatement Contractor with a copy of the field report, if requested. Copies of field notes and reports of observations shall be kept in project logbook.

D. The air monitoring firm is to conform to the Asbestos Abatement Contractor's schedule and shall respond to necessary changes, provided an advance notice is given as outlined in Section 01043.

E. The air monitoring firm’s project monitor shall furnish the GC, Designer and Asbestos Abatement Contractor with a mobile phone number where they can be reached quickly at all times.

F. The air monitoring firm shall notify the Asbestos Abatement Contractor immediately via phone and within twenty-four hours, and in writing, of any failed clearances.

G. At the completion of the project, the air monitoring firm shall prepare a report describing the assessment of the project, all air monitoring data, acceptance letters, calibration records, and a description of the project as it proceeded to completion and submit four copies of the report to the Designer.

## 1.03 AIR MONITORING

A. Work Area Clearance: To determine if the elevated airborne fiber levels encountered during abatement operations have been reduced to an acceptable level, the air monitoring firm will sample and analyze air per Section 01714.

# SECTION 01503

# TEMPORARY FACILITIES

## 1.01 GENERAL

A. Provide temporary connection to existing building utilities or provide temporary facilities as required herein or as necessary to conduct the work.

B. Use qualified tradesmen for installation of temporary services and facilities. Locate, modify and extend temporary services and facilities where they will serve the project adequately and result in minimum interference with the performance of the work.

C. The Asbestos Contractor is responsible for the lock and tag out of all power sources.

## 1.02 WATER SERVICE

A. Water is not available at the site. The Asbestos Abatement Contractor will be responsible for water service at the site required for execution of the project.

B. The Asbestos Abatement Contractor shall supply hot and cold water to the decontamination unit in accordance with Section 01563. Hot water shall be supplied at a minimum temperature of 100 degrees Fahrenheit.

## 1.03 ELECTRICAL SERVICE

A. Electrical service at the site, required for execution of the project, will be provided to the Asbestos Abatement Contractor by the Owner or GC. The Asbestos Abatement Contractor shall comply with applicable NEMA, NEC and UL standards and governing state and local regulations for materials and layout of temporary electric service.

B. Ground Fault Protection: The Owner or GC will provide receptacle outlets equipped with ground fault circuit interrupters (GFCI), reset button and pilot light, for plug-in connection of power tools and equipment. All GFCI shall be located outside of the containment areas. All powered equipment shall be connected to a GFCI.

C. The Asbestos Abatement Contractor will be responsible for installing temporary lighting adequate to provide sufficient illumination for safe work and traffic conditions in every area of work.

D. The Owner or GC will provide additional power service and distribution service, consisting of individual dedicated 15-amp 120-volt circuits to electrical drops with

receptacle outlets equipped with ground fault interrupt protection, color coded for the exclusive use of the air monitoring firm.

## 1.04 FIRST AID

A. A minimum of one first aid kit shall be located in the clean rooms. Additional first aid kits as the Asbestos Abatement Contractor feels is adequate or is required by law shall be located throughout the work areas.

## 1.05 FIRE EXTINGUISHERS

A. Comply with the applicable recommendations of NFPA Standard 10 - "Standard for Portable Fire Extinguishers." Locate fire extinguishers where they are most convenient and effective for their intended purpose but provide not less than one extinguisher in each work area equipment room and one in the clean rooms of the personnel decontamination units.

## 1.06 TOILET FACILITIES

A. Toilet facilities or toiletries are not available at the site. Toilet facilities and toiletries (i.e., toilet paper) for the site will be provided by the GC.

## 1.07 BUILDING SECURITY

A. The Asbestos Abatement Contractor is responsible for constructing and maintaining secure containment areas including the entry/exit areas. The regulated areas shall be restricted to authorized, trained, and protected personnel. These may include the Asbestos Abatement Contractor’s employees, employees of approved subcontractors, state representatives, and any other designated individuals. The Asbestos Abatement Contractor shall establish a list of authorized personnel prior to job start and post this list in the clean rooms of the decontamination facilities. Abatement locations will be appropriately identified utilizing warning signs as required by OSHA and all city, state, and federal regulations. The Asbestos Abatement Contractor is responsible for creating and maintaining a secure work area during the entire project.

B. The Asbestos Abatement Contractor is responsible for maintaining secure entry/exit locations at the facility while work is being completed. The Asbestos Abatement Contractor is responsible for coordinating building security issues with the Owner or Owner’s Representative.

C. The Asbestos Abatement Contractor shall maintain a logbook in the clean room areas of the decontamination systems. Anyone who enters the regulated areas must record name, affiliation, time in, and time out for each entry.

D. Access to the regulated area shall be through a single decontamination system. All other means of access (doors, windows, hallways, etc.) shall be blocked or locked so as to prevent entry to or exit from the regulated area. The only exceptions to this rule are the waste pass-out air lock, which shall be sealed except during the removal of containerized asbestos waste from the regulated area, and emergency exits in case of fire or accident. **Emergency exits within the work area shall <u>not</u> be locked from the inside; however, they shall be sealed with pre-scored polyethylene sheeting and high-visibility tape until needed. Keep a razor knife taped to the polyethylene sheeting for emergency egress.**

## 1.08 STORAGE

A. Supply temporary storage required for storage of equipment and materials for duration of project. Trailer and storage dumpsters will be maintained in areas designated by the Owner or Owner's Representative

# SECTION 01513

# NEGATIVE PRESSURE SYSTEM

## 1.01 GENERAL

A. High efficiency particulate air (HEPA) filter exhaust systems equipped with new HEPA filters for each project shall be used. Exhaust equipment and systems shall comply with ANSI Z9.2-79 and shall be used according to manufacturer's recommendations.

B. A system of HEPA-equipped air filtration devices shall be configured so that a pressure differential is established between the work area and the surrounding area (-0.02 to -0.04" water column) as measured at any point inside or outside the containment area. **At least one continuous chart-recorded manometer shall be used to confirm this condition.** The HEPA-equipped air filtration devices shall be operated according to the manufacture specifications including regular air filter changes.

C. Additional air filtration devices shall be provided inside the work areas for emergency standby as well as for circulation of dead air spaces.

D. The pressure differential is maintained at all times after preparation is complete and until the final visual inspection and air tests confirm the area is clean and acceptable for occupancy and the Designer confirms verbally with written follow-up to discontinue the use of the negative pressure system.

E. Air shall be exhausted outside the building and away from pedestrian traffic areas. Any variations must be approved by the Designer. Negative air machines shall be located at the farthest possible location from the clean air intake(s). Asbestos Abatement Contractor shall install templates (5/8” fire rated plywood) for exhaust of negative air.

F. The Asbestos Abatement Contractor shall check daily both before and during work for leaks and log his checks in the bound logbook. This includes pre-work and periodic internal checks to air-moving devices.

G. There shall be a minimum of four air changes per hour in any containment.

H. The following formula shall be used to determine the approximate ventilation requirements for each work area using four air changes per hour (one air change every 15 minutes):

$$\text{Total air flow ft}^3\text{/min} = \frac{\text{Volume of work area (in ft}^3\text{)}}{\text{15 min.}}$$

$$\text{Number of units needed} = \frac{\text{Total air flow (ft}^3\text{/min)}}{\text{Capacity of unit (ft}^3\text{/min)}} + (1 \text{ Unit for Safety Factor})$$

I. Prepare a contingency plan (as described in section 01043) in the event of power failure and loss of negative pressure within the work areas. The contingency plan shall be approved by the Owner, GC and Designer.

# SECTION 01526

# WORK AREA PREPARATION

## 1.01 GENERAL

A. Before work begins in an area, a decontamination unit must be in operation as outlined in Section 01563.

B. Completely isolate each work area from other parts of the building so as to prevent contamination beyond the isolated area.

C. Temporary facilities shall be addressed as outlined in Section 01503.

D. The Asbestos Abatement Contractor shall set up each work area, load out, and decontamination area as shown in the plans and specifications. Any variations must be approved by the Designer. The decontamination facility outside of each work area shall consist of a change room, shower room and equipment room as described in Section 01563.

E. Appropriate signage per 29 CFR 1926.1101 shall be posted at entrances, critical barriers, and barrier tape for each asbestos containment.

## 1.02 DEMOLITION/REMOVAL OF NON-ASBESTOS CONTAINING MATERIALS

A. The Asbestos Abatement Contractor is responsible for the demolition and/or removal of all fixtures (i.e. flooring, moldings, cabinetry, wall units, etc.) necessary to gain access to asbestos-containing materials.

1. The Asbestos Abatement Contractor is responsible for coordinating demolition and/or removal activities with the Owner, Owner's Representative, and/or GC.

2. Asbestos Abatement Contractor's demolition and/or removal of non-ACMs may include, but may not be limited to;

- Window units and framing

## 1.03 NON-FRIABLE, NON-REGULATED CATEGORY II ACM REMOVAL

Non-friable, non-regulated category II ACM removal will include window and door frame caulk. See Section 02080 for category II non-friable ACM descriptions and additional details.

Asbestos Contractor shall install and seal critical barriers consisting of two layers of 6-mil (minimum) polyethylene sheeting over doors, windows, and/or other openings in the work areas.

1. Entrances/exits from the work areas shall have triple barriers of 6-mil (minimum) polyethylene sheeting in a z-flap arrangement. Proper signage per 29 CFR 1926.1101 shall be posted.

2. An attached decontamination unit must be in place and operational prior to the start of removal operations.

3. Asbestos Contractor shall use a HEPA filter exhaust unit in the vicinity of the work area. Filtered air must be exhausted outside of the building.

# SECTION 01560

# WORKER PROTECTION

## 1.01 GENERAL

A. Provide worker protection as required by OSHA, state and local standards applicable to the work. The Asbestos Abatement Contractor is solely responsible for enforcing worker protection requirements at least equal to those specified in this Section.

B. Each time the work area is entered the Asbestos Abatement Contractor shall require all persons to remove all street clothes in the changing room of the personnel decontamination unit and put on new disposable coveralls, new head cover, and a clean respirator. Proceed through shower room to equipment room and put on work boots.

C. Workers shall not eat, drink, smoke, chew gum or chew tobacco in the work areas, the equipment rooms, the load out areas, or the clean rooms.

D. Lighters and matches are not allowed in the work areas, the equipment rooms, the load-out areas, or the clean rooms.

## 1.02 WORKER TRAINING

A. Train all workers in accordance with 29 CFR 1926 and Alabama state regulations regarding the dangers inherent in handling asbestos, breathing asbestos dust, proper work procedures and personal and area protective measures.

## 1.03 MEDICAL EXAMINATIONS

A. Provide medical examinations for all workers. Examination shall, at a minimum, meet OSHA requirements as set forth in 29 CFR 1926.

## 1.04 PROTECTIVE CLOTHING

A. Provide disposable full-body coveralls and disposable head covers and require that they be worn by all workers in the work area. Provide a sufficient number for all required changes, for all workers in the work area.

B. Boots: Provide sturdy, over the ankle work boots with non-skid soles and, where required by OSHA, foot protection for all workers.

C. Gloves: Provide work gloves to all workers and require that they be worn at the appropriate times. Do not remove gloves from work area. Dispose of work gloves as asbestos-contaminated waste at the completion of the project.

D. Safety Glasses: Provide OSHA with approved safety glasses with side shields to be worn at all times in all construction areas.

E. Hard Hats: Provide OSHA approved hard hats for the duration of the project. Hard hats should be worn at all times when on the project site.

## 1.05 ADDITIONAL PROTECTIVE EQUIPMENT

A. The appropriate level of respiratory protection (i.e. half-face air purifying respirators with replaceable HEPA filters) disposable coveralls, head covers, and footwear covers shall be provided by the Asbestos Abatement Contractor for the Owner, the GC, the Designer, air monitoring firm and other authorized representatives who may inspect the job site.

## 1.06 DECONTAMINATION PROCEDURES

A. Require that all workers use the following decontamination procedure as a minimum requirement whenever leaving the work area:

1. Work clothing must be cleaned with a HEPA vacuum before it is removed in the equipment room.

2. Remove disposable coveralls, disposable head covers, and disposable footwear covers or boots in the equipment room.

3. Showering is mandatory during the removal of RACM. If at any time during the non-friable removal, the ACM becomes friable, then showering becomes mandatory. Still wearing respirators, proceed to showers. Care must be taken to follow reasonable procedures in removing the respirator to avoid asbestos fibers while showering. The following procedure is required as a minimum:

   a. Thoroughly wet body including hair and face.
   b. With respirator still in place thoroughly wash body, hair, respirator face piece, and all exterior parts of the respirator.
   c. Take a deep breath; hold it and/or exhale slowly, completely wet hair, face and respirator. While still holding breath, remove respirator and hold it away from face before starting to breathe.
   d. Carefully wash face piece of respirator inside and out.
   e. Shower completely with soap and water; rinse thoroughly.

f. Rinse shower room walls and floor prior to exit.
g. Proceed from shower to changing (clean) room and change into street clothes or new disposable work items.

3. After showering, each employee shall inspect, clean and repair his respirator as needed. The respirator shall be dried, placed in a suitable storage bag and properly stored.

# SECTION 01562

# RESPIRATORY PROTECTION

## 1.01 DESCRIPTION OF WORK

A. Instruct and train each worker involved in asbestos abatement in proper respirator use and require that each worker always wear a respirator, properly fitted on the face, in the work area from the start of any operation which may cause airborne asbestos fibers until the work area is completely decontaminated. Use respiratory protection appropriate for the fiber level encountered in the workplace or as required for other toxic or oxygen-deficient situations encountered.

## 1.02 GENERAL

A. Provide workers with personally issued and marked respiratory equipment approved by the National Institute for Occupational Safety and Health (NIOSH) and suitable for the asbestos exposure level in the work areas according to OSHA Standard 29 CFR 1926.1101 and other possible contaminants employees might be exposed to during the project.

B. Provide respiratory protection from the time the first operation involved in the project requires contact with asbestos-containing materials (including construction of decontamination units, construction of airtight barriers/barricades, and placing of plastic sheeting on walls) until acceptance of final air clearance test results by the air monitoring firm.

C. The minimum respiratory protection for the project during gross removal of all friable regulated ACM (RACM) shall be powered air purifying respirators (PAPRs) with HEPA filters. The minimum respiratory protection for the project during gross removal of all non-friable asbestos-containing materials shall be half-face air purifying respirators with HEPA filters.

D. Respirator fit testing shall be performed as a minimum at the beginning of the project, at any change in respiratory protection equipment, and at any time during the project if requested by the employee. Fit testing is to be performed by one of the methods listed in the 29 CFR 1926.1101, Appendix C.

E. Do not allow the use of single-use, disposable or quarter-face respirators for any purpose.

# SECTION 01563

# DECONTAMINATION UNITS

## 1.01 DESCRIPTION OF WORK

A. Provide separate personnel and equipment/loadout decontamination facilities. Require that the personnel decontamination units be the only means of ingress and egress for the work area. Require that all materials exit the work area through the equipment/loadout decontamination units. The Asbestos Abatement Contractor shall comply with 29 CFR 1926.1101, specifically paragraph (j) Hygiene facilities and practices for employees. See Appendix B for a typical plan view of personnel and equipment decontamination facilities.

## 1.02 GENERAL

Provide separate personnel decontamination units and equipment/loadout decontamination units. Personnel decontamination units are required during removal of RACM and if at any time the non-friable ACM becomes friable.

A. Personnel Decontamination Units

1. Provide a Personnel Decontamination Unit consisting of a serial arrangement of connected rooms or spaces, changing room, shower room, and equipment room. Each shall be separated by a minimum of three curtain doorways. Require all persons without exception to pass through this decontamination unit for entry into and exiting from the work area for any purpose. Do not allow parallel routes for entry or exit. Do not remove equipment or materials through Personnel Decontamination Unit.

2. Provide temporary lighting within decontamination units as necessary to reach an adequate lighting level.

3. Maintain changing floor sanitation by keeping it dry and clean at all times. Do not allow the overflow water from the shower to escape the shower room.

4. Damp wipe all surfaces twice after each shift change with a disinfectant solution.

5. Provide hot and cold water, drainage and standard fixtures including an elevated shower head as necessary for a complete and operable shower. A water hose and bucket is not an acceptable shower.

6. Arrange water shut off and drain pump operation controls so that a single individual can shower without assistance from either inside or outside of the work area.

7. Pump shower wastewater to drain. Provide 20 micron and 5-micron wastewater filters in line to drain. Change filters daily or more often if necessary.

B. Equipment Decontamination Units:

1. Provide an equipment decontamination unit consisting of a serial arrangement of rooms, clean rooms, holding areas, and washrooms with each room separated by a minimum of three curtain doorways, for removal of equipment and material from work areas. Do not allow personnel to enter or exit work areas through equipment decontamination units.

2. Washrooms: Provide washrooms for cleaning of bagged or drummed asbestos-containing waste materials passed from the work areas.

3. Holding Areas: Provide holding areas as a drop location for sealed drums and bagged asbestos-containing materials passed from the washrooms.

4. Clean Rooms: Provide clean rooms to isolate the holding areas from the building exterior.

5. Equipment or Material: Obtain all equipment or material from the work areas through the equipment decontamination units according to the following procedures:

   a. When passing contaminated equipment, sealed plastic bags, drums or containers into the washroom, close all doorways of the equipment decontamination unit, other than the doorway between the work area and the washroom. Keep all outside personnel clear of the equipment decontamination unit.

   b. Once inside the washroom, wet-clean the bags and/or equipment.

   c. When cleaning is complete, insert bagged material into a clean bag/drum during the pass between the washroom and holding area. Close all doorways except the doorway between the washroom and holding area.

   d. Workers from the building exterior enter the clean room then the holding area to remove decontaminated equipment and/or containers for disposal.

Require these workers to wear full protective clothing and respiratory protection as described in Section 01562.

e. Bagged material shall be placed in a buggy lined with two layers of six-mil polyethylene sheeting (minimum). Once buggy is full, drape one layer of six-mil polyethylene sheeting over waste in preparation for transport. Bagged material may not be removed from the work area until after business hours.

C. Decontamination Unit Contamination: If the air quality in the decontamination unit exceeds 0.01 fibers per cc analyzed by phase contrast microscopy (PCM) or its integrity is diminished through use as determined by the Designer or air monitoring firm, no employee shall use the unit until corrective steps are taken and approved by the Designer and air monitoring firm.

# SECTION 01711

# PROJECT DECONTAMINATION

## 1.01 GENERAL

A. Conduct a first cleaning of all surfaces of the work area including plastic sheeting, tools, scaffolding and/or staging by use of damp-cleaning and mopping and/or a HEPA filter vacuum until there is no visible debris from removed materials or residue on plastic sheeting or other surfaces. Do not perform dry-dusting or dry-sweeping.

B. Equipment shall be cleaned, and all contaminated materials removed before removing polyethylene from the walls.

C. The Asbestos Abatement Contractor shall replace all pre-filters and clean the inside and outside of the HEPA exhaust units.

D. After polyethylene sheets have been removed from walls, but are still remaining on all windows, doors and the critical components, the Asbestos Abatement Contractor shall clean all surfaces in the work areas, including ducts, electrical conduits, steel beams, roof deck, etc., with amended water and/or HEPA-filtered vacuum.

E. After cleaning the work areas, the Asbestos Abatement Contractor shall allow the areas to thoroughly dry and then wet-clean and/or HEPA vacuum all surfaces in work areas again.

F. At the completion of the cleaning operation, the Asbestos Abatement Contractor's supervisor shall perform a complete visual inspection of the work areas to ensure that the work areas are dust and fiber-free. If the supervisor believes he is ready for a final project decontamination inspection, he shall notify the Designer.

G. Final project decontamination inspection includes the visual inspection and air monitoring clearance. Final inspection for exterior work areas includes a visual inspection only.

H. Visual inspection for acceptance shall be performed after all areas are dry.

I. The Designer and air monitoring firm shall perform the final visual inspection. The air monitoring firm shall conduct the final air clearance. Any discrepancies found shall be documented in the form of a punch list.

J. Final air sampling shall not commence until the visual inspection is completed and passed. Final air clearances shall meet the requirements of Section 01714.

K. If the Designer or air monitoring firm finds that the work areas have not been adequately decontaminated, cleaning and/or air monitoring shall be repeated at the Asbestos Abatement Contractor's expense, including additional industrial hygiene fees, until the work area is in compliance.

L. After the work areas are found to be in compliance, all entrances and exits shall be unsealed and the plastic sheeting, tape and any other trash and debris shall be disposed of in sealable plastic bags (6 mil minimum) and disposed of as outlined in Section 02084.

M. All HEPA unit intakes and exhausts shall be wrapped with six mil polyethylene before leaving the work area.

N. After the Designer and air monitoring firm has approved the final project decontamination and the Asbestos Abatement Contractor has completed the tear down for occupancy by others, the Air Monitor or Designer shall perform the project final inspection as outlined in the general conditions.

O. Any residual asbestos that may be present after removing critical barriers that in the Designer's judgment should have been cleaned during the pre-cleaning phase prior to installing critical barriers, shall be cleaned and cleared at the Asbestos Abatement Contractor's expense.

P. There shall be appropriate seals totally enclosing the inspection area to keep it separate from clean areas or other areas where abatement is or will be in progress. Once an area has been accepted and passed air tests, loss of the critical barrier integrity or escape of asbestos into an already clean area shall void previous acceptance and tests. Additional visual and final air clearance sampling shall be required at the Asbestos Abatement Contractor's expense.

# SECTION 01714

# WORK AREA CLEARANCE

## 1.01 GENERAL

A. Notification and scheduling of the final inspection during the project is the responsibility of the Asbestos Abatement Contractor.

## 1.02 FINAL CLEARANCE VISUAL INSPECTION(S)

A. After the second cleaning operation and after the area is completely dry, the following procedure test shall be performed:

1. A final visual inspection shall be conducted by the air monitoring firm. The inspection shall be conducted following the guidelines set forth in the American Society for Testing and Materials, Standard Practices for Visual Inspection of Asbestos Abatement Projects, Designation: E1368-14. If the work area is found visibly clean, and 24-hours after the Abatement Contractor "locks down" the work area and the work area is dry, the air monitoring firm will collect air samples.

2. During the air testing, the Air Monitor shall cause disruptive air currents as described in the EPA-AHERA regulations (40 CFR Part 763, Subpart E, Appendix A)

3. Clearance air samples are to be analyzed using Phase Contrast Microscopy (PCM) (minimum of five samples per containment using NIOSH 7400 method), with a maximum flow rate is 10 liters per minute, with a minimum sample size of 1,500 liters for each sample. Clearance criteria shall be less than 0.01 F/cc for all samples analyzed.

4. The air monitoring firm shall immediately report the visual clearance results to the Designer and Abatement Contractor. PCM results will be provided within 24 hours following receipt by the analytical laboratory.

5. The use of the negative pressure system may be discontinued after the air monitoring firm instructs the Asbestos Abatement Contractor that he has passed the final project decontamination inspection.

# SECTION 02080

# ASBESTOS REMOVAL

## 1.01 GENERAL

A. Prior to starting asbestos removal, the Asbestos Abatement Contractor's equipment, work area and decontamination units will be inspected and approved by the Designer.

B. All loose asbestos material removed in the work area shall be adequately wet with a surfactant, bagged, sealed and labeled properly before personnel breaks or end of shift. The surfactant to be utilized with asbestos-containing materials identified as "chrysotile", "crocidolite", or types other than Amosite, shall consist of soapy water mixed in a proportion of two (2) fluid ounces of liquid soap to five (5) gallons of water.

C. Plastic sheeting, tape, cleaning material, clothing and all other disposable material or items used in the work area shall be packed into sealable plastic bags (6- mil minimum) and treated as contaminated material.

D. Material shall be double-bagged by placing in two 6-mil (minimum) polyethylene bags. The outer bag must be a clear 6-mil (minimum) polyethylene bag.

E. All excess water (except shower water) shall be combined with removed material or other absorptive material and properly disposed of as per EPA regulations. Asbestos Abatement Contractor shall not place water in storm drains, onto lawns, or into ditches, creeks, streams, rivers or oceans.

## 1.02 SCHEDULE

A. Project Dates: The project is to commence and conclude on dates as specified or pre-approved by the Owner and GC. The Asbestos Abatement Contractor shall refer to Owner’s or GC’s schedule. Asbestos Abatement Contractor shall coordinate the phasing of the project with the Owner and Designer to achieve this goal.

## 1.03 DEMOLITION OF NON-ASBESTOS CONTAINING MATERIALS

A. The Asbestos Abatement Contractor is responsible for the removal and/or demolition of all fixtures necessary to gain access to asbestos containing materials per Section 01526.

## 1.04 SCOPE OF WORK

Removal of NESHAP Category I and II ACMs (asbestos-containing materials) shall be performed using non-friable removal techniques. Removal of RACMs (regulated asbestos-containing materials) shall be performed using wet methods and HEPA-vacuums under full containment. The Asbestos Abatement Contractor shall adequately wet the ACMs in a Negative Pressure Enclosure (NPE). Each NPE where friable removal is completed shall remain intact; under negative pressure until air sampling clearance is achieved.

A. During this project, the NESHAP Category II non-friable ACM to be removed from the building includes:

- Interior and exterior plate glass window / door frame caulk (brown)
- Interior plate glass window caulk (side door window)

## 1.05 ASBESTOS REMOVAL

A. Non-Friable Removal of Category I and Category II ACMs.

1. Asbestos Contractor shall remove Category I and Category II non-friable ACMs, using non-friable, non-regulated removal techniques where applicable. If at any time during removal materials become friable in an area that is not already in a negative pressure enclosure, the Asbestos Contractor will immediately stop removal activities and construct a negative pressure enclosure for the work area. Work and clearance will then be performed in accordance with full containment specifications.

2. in order to completely remove asbestos-containing materials.

3. Asbestos Abatement Contractor shall clean work area as required by section 01711.

B. Full containment removal of RACM (if ACM becomes friable during abatement).

1. After work area preparation is complete, Asbestos Abatement Contractor shall adequately wet assumed asbestos-containing materials with a fine mist of amended water. Care shall be taken not to over saturate and allow excess dripping to pool on floor of the containment.

2. Asbestos Abatement Contractor shall carefully remove manageable sections of asbestos-containing materials and place it directly into bags for disposal. Do not allow asbestos debris to accumulate on floor of the containment.

3. Asbestos Abatement Contractor shall continue misting asbestos-containing materials with amended water throughout the removal process.

4. Asbestos Abatement Contractor shall take all precautions necessary not to allow assumed asbestos-containing material to free fall to the floor. Assumed asbestos-containing materials may not free fall more than six feet.

5. Asbestos Abatement Contractor shall clean work area as required by Section 01711.

6. Asbestos Abatement Contractor shall remove asbestos-containing materials using hand tools and wet methods. No mechanical tools will be allowed for removal of asbestos-containing materials.

Following removal of asbestos-containing materials within a containment area, initial cleaning, and passing visual clearance inspection conducted by the Designer and air monitoring firm, the Asbestos Abatement Contractor shall seal exposed surfaces in which asbestos-containing materials were removed with a penetrating type encapsulant. The encapsulant material shall be capable of being applied with airless spray equipment, able to withstand light impact or abrasion without releasing fibers. The encapsulant will be allowed to dry thoroughly before final air clearance samples are collected.

# SECTION 02084

# DISPOSAL OF ASBESTOS-CONTAINING WASTE MATERIAL

## 1.01 GENERAL

A. All asbestos materials and miscellaneous contaminated debris shall be properly sealed and protected, and the loadout vehicle/dumpster shall be enclosed and shall remain locked while located on the facility site and then transported to a pre-designated disposal site in accordance with 40 CFR 61.150 and DOT 49 CFR Parts 100-399. Location of the loadout vehicle/dumpster shall be maintained in an area onsite approved by the Owner.

B. An enclosed vehicle will be used to haul waste material to the disposal site. No rental vehicles or trailers shall be used. Vehicle selection, vehicle covers, and work practices shall ensure that no asbestos becomes airborne during the loading, transport and unloading activity, and that material is placed in the waste site without breaking any seals.

C. Waste disposal polyethylene bags (6 mil minimum) and containers, non-porous (steel/plastic) drums or equivalent, with labels appropriate for storing asbestos waste during transportation to the disposal site shall be used. In addition to the OSHA labeling requirements, all containers shall be labeled with the name of the waste generator and the location at which the waste was generated.

D. The Asbestos Abatement Contractor shall transport the containers and bags of waste material to the approved waste disposal site. The sealed plastic bags shall be placed into the burial site unless the bags have been broken or damaged. Upon the landfill's approval damaged bags shall be left in the non-porous containers and the entire contaminated package shall be buried. Uncontaminated containers may be reused.

E. Workers loading and unloading the asbestos will wear respirators and disposable clothing when handling material. Asbestos warning signs shall be posted during loading and unloading of asbestos waste.

F. The Asbestos Abatement Contractor shall distribute a copy of all waste shipment records to the Designer after the completion of the project.

| LEGEND | | |
|---|---|---|
| **IDENTIFIED ACM** | **SYMBOL** | **ESTIMATED QUANTITY** |
| INTERIOR AND EXTERIOR PLATE GLASS WINDOW / DOOR FRAME CAULK (BROWN) | | 5 ft² 4 windows |
| INTERIOR PLATE GLASS WINDOW CAULK (SIDE DOOR WINDOW) | | 2 ft² 2 Windows |

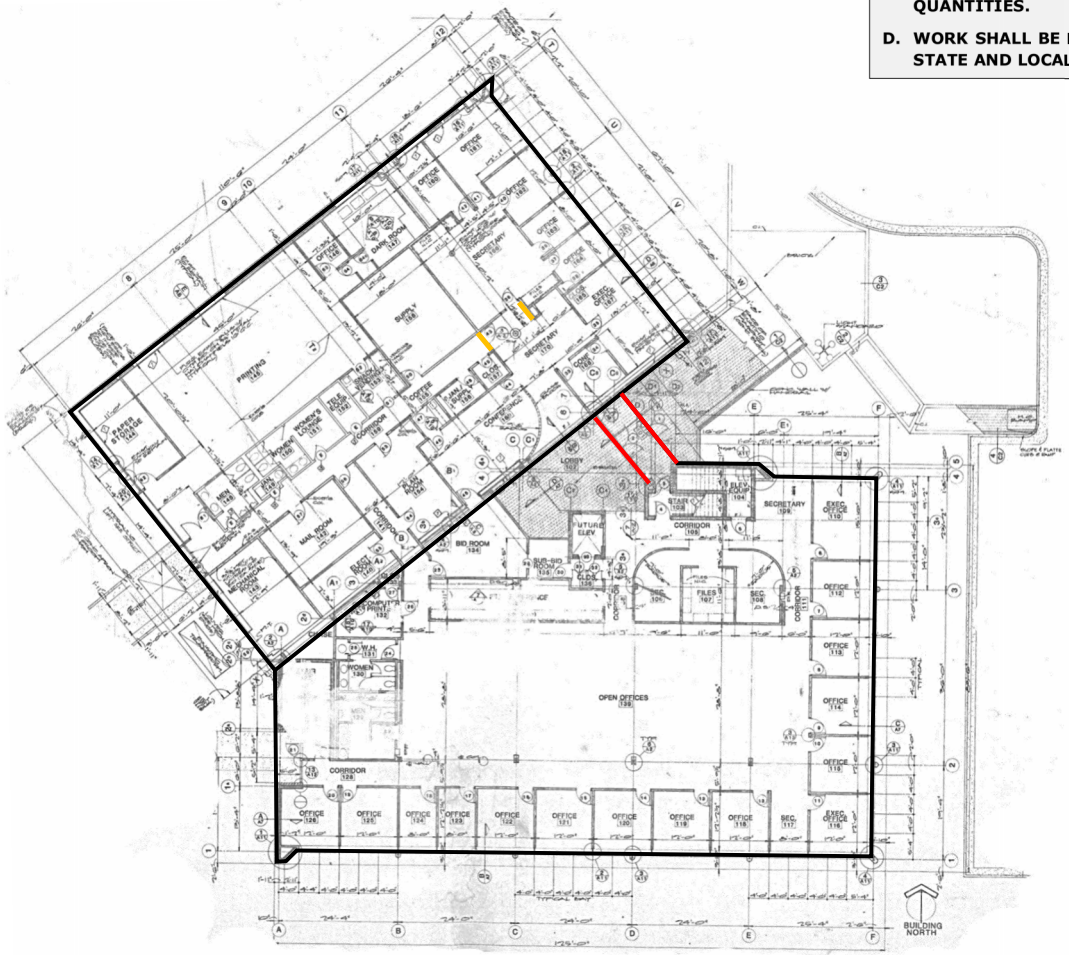
**GENERAL NOTES**

A. **THE ASBESTOS CONTRACTOR IS RESPONSIBLE FOR THE REMOVAL AND/OR DEMOLITION OF ALL FIXTURES (E.G., DEBRIS, CEILING TILES, STORED MATERIALS, NON-ASBESTOS WALL AND CEILING BOARD, CABINETRY, BASEBOARD, ETC.) TO GAIN ACCESS TO ASBESTOS-CONTAINING MATERIALS.**

B. **THE ASBESTOS CONTRACTOR IS RESPONSIBLE FOR COORDINATING ASBESTOS REMOVAL ACTIVITIES WITH THE GENERAL CONTRACTOR AND THE OWNER OR OWNER'S REPRESENTATIVE.**

C. **BOUNDARIES, LOCATIONS AND QUANTITIES ARE APPROXIMATE. ASBESTOS CONTRACTOR SHALL CONFIRM ALL BOUNDARIES, LOCATIONS AND QUANTITIES.**

D. **WORK SHALL BE PERFORMED IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS.**




N

Exhibit 1

Asbestos Location Map

2511 Fairlane Drive
Montgomery, Alabama

Terracon
2147 Riverchase Office Road
Birmingham, Alabama 35244
PH: (205) 942-2159
FAX: (205) 942-3502

| | |
|---|---|
| Project No. | E1227393 |
| Scale: | Not To Scale |
| File Name: | E1227393 |
| Date: | 5/04/2026 |

## APPENDIX A

## PREWORK ASBESTOS INSPECTION CHECKLIST

Name of State Facility: _____

Project Name: _____

Project ID Number: _____

Date of Inspection: _____ Pass: _____ Fail: _____

| A. **DOCUMENTS** | **Yes** | **No** | **N/A** |
|---|---|---|---|
| 1) Asbestos Removal Permit/NESHAP Notification | | | |
| 2) Accreditation Documents for Workers & Supervisors | | | |
| 3) Asbestos Plans and Specifications | | | |
| 4) Air Monitoring Data | | | |
| 5) Waste Shipment Records | | | |
| 6) Sign-in Sheets and Bound Book for Comments | | | |
| 7) Calibration Record for Grade "D" Air | | | |
| 8) Items Listed in Section 01043 of Specification | | | |

| B. **PPE SUPPLIES** | **Yes** | **No** | **N/A** |
|---|---|---|---|
| 1) Tyvek Clothing | | | |
| 2) Rubber Boots | | | |
| 3) Respirators with HEPA Filters | | | |

| C. **CLEAN ROOM** | **Yes** | **No** | **N/A** |
|---|---|---|---|
| 1) Entry Curtains | | | |
| 2) Emergency Phone Numbers Posted | | | |
| 3) First Aid Kit | | | |
| 4) Asbestos Signs | | | |
| 5) Decontamination Procedures Posted | | | |
| 6) Fire Extinguisher | | | |

| D. **SHOWER ROOM** | **Yes** | **No** | **N/A** |
|---|---|---|---|
| 1) Polyethylene Curtains | | | |
| 2) Hot/Cold Water & Operational | | | |
| 3) Soap & Towels | | | |
| 4) Wastewater Filter Pump Operational | | | |
| 5) Extra Five-Micron Size Filters | | | |
| 6) Filtered Wastewater to Sanitary Sewer | | | |

| E. **WORK AREA** | **Yes** | **No** | **N/A** |
|---|---|---|---|
| 1) Removable Items Out of Area | | | |
| 2) Non-removable Items Protected | | | |
| 3) Critical Barriers Installed | | | |
| 4) Polyethylene Curtains | | | |
| 5) Polyethylene on Walls/Floors as Specified | | | |
| 6) HVAC off | | | |
| 7) Air Filtration Devices in Place and Operational | | | |
| 8) Air Exhausted to Outside | | | |
| 9) Electricity Locked and Tagged Out | | | |
| 10) Temporary Power Installed with GFCI | | | |
| 11) Fire Extinguishers | | | |
| 12) Emergency and Fire Exits Marked | | | |
| 13) Audible Alarms Operational | | | |
| 14) Toilet Available | | | |

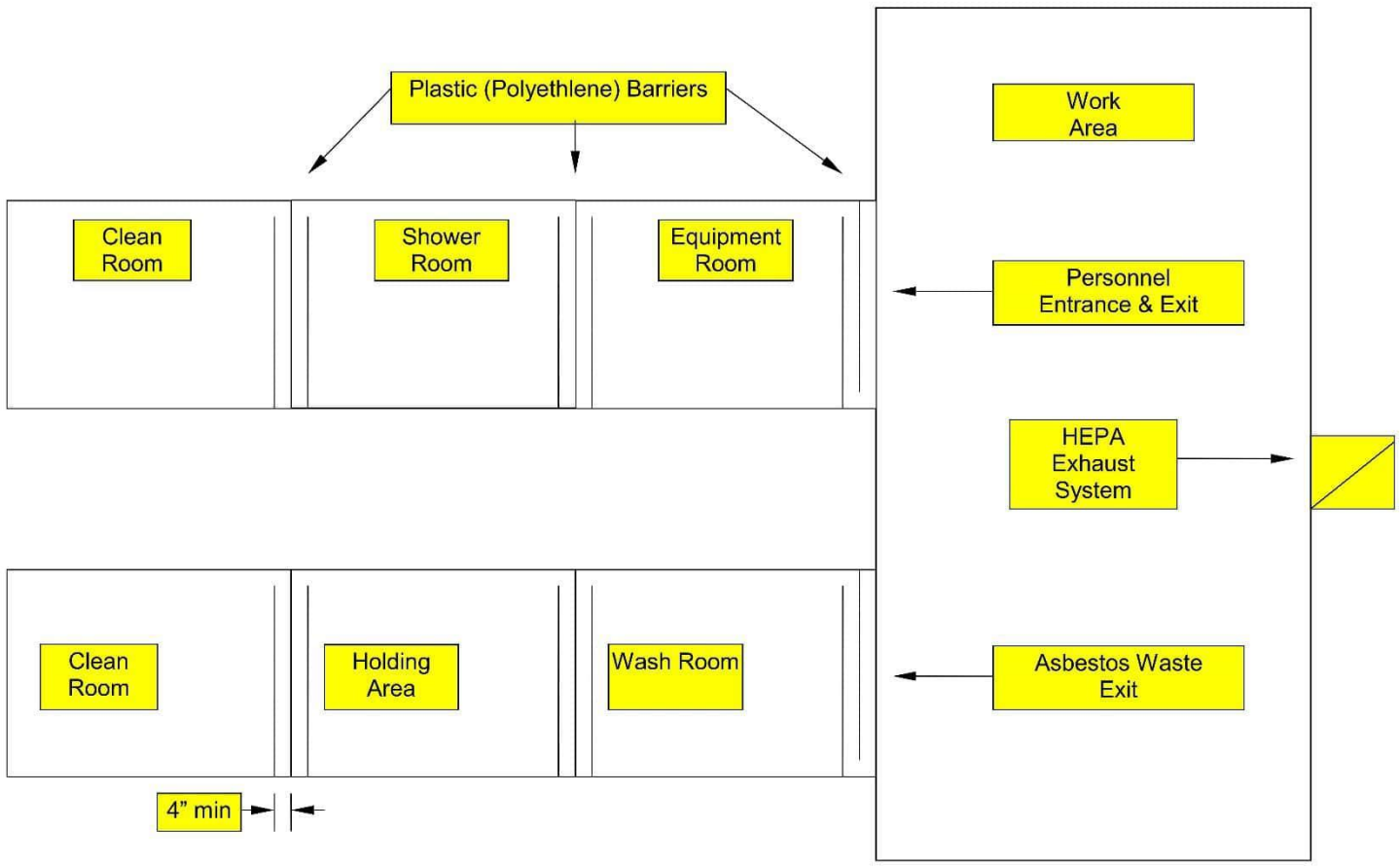
| F. **EQUIPMENT** | **Yes** | **No** | **N/A** |
|---|---|---|---|
| 1) Safety Equipment | | | |
| 2) HEPA Vacuums | | | |
| 3) Waste Disposal Bags | | | |
| 4) Airless Sprayer with Water Source | | | |
| 5) Cleaning Equipment | | | |
| 6) Glove Bags | | | |
| 7) Emergency Power Generator (if required) | | | |
| 8) Temporary Lighting | | | |

| G. **Other** | **Yes** | **No** | **N/A** |
|---|---|---|---|
| 1) _____ | | | |
| 2) _____ | | | |
| 3) _____ | | | |
| 4) _____ | | | |

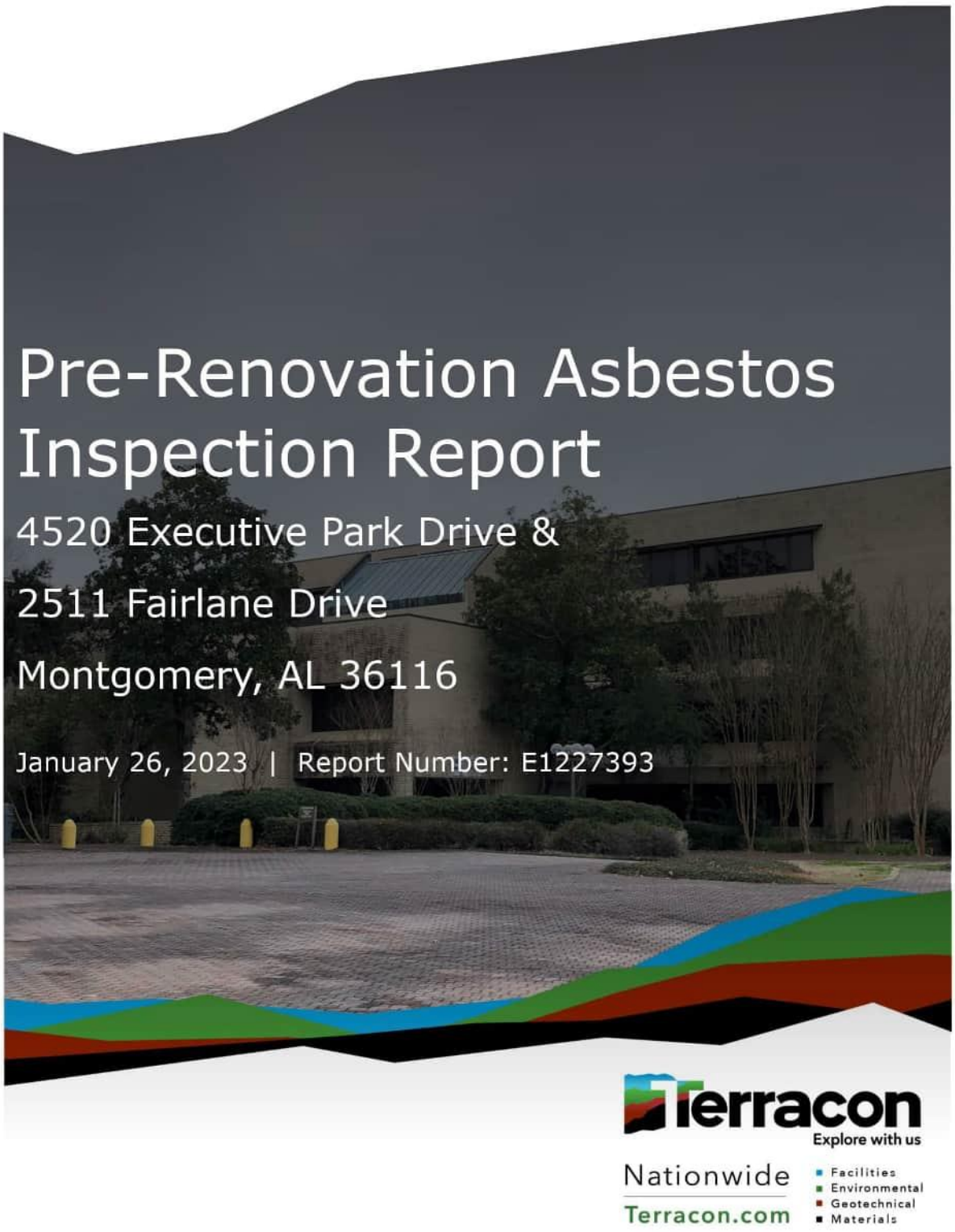
_____ _____
*Asbestos Design Consultant* *Date*

_____ _____
*Asbestos Abatement Contractor's Representative* *Date*

## Appendix B




Sample Decontamination Area Arrangement - Plan View


Pre-Renovation Asbestos Inspection Report
4520 Executive Park Drive &
2511 Fairlane Drive
Montgomery, AL 36116
January 26, 2023 | Report Number: E1227393
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January 26, 2023

Alabama Community College System
135 South Union St
Montgomery, AL 36130

**ATTN:** Mr. Mark Salmon
P: (334) 293-4500
E: Mark.Salmon@accs.edu

**RE:** **Pre-Renovation Asbestos Inspection Report**
4520 Executive Park Drive & 2511 Fairlane Drive
Montgomery, AL 36116
Terracon Project No. E1227393

Dear Mr. Salmon:

The purpose of this report is to present the results of the pre-renovation asbestos inspection performed on December 20 and 21, 2022 for the above-referenced structures located in Montgomery, Alabama. This inspection was conducted in general accordance with Terracon Proposal No. PE1227389 dated December 1, 2022.

**Asbestos was identified** by the laboratory in the samples collected by Terracon. Please refer to the report for details.

We appreciate the opportunity to be of service to you on this project. If there are any questions regarding this report or if we may be of further assistance, please do not hesitate to contact us.

Sincerely,
**Terracon**

Stephen Howard
Industrial Hygienist

Matt Johnston
Authorized Project Reviewer

Pre-Renovation Asbestos Inspection Report
4520 Executive Park Dr. & 2511 Fairlane Dr. | Montgomery, AL
January 26, 2023 | Terracon Report No. E1227393

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Pre-Renovation Asbestos Inspection Report
4520 Executive Park Dr. & 2511 Fairlane Dr. | Montgomery, AL
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# 1.0 Introduction

Terracon Consultants, Inc. (Terracon) conducted a pre-renovation asbestos inspection of structures located at 4520 Executive Park Drive and 2511 Fairlane Drive in Montgomery, Alabama. The inspection was conducted on December 20 and 21, 2022, by State of Alabama "Safe State" accredited asbestos inspectors in general accordance with Terracon Proposal No. PE1227389 dated December 1, 2022. Interior and exterior building components were inspected, and homogeneous areas of suspect asbestos-containing materials (ACM) were visually identified and documented. Suspect ACM samples were collected in general accordance with the sampling protocols outlined in the Environmental Protection Agency (EPA) regulation 40 CFR 763 (Asbestos Hazard Emergency Response Act, AHERA). Samples were delivered to an accredited laboratory for analysis by polarized light microscopy (PLM).

## 1.1 Project Objective

We understand the asbestos inspection was requested to identify and sample suspect ACM and provide information regarding the identity, location, condition, and approximate quantities of ACM in interior and exterior building components prior to renovation of the buildings. EPA regulation 40 CFR 61, Subpart M, National Emission Standards for Hazardous Air Pollutants (NESHAP), prohibits the release of asbestos fibers to the atmosphere during renovation or demolition activities. The asbestos NESHAP requires that potentially regulated ACM be identified, classified, and quantified prior to planned disturbances or demolition activities. The Occupational Health and Safety Administration (OSHA) has promulgated worker protection standard for the disturbance of materials containing asbestos during demolition and renovation projects.

## 1.2 General Conditions and Limitations

**At the direction of the Client (Alabama Community College System), the building roof systems were excluded from the inspection scope.** The level of effort and associated tasks performed for this service was limited to the scope of services outlined in Terracon's proposal. Terracon did not attempt to identify every potential exposure or hazard present in the buildings.

## 1.3 Reliance

This report is prepared for the exclusive use and reliance of the Client. Use or reliance by any other party is prohibited without the written authorization of the Client and Terracon.

Reliance on the report by the Client and all authorized parties will be subject to the terms, conditions and limitations stated in Terracon's proposal and the Agreement for Services. The limitation of liability defined in the Agreement for Services is the aggregate limit of Terracon's liability to the Client and all relying parties.

## 2.0 Building Descriptions

**4520 Executive Park Drive**

The 4520 Executive Park Drive property contains two separate buildings, Building 1 and Building 2. Building 1 comprises a 4-story section and an adjoining 2-story section totaling approximately 75,000 square feet. Building 2 comprises a 2-story section and an adjoining 1-story section totaling approximately 39,000 square feet. According to the Montgomery County Tax Assessor database, Building 1 was constructed in 1981 and Building 2 was constructed in 1972.

The buildings are concrete block structures with exterior brick cladding. Both buildings have flat roof systems and basement-level mechanical rooms. The building interiors comprise office space, mechanical rooms, bathrooms, conference rooms, racquet ball courts, lobbies, a gym, a break room, and an area currently being used by a church as a meeting space. Interior walls are concrete block, brick, and gypsum board. Flooring in the buildings consists of carpet, vinyl floor tile, wood plank and parquet, and ceramic tile. Ceilings in the buildings consist of suspended acoustical ceiling tile and gypsum board. Heating, ventilation, and air conditioning (HVAC) for the buildings consists of forced air systems with ducted air supplies and returns. Air handling equipment is in mechanical rooms.

**2511 Fairlane Park Drive**

The 2511 Fairlane Park Drive property contains an approximately 26,300 square feet building comprising a 1-story section and a 2-story section. According to the Montgomery County Tax Assessor database, the 1-story section was constructed in 1972 and the 2-story section was constructed in 1994. The building is a concrete block structure with exterior brick cladding and a flat roof system. The building interior comprise office space, mechanical rooms, bathrooms, conference rooms, and a break room. Interior walls are concrete block, brick, and gypsum board. Flooring in the buildings consists of carpet, vinyl floor tile, ceramic tile, and brick. Ceilings in the buildings consist of suspended acoustical ceiling tile and gypsum board. HVAC for the building consists of forced air systems with ducted air supplies and returns. Air handling equipment is in mechanical rooms.

# 3.0 Field Activities

The inspection was conducted by Mr. Stephen Howard and Mr. Jordan Thomas, State of Alabama "Safe State" accredited asbestos inspectors. Copies of their asbestos inspector certificates are included in Appendix A. The inspection was conducted in general accordance with the sample collection protocols established in EPA regulation 40 CFR 763 (AHERA). A summary of inspection activities is provided below.

## 3.1 Visual Assessment

Our inspection activities began with visual observation of the interior and exterior of the buildings to identify homogeneous areas of suspect ACM that may be impacted by renovation activities. A homogeneous area consists of building materials that appear similar throughout in terms of color, texture, and date of application. The assessment was conducted throughout visually accessible areas of the building. Building materials identified as concrete, glass, wood, masonry, metal, or rubber were not considered suspect ACM.

## 3.2 Physical Assessment

A physical assessment of each homogeneous area of suspect ACM was conducted to assess the friability and condition of the materials. A friable material is defined by the EPA as a material which can be crumbled, pulverized, or reduced to powder by hand pressure when dry. Friability was assessed by physically touching suspect materials.

## 3.3 Sample Collection

Based on results of the visual observation, bulk samples of suspect ACM were collected in general accordance with AHERA sampling protocols. Random samples of suspect materials were collected in each homogeneous area. Bulk samples were collected using wet methods as applicable to reduce the potential for fiber release. Samples were placed in sealable containers and labeled with unique sample numbers using an indelible marker.

Two hundred twelve (212) bulk samples were collected from seventy (70) homogeneous areas of suspect ACM. A summary of suspect ACM samples collected during the inspection is included as Appendix B.

## 3.4 Sample Analysis

Bulk samples were submitted under chain of custody to Moody Labs of Farmers Branch, Texas for analysis by PLM with dispersion staining techniques per EPA methodology (EPA Method 600/R-93/116). The percentage of asbestos, where applicable, was determined by

microscopic visual estimation. Moody Labs is accredited under the National Voluntary Laboratory Accreditation Program (NVLAP Accreditation No. 102056-0). Terracon instructed the laboratory to utilize the 'stop positive' method where the laboratory would cease analyzing the rest of the samples in the HA after the first sample was identified with asbestos.

## 4.0 Regulatory Overview

The asbestos NESHAP (40 CFR Part 61, Subpart M) regulates asbestos fiber emissions and asbestos waste disposal practices. It also requires the identification and classification of existing building materials prior to demolition or renovation activity. Under NESHAP, asbestos-containing building materials are classified as either friable, Category I non-friable or Category II non-friable ACM. Friable materials are those that, when dry, may be crumbled, pulverized, or reduced to powder by hand pressure. Category I non-friable ACM includes packings, gaskets, resilient floor coverings and asphalt roofing products containing more than 1% asbestos. Category II non-friable ACM are any materials other than Category I materials that contain more than 1% asbestos.

Friable ACM, Category I and Category II non-friable ACM which is in poor condition and has become friable or which will be subjected to drilling, sanding, grinding, cutting, or abrading and which could be crushed or pulverized during anticipated renovation or demolition activities are considered regulated ACM (RACM). RACM must be removed prior to renovation or demolition activities which will disturb the materials. Removal of RACM must be conducted by an Alabama-licensed asbestos abatement contractor. The owner or operator must provide the Alabama Department of Environmental Management (ADEM) Air Division with written notification of planned removal activities at least 10 working days prior to the commencement of asbestos abatement activities for projects which affect at least 160-square feet, 260-linear feet, or 35-cubic feet. A copy of the notification form is attached as Appendix C. Removal of RACM must be conducted by an Alabama-licensed asbestos abatement contractor. Please note that notification for demolition is required regardless of the presence of asbestos.

The OSHA Asbestos standard for construction (29 CFR 1926.1101) regulates workplace exposure to asbestos. The OSHA standard requires that employee exposure to airborne asbestos fibers be maintained below 0.1 asbestos fibers per cubic centimeter of air (0.1 f/cc as an eight-hour time weighted average). The OSHA standard classifies construction and maintenance activities which could disturb ACM and specifies work practices and precautions which employers must follow when engaging in each class of regulated work.

## 5.0 Findings and Recommendations

Based on the results of laboratory analysis, samples of the following material were identified to contain asbestos:

**4520 Executive Park Drive**

- Interior brown caulk on metal window/door framing, Building 1 - ground floor lobby windows and exercise room;
- White mastic/sealant on paper/foil pipe wrap covering fiberglass insulation, Building 1 - mechanical rooms, and basement mechanical areas;
- Thermal system insulation and black mastic on CentraVac unit (valves and joints), Building 2 - basement mechanical area, CentraVac Unit (joints, valves, and elbows);
- 12x12-inch floor tile (beige-speckled) and black mastic, Building 1;
- Remnant black mastic associated with non-asbestos-containing 12x12-inch floor tile (brown-speckled), Building 1;
- Gray metal sink undercoating, Building 1;
- 12x12-inch floor tile (Black) and black mastic, Building 1 (2-story section, 4th floor kitchenette)
- 12x12-inch floor tile (brown-speckled) and black mastic, Building 1 - breakroom, and Building 2 - east stairwell landings
- Interior plate glass window frame caulk, Building 2 – 2-story section;
- Black tar sealant on paper pipe wrap covering fiberglass insulation, Buildings 2 – above suspended ceilings;
- Interior plate glass window caulking, Building 2;
- Joint compound associated with non-asbestos-containing gypsum wallboard, Building 2 – 1-story section; and,
- Applied acoustic ceiling/wall texture, Building 2 – 1-story section lobby.

**2511 Fairlane Park Drive**

- Interior and exterior brown caulk on metal window/door framing; and,
- Interior plate glass window caulking, side office door windows.

The asbestos-containing vinyl floor tiles and mastics and black tar sealant on paper/foil pipe wrap are considered NESHAP Category I non-friable ACM in good condition. Terracon recommends that these materials be removed by a State of Alabama-licensed asbestos abatement contractor prior to renovation activities that may impact the materials.

The asbestos-containing window/door caulks, white mastic/sealant on paper/foil pipe wrap, and sink undercoating are considered NESHAP Category II non-friable ACM in good

condition. These materials should be removed by a State of Alabama-licensed asbestos abatement contractor prior to renovation activities that may impact the materials.

The asbestos-containing thermal system insulation and black mastic on the CentraVac unit, white duct seam tape, gypsum board joint compound, and applied acoustic ceiling texture are considered NESHAP friable ACM (RACM). These materials must be removed by a State of Alabama-licensed asbestos abatement contractor prior to renovation activities that may impact the materials.

A summary of the classification and condition of the identified ACM is presented in Appendix D. The laboratory analytical report and the chain of custody are included in Appendix E. Building photographs and photographs of identified ACM are included in Appendix F.

## 6.0 General Comments

The asbestos inspection was conducted in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing under similar conditions in the same locale. The results, findings, conclusions, and recommendations expressed in this report are based on conditions observed during our inspection of the buildings. The information contained in this report is relevant to the date on which this inspection was performed and should not be relied upon to represent conditions later. This report has been prepared on behalf of and exclusively for use by the Client. for specific application to their project as discussed. This report is not a bidding document. Contractors or consultants reviewing this report must draw their own conclusions regarding further investigation or remediation deemed necessary. Terracon does not warrant the work of regulatory agencies, laboratories or other third parties supplying information which may have been used in the preparation of this report. No warranty, express or implied is made.

Pre-Renovation Asbestos Inspection Report
4520 Executive Park Dr. & 2511 Fairlane Dr. | Montgomery, AL
January 26, 2023 | Terracon Report No. E1227393

# Appendix A

# Certifications

THE UNIVERSITY OF ALABAMA®

UA SafeState

has examined the documentation of asbestos training and qualifications of the person named below and confers this

# Certificate of Accreditation

Asbestos Inspector Renewal

Stephen Howard

Alabama Accreditation Number

AIN1022159469

Certificate Expiration Date

October 18, 2023

This certificate has been issued pursuant to the authority granted to The University of Alabama SafeState Program by the Alabama Asbestos Contractor Accreditation Act, Alabama Act No. 89-517, May, 1989 and Alabama Act No. 97-626, May, 1997.

Environmental Services Manager

Associate Director for Environmental Programs

THE UNIVERSITY OF ALABAMA®

UA SafeState

has examined the documentation of asbestos training and qualifications of the person named below and confers this

# Certificate of Accreditation

Asbestos Inspector Renewal

Jordan Thomas

Alabama Accreditation Number

AIN0622725364

Certificate Expiration Date

June 6, 2023

This certificate has been issued pursuant to the authority granted to The University of Alabama SafeState Program by the Alabama Asbestos Contractor Accreditation Act, Alabama Act No. 89-517, May, 1989 and Alabama Act No. 97-626, May, 1997.

Executive Director

Associate Director for Environmental Programs

Pre-Renovation Asbestos Inspection Report
4520 Executive Park Dr. & 2511 Fairlane Dr. | Montgomery, AL
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# Appendix B

# Asbestos Inspection Sample Summary

## APPENDIX B

### Asbestos Inspection Sample Summary
### 4520 Executive Park Drive & 2511 Fairlane Drive
### Montgomery, AL 36116
### Terracon Project No. E1227393

| 4520 Executive Park Drive | | | | |
|---|---|---|---|---|
| **HA** | **Sample No.** | **Description** | **Sample Location** | **Asbestos Content** |
| 1 | 1-1 | 1 x 1 Acoustical Ceiling Tile (Deep Fissures) | Building 1 | ND - Acoustic Tile |
| | 1-2 | 1 x 1 Acoustical Ceiling Tile (Deep Fissures) | Building 1 | ND - Acoustic Tile |
| | 1-3 | 1 x 1 Acoustical Ceiling Tile (Deep Fissures) | Building 1 | ND - Acoustic Tile |
| 2 | 2-4 | Cove Base Glue (Brown) | Building 1 | ND - Cove Base<br>ND - Yellow Glue<br>ND - Brown Glue |
| | 2-5 | Cove Base Glue (Brown) | Building 1 | ND - Cove Base<br>ND - Yellow Glue |
| | 2-6 | Cove Base Glue (Brown) | Building 1 | ND - Cove Base<br>ND - Yellow Glue<br>ND - Brown Glue |
| **3** | **3-7** | **Interior Caulk (Brown), Metal-Frame Windows** | **Building 1, Lobby Windows and Exercise Room** | **5% C - Caulking** |
| | **3-8** | **Interior Caulk (Brown), Metal-Frame Windows** | **Building 1, Lobby Windows and Exercise Room** | **NA/PS** |
| | **3-9** | **Interior Caulk (Brown), Metal-Frame Windows** | **Building 1, Lobby Windows and Exercise Room** | **NA/PS** |

HA= Homogeneous Area
ND = None Detected
C = Chrysotile
Bold Font Indicates ACM
NA/PS = Not Analyzed, positive Stop

Pre-Renovation Asbestos Inspection Report
4520 Executive Park Dr. & 2511 Fairlane Dr. | Montgomery, AL
January 26, 2023 | Terracon Report No. E1227393

| 4520 Executive Park Drive | | | | |
|---|---|---|---|---|
| **HA** | **Sample No.** | **Description** | **Sample Location** | **Asbestos Content** |
| 4 | 4-10 | Interior Caulk (Brown), Metal-Frame Windows / Doors | Building 1, Lobby Entrance | ND - Caulking |
| | 4-11 | Interior Caulk (Brown), Metal-Frame Windows / Doors | Building 1, Lobby Entrance | ND - Caulking |
| | 4-12 | Interior Caulk (Brown), Metal-Frame Windows / Doors | Building 1, Lobby Entrance | ND - Caulking |
| 5 | 5-13 | Carpet Glue | Buildings 1 | ND – Yellow Glue |
| | 5-14 | Carpet Glue | Building 1 | ND – Yellow Glue |
| | 5-15 | Carpet Glue | Building 1 | ND – Yellow Glue |
| 6 | 6-16 | Drywall and Joint Compound | Building 1 | ND - Drywall Material<br>ND - Joint Compound |
| | 6-17 | Drywall and Joint Compound | Building 1 | ND - Drywall Material<br>ND - Joint Compound |
| | 6-18 | Drywall and Joint Compound | Building 1 | ND - Drywall Material<br>ND - Joint Compound |
| 7 | 7-19 | Duct Tape (White) | Buildings 1 | ND - Duct Seam Tape |
| | 7-20 | Duct Tape (White) | Buildings 1 | ND - Duct Seam Tape |
| | 7-21 | Duct Tape (White) | Buildings 1 | ND - Duct Seam Tape |

HA= Homogeneous Area
ND = None Detected

Pre-Renovation Asbestos Inspection Report
4520 Executive Park Dr. & 2511 Fairlane Dr. | Montgomery, AL
January 26, 2023 | Terracon Report No. E1227393

| 4520 Executive Park Drive | | | | |
|---|---|---|---|---|
| **HA** | **Sample No.** | **Description** | **Sample Location** | **Asbestos Content** |
| 8 | 8-22 | Sealant (White) on Paper / Foil Pipe Wrap | Building 1 Mechanical Rooms | ND - TSI<br>ND - Paper/Foil Wrap<br>10% C - Sealant |
| | 8-23 | Sealant (White) on Paper / Foil Pipe Wrap | Building 1 Mechanical Rooms | ND - TSI<br>ND - Paper/Foil Wrap<br>NA/PS - Sealant |
| | 8-24 | Sealant (White) on Paper / Foil Pipe Wrap | Building 1 Mechanical Rooms | ND - TSI<br>ND - Paper/Foil Wrap<br>NA/PS - Sealant |
| 9 | 9-25 | TSI Wrap on Cellular Glass Insulation | Building 2, Basement Mechanical Area, CentraVac Unit | ND - Glass Foam<br>5% C - Black Mastic<br>ND - Glass Fiber Wrap<br>65% C - TSI<br>ND - Cotton Wrap<br>ND - White Mastic |
| | 9-26 | TSI Wrap on Cellular Glass Insulation | Building 2, Basement Mechanical Area, CentraVac Unit | ND - Glass Foam<br>NA/PS - Black Mastic<br>ND - Glass Fiber Wrap<br>NA/PS - TSI<br>ND - Cotton Wrap<br>ND - White Mastic |
| | 9-27 | TSI Wrap on Cellular Glass Insulation | Building 2, Basement Mechanical Area, CentraVac Unit | ND - Glass Foam<br>NA/PS - Black Mastic<br>ND - Glass Fiber Wrap<br>NA/PS - TSI<br>ND - Cotton Wrap<br>ND - White Mastic |

HA= Homogeneous Area
ND = None Detected
C = Chrysotile
Bold Font Indicates ACM
TSI = Thermal System Insulation
NA/PS = Not Analyzed, positive Stop

Pre-Renovation Asbestos Inspection Report
4520 Executive Park Dr. & 2511 Fairlane Dr. | Montgomery, AL
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| 4520 Executive Park Drive | | | | |
|---|---|---|---|---|
| **HA** | **Sample No.** | **Description** | **Sample Location** | **Asbestos Content** |
| **10** | **10-28** | **Sealant (White) / Tape on Air Return Duct** | **Buildings 1 & 2, Basement Mechanical Areas** | **ND - TSI<br>ND - Foil Wrap<br>10% C - White Mastic** |
| | **10-29** | **Sealant (White) / Tape on Air Return Duct** | **Buildings 1 & 2, Basement Mechanical Areas** | **ND - TSI<br>ND - Foil Wrap<br>NA/PS - White Mastic** |
| | **10-30** | **Sealant (White) / Tape on Air Return Duct** | **Buildings 1 & 2, Basement Mechanical Areas** | **ND - TSI<br>ND - Foil Wrap<br>NA/PS - White Mastic** |
| 11 | 11-31 | Mastic (Brown) on Air Return Duct | Building 2, Basement Mechanical Areas | ND - Tan Mastic |
| | 11-32 | Mastic (Brown) on Air Return Duct | Building 2, Basement Mechanical Areas | ND - Tan Mastic |
| | 11-33 | Mastic (Brown) on Air Return Duct | Building 2, Basement Mechanical Areas | ND - Tan Mastic |
| 12 | 12-34 | Drywall and Joint Compound | Building 1 | ND - Drywall Material<br>ND - Joint Compound |
| | 12-35 | Drywall and Joint Compound | Building 1 | ND - Drywall Material<br>ND - Joint Compound |
| | 12-36 | Drywall and Joint Compound | Building 1 | ND - Drywall Material<br>ND - Joint Compound |
| **13** | **13-37** | **12 x 12 Floor Tile (Beige Speckled) and Mastic** | **Building 1** | **3% C - Floor Tile<br>5% C - Black Mastic** |
| | **13-38** | **12 x 12 Floor Tile (Beige Speckled) and Mastic** | **Building 1** | **NA/PS - Floor Tile<br>NA/PS - Black Mastic** |
| | **13-39** | **12 x 12 Floor Tile (Beige Speckled) and Mastic** | **Building 1** | **NA/PS - Floor Tile<br>NA/PS - Black Mastic** |

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Pre-Renovation Asbestos Inspection Report
4520 Executive Park Dr. & 2511 Fairlane Dr. | Montgomery, AL
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| 4520 Executive Park Drive | | | | |
|---|---|---|---|---|
| **HA** | **Sample No.** | **Description** | **Sample Location** | **Asbestos Content** |
| **14** | **14-40** | **12 x 12 Floor Tile (Brown Speckled) and Mastic** | **Building 1** | **ND - Floor Tile ND – Yellow Mastic 5% C - Black Mastic** |
| | **14-41** | **12 x 12 Floor Tile (Brown Speckled) and Mastic** | **Building 1** | **ND - Floor Tile ND – Yellow Mastic PS/NA - Black Mastic** |
| | **14-42** | **12 x 12 Floor Tile (Brown Speckled) and Mastic** | **Building 1** | **ND - Floor Tile ND – Yellow Mastic PS/NA - Black Mastic** |
| **15** | **15-43** | **Metal Sink Undercoating (Light Gray)** | **Building 1** | **5% C - Sink Undercoating** |
| | **15-44** | **Metal Sink Undercoating (Light Gray)** | **Building 1** | **PS/NA** |
| | **15-45** | **Metal Sink Undercoating (Light Gray)** | **Building 1** | **PS/NA** |
| 16 | 16-46 | 2 x 4 Suspended Ceiling Tile | Building 1 | ND - Acoustic Tile |
| | 16-47 | 2 x 4 Suspended Ceiling Tile | Building 1 | ND - Acoustic Tile |
| | 16-48 | 2 x 4 Suspended Ceiling Tile | Building 1 | ND - Acoustic Tile |
| 17 | 17-49 | Fire Door Insulation | Building 1 | ND – Thermal Insulation |
| | 17-50 | Fire Door Insulation | Building 1 | ND – Thermal Insulation |
| | 17-51 | Fire Door Insulation | Building 1 | ND – Thermal Insulation |

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| 4520 Executive Park Drive | | | | |
|---|---|---|---|---|
| **HA** | **Sample No.** | **Description** | **Sample Location** | **Asbestos Content** |
| 18 | 18-52 | Cove Base (Tall, Black) | Building 1 | ND - Cove Base<br>ND - Tan Mastic |
| | 18-53 | Cove Base (Tall, Black) | Building 1 | ND - Cove Base<br>ND - Tan Mastic |
| | 18-54 | Cove Base (Tall, Black) | Building 1 | ND - Cove Base<br>ND - Tan Mastic |
| 19 | 19-55 | 12 x 12 Floor Tile (Beige Speckled with Blue Specks) and Mastic | Building 1 | ND - Floor Tile<br>ND - Yellow Mastic |
| | 19-56 | 12 x 12 Floor Tile (Beige Speckled with Blue Specks) and Mastic | Building 1 | ND - Floor Tile<br>ND - Yellow Mastic |
| | 19-57 | 12 x 12 Floor Tile (Beige Speckled with Blue Specks) and Mastic | Building 1 | ND - Floor Tile<br>ND - Yellow Mastic |
| 20 | 20-58 | Duct Tape (White) | Building 1 | ND - Duct Tape |
| | 20-59 | Duct Tape (White) | Building 1 | ND - Duct Tape |
| | 20-60 | Duct Tape (White) | Building 1 | ND - Duct Tape |
| 21 | 21-61 | Drywall and Joint Compound | Building 1 | ND - Drywall Material<br>ND - Joint Compound |
| | 21-62 | Drywall and Joint Compound | Building 1 | ND - Drywall Material<br>ND - Joint Compound |
| | 21-63 | Drywall and Joint Compound | Building 1 | ND - Drywall Material<br>ND - Joint Compound |

HA= Homogeneous Area
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| 4520 Executive Park Drive | | | | |
|---|---|---|---|---|
| **HA** | **Sample No.** | **Description** | **Sample Location** | **Asbestos Content** |
| 22 | 22-64 | Ceramic Tile Thinset | Building 1, Bathrooms | ND - Ceramic Tile<br>ND - Grout<br>ND - Thinset |
| | 22-65 | Ceramic Tile Thinset | Building 1, Bathrooms | ND - Ceramic Tile<br>ND - Grout<br>ND - Thinset |
| | 22-66 | Ceramic Tile Thinset | Building 1, Bathrooms | ND - Ceramic Tile<br>ND - Grout<br>ND - Thinset |
| **23** | **23-67** | **12 x 12 Floor Tile (Brown Speckled) and Mastic** | **Building 1, Breakroom (2-Story Section)** | **ND - Floor Tile<br>ND - Yellow Mastic<br>3% C - Black Mastic** |
| | **23-68** | **12 x 12 Floor Tile (Brown Speckled) and Mastic** | **Building 1, Breakroom (2-Story Section)** | **ND - Floor Tile<br>ND - Yellow Mastic<br>NA/PS - Black Mastic** |
| | **23-69** | **12 x 12 Floor Tile (Brown Speckled) and Mastic** | **Building 1, Breakroom (2-Story Section)** | **ND - Floor Tile<br>ND - Yellow Mastic<br>NA/PS - Black Mastic** |
| 24 | 24-70 | 12 x 12 Floor Tile (White Speckled) and Mastic | Building 1 | ND - Floor Tile<br>ND - Yellow Mastic<br>ND - Leveling Compound |
| | 24-71 | 12 x 12 Floor Tile (White Speckled) and Mastic | Building 1 | ND - Floor Tile<br>ND - Yellow Mastic<br>ND - Leveling Compound |
| | 24-72 | 12 x 12 Floor Tile (White Speckled) and Mastic | Building 1 | ND - Floor Tile<br>ND - Yellow Mastic<br>ND - Leveling Compound |

HA= Homogeneous Area
ND = None Detected
C = Chrysotile
Bold Font Indicates ACM
NA/PS = Not Analyzed, positive Stop

Pre-Renovation Asbestos Inspection Report
4520 Executive Park Dr. & 2511 Fairlane Dr. | Montgomery, AL
January 26, 2023 | Terracon Report No. E1227393

| 4520 Executive Park Drive | | | | |
|---|---|---|---|---|
| **HA** | **Sample No.** | **Description** | **Sample Location** | **Asbestos Content** |
| 25 | 25-73 | 12 x 12 Floor Tile (Gray Speckled) and Mastic | Building 1 | ND - Floor Tile<br>ND - Yellow Mastic |
| | 25-74 | 12 x 12 Floor Tile (Gray Speckled) and Mastic | Building 1 | ND - Floor Tile<br>ND - Yellow Mastic |
| | 25-75 | 12 x 12 Floor Tile (Gray Speckled) and Mastic | Building 1 | ND - Floor Tile<br>ND - Yellow Mastic |
| 26 | 26-76 | Staircase Tread Glue | Building 1 | ND - Stair Tread<br>ND - Yellow Glue<br>ND - Brown Glue |
| | 26-77 | Staircase Tread Glue | Building 1 | ND - Stair Tread<br>ND - Yellow Glue<br>ND - Brown Glue |
| | 26-78 | Staircase Tread Glue | Building 1 | ND - Stair Tread<br>ND - Yellow Glue<br>ND - Brown Glue |
| 27 | 27-79 | Ceramic Tile Thinset | Building 1 | ND - Ceramic Tile<br>ND - Orange Grout<br>ND - Brown Grout<br>ND - Thinset |
| | 27-80 | Ceramic Tile Thinset | Building 1 | ND - Ceramic Tile<br>ND - Orange Grout<br>ND - Brown Grout<br>ND - Thinset |
| | 27-81 | Ceramic Tile Thinset | Building 1 | ND - Ceramic Tile<br>ND - Orange Grout<br>ND - Brown Grout<br>ND - Thinset |
| 28 | 28-82 | 2 x 2 Suspended Ceiling Tile | Building 1 | ND - Acoustic Tile |
| | 28-83 | 2 x 2 Suspended Ceiling Tile | Building 1 | ND - Acoustic Tile |
| | 28-84 | 2 x 2 Suspended Ceiling Tile | Building 1 | ND - Acoustic Tile |

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| 4520 Executive Park Drive | | | | |
|---|---|---|---|---|
| **HA** | **Sample No.** | **Description** | **Sample Location** | **Asbestos Content** |
| 29 | 29-85 | Wood Parquet Flooring Glue | Building 1 | ND - Floor Glue<br>ND - Leveling Compound |
| | 29-86 | Wood Parquet Flooring Glue | Building 1 | ND - Floor Glue<br>ND - Leveling Compound |
| | 29-87 | Wood Parquet Flooring Glue | Building 1 | ND - Floor Glue<br>ND - Leveling Compound |
| **30** | **30-88** | **12 x 12 Floor Tile (Black) and Mastic** | **Building 1, Kitchenette (4-Story Section, 4th Floor)** | **3% C - Floor Tile<br>5% C - Black Mastic** |
| | **30-89** | **12 x 12 Floor Tile (Black) and Mastic** | **Building 1, Kitchenette (4-Story Section, 4th Floor)** | **PS/NA - Floor Tile<br>PS/NA - Black Mastic** |
| | **30-90** | **12 x 12 Floor Tile (Black) and Mastic** | **Building 1, Kitchenette (4-Story Section, 4th Floor)** | **PS/NA - Floor Tile<br>PS/NA - Black Mastic** |
| 31 | 31-91 | Ceramic Tile Thinset | Building 2 | ND - Ceramic Tile<br>ND - Cream Adhesive |
| | 31-92 | Ceramic Tile Thinset | Building 2 | ND - Ceramic Tile<br>ND - Cream Adhesive |
| | 31-93 | Ceramic Tile Thinset | Building 2 | ND - Ceramic Tile<br>ND - Cream Adhesive |
| 33 | 33-97 | 2 x 2 Suspended Ceiling Tile | Building 2 | ND - Acoustic Tile |
| | 33-98 | 2 x 2 Suspended Ceiling Tile | Building 2 | ND - Acoustic Tile |
| | 33-99 | 2 x 2 Suspended Ceiling Tile | Building 2 | ND - Acoustic Tile |

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|---|---|---|---|---|
| **HA** | **Sample No.** | **Description** | **Sample Location** | **Asbestos Content** |
| 34 | 34-100 | Sealant (White) on HVAC Foil Duct Insulation Wrap | Building 2 | ND - Thermal Insulation<br>ND - Paper / Foil Wrap<br>ND - Sealant |
| | 34-101 | Sealant (White) on HVAC Foil Duct Insulation Wrap | Building 2 | ND - Paper / Foil Wrap<br>ND - Sealant |
| | 34-102 | Sealant (White) on HVAC Foil Duct Insulation Wrap | Building 2 | ND - Thermal Insulation<br>ND - Paper / Foil Wrap<br>ND - Sealant |
| 35 | 35-103 | Cove Base (Brown) Glue | Building 2 | ND - Cove Base<br>ND - Yellow Glue |
| | 35-104 | Cove Base (Brown) Glue | Building 2 | ND - Cove Base<br>ND - Yellow Glue |
| | 35-105 | Cove Base (Brown) Glue | Building 2 | ND - Cove Base<br>ND - Yellow Glue |
| 36 | 36-106 | 2 x 2 Elevated Floor Panels | Building 2 | ND - Laminate<br>ND - Yellow Mastic |
| | 36-107 | 2 x 2 Elevated Floor Panels | Building 2 | ND - Laminate<br>ND - Yellow Mastic |
| | 36-108 | 2 x 2 Elevated Floor Panels | Building 2 | ND - Laminate<br>ND - Yellow Mastic |
| 37 | 37-109 | 12 x 12 Floor Tile (Beige Speckled) and Mastic | Building 2, West Stairwell Landings | ND - Floor Tile<br>ND - Yellow Mastic<br>ND - Black Mastic |
| | 37-110 | 12 x 12 Floor Tile (Beige Speckled) and Mastic | Building 2, West Stairwell Landings | ND - Floor Tile<br>ND - Yellow Mastic<br>ND - Black Mastic |
| | 37-111 | 12 x 12 Floor Tile (Beige Speckled) and Mastic | Building 2, West Stairwell Landings | ND - Floor Tile<br>ND - Yellow Mastic<br>ND - Black Mastic |

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|---|---|---|---|---|
| **HA** | **Sample No.** | **Description** | **Sample Location** | **Asbestos Content** |
| **38** | **38-112** | **12 x 12 Floor Tile (Brown Speckled) and Mastic** | **Building 2, East Stairwell Landings** | **5% C - Floor Tile<br>ND - Yellow Mastic<br>5% C - Black Mastic** |
| | **38-113** | **12 x 12 Floor Tile (Brown Speckled) and Mastic** | **Building 2, East Stairwell Landings** | **PS/NA - Floor Tile<br>ND - Yellow Mastic<br>PS/NA - Black Mastic** |
| | **38-114** | **12 x 12 Floor Tile (Brown Speckled) and Mastic** | **Building 2, East Stairwell Landings** | **PS/NA - Floor Tile<br>ND - Yellow Mastic<br>PS/NA - Black Mastic** |
| **39** | **39-115** | **Interior Plate Glass Window Frame Caulk** | **Building 2, 2-Story Section** | **5% C - Caulking** |
| | **39-116** | **Interior Plate Glass Window Frame Caulk** | **Building 2, 2-Story Section** | **PS/NA** |
| | **39-117** | **Interior Plate Glass Window Frame Caulk** | **Building 2, 2-Story Section** | **PS/NA** |
| 40 | 40-118 | Drywall and Joint Compound | Building 2, 2-Story Section | ND - Drywall Material<br>ND - Joint Compound |
| | 40-119 | Drywall and Joint Compound | Building 2, 2-Story Section | ND - Drywall Material<br>ND - Joint Compound |
| | 40-120 | Drywall and Joint Compound | Building 2, 2-Story Section | ND - Drywall Material<br>ND - Joint Compound |
| 41 | 41-121 | 2 x 2 Suspended Ceiling Tile (Rough Finish) | Building 2 | ND - Acoustic Tile |
| | 41-122 | 2 x 2 Suspended Ceiling Tile (Rough Finish) | Building 2 | ND - Acoustic Tile |
| | 41-123 | 2 x 2 Suspended Ceiling Tile (Rough Finish) | Building 2 | ND - Acoustic Tile |

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| 4520 Executive Park Drive | | | | |
|---|---|---|---|---|
| **HA** | **Sample No.** | **Description** | **Sample Location** | **Asbestos Content** |
| 42 | 42-124 | 1 x 1 Acoustical Ceiling Tile (Rough Finish) | Building 2 | ND - Acoustic Tile |
| | 42-125 | 1 x 1 Acoustical Ceiling Tile (Rough Finish) | Building 2 | ND - Acoustic Tile |
| | 42-126 | 1 x 1 Acoustical Ceiling Tile (Rough Finish) | Building 2 | ND - Acoustic Tile |
| **43** | **43-127** | **Tar Sealant on Paper/Foil Pipe Wrap** | **Building 2, Above Suspended Ceilings** | **ND - Paper/Foil Wrap 5% C - Tar Wrap** |
| | **43-128** | **Tar Sealant on Paper/Foil Pipe Wrap** | **Building 2, Above Suspended Ceilings** | **ND - Paper Foil Wrap NA/PS - Tar Wrap** |
| | **43-129** | **Tar Sealant on Paper/Foil Pipe Wrap** | **Building 2, Above Suspended Ceilings** | **ND - Paper/Foil Wrap NA/PS - Tar Wrap** |
| 44 | 44-130 | Firestop Caulk on HVAC Duct Insulation Wrap | Building 2 | ND - Caulking |
| | 44-131 | Firestop Caulk on HVAC Duct Insulation Wrap | Building 2 | ND - Caulking |
| | 44-132 | Firestop Caulk on HVAC Duct Insulation Wrap | Building 2 | ND - Caulking |
| **45** | **45-133-** | **Interior Plate Glass Window Caulk** | **Building 2, 1-Story Section** | **2% C - Caulking** |
| | **45-134** | **Interior Plate Glass Window Caulk** | **Building 2, 1-Story Section** | **NA/PS** |
| | **45-135** | **Interior Plate Glass Window Caulk** | **Building 2, 1-Story Section** | **NA/PS** |

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|---|---|---|---|---|
| **HA** | **Sample No.** | **Description** | **Sample Location** | **Asbestos Content** |
| 46 | 46-136 | 2 x 2 Suspended Ceiling Tile (Rough Finish) | Building 2 | ND - Acoustic Tile |
| | 46-137 | 2 x 2 Suspended Ceiling Tile (Rough Finish) | Building 2 | ND - Acoustic Tile |
| | 46-138 | 2 x 2 Suspended Ceiling Tile (Rough Finish) | Building 2 | ND - Acoustic Tile |
| **47** | **47-139** | **Drywall and Joint Compound** | **Building 2, 1-Story Section** | **ND - Drywall Material 2% C - Joint Compound** |
| | **47-140** | **Drywall and Joint Compound** | **Building 2, 1-Story Section** | **ND - Drywall Material NA/PS - Joint Compound** |
| | **47-141** | **Drywall and Joint Compound** | **Building 2, 1-Story Section** | **ND - Drywall Material NA/PS - Joint Compound** |
| **48** | **48-142** | **Acoustic Texture on Wall and Ceiling** | **Building 2, 1-Story Section Lobby** | **3% C - Acoustic Texture** |
| | **48-143** | **Acoustic Texture on Wall and Ceiling** | **Building 2, 1-Story Section Lobby** | **NA/PS - Acoustic Texture** |
| | **48-144** | **Acoustic Texture on Wall and Ceiling** | **Building 2, 1-Story Section Lobby** | **NA/PS - Acoustic Texture** |
| | **48-145** | **Acoustic Texture on Wall and Ceiling** | **Building 2, 1-Story Section Lobby** | **NA/PS - Acoustic Texture** |
| | **48-146** | **Acoustic Texture on Wall and Ceiling** | **Building 2, 1-Story Section Lobby** | **NA/PS - Acoustic Texture** |

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| 4520 Executive Park Drive | | | | |
|---|---|---|---|---|
| **HA** | **Sample No.** | **Description** | **Sample Location** | **Asbestos Content** |
| 49 | 49-147 | Exterior Wall Base Flashing | Building 2 | ND - Flashing<br>ND - Felt |
| | 49-148 | Exterior Wall Base Flashing | Building 2 | ND - Flashing<br>ND - Felt |
| | 49-149 | Exterior Wall Base Flashing | Building 2 | ND - Flashing<br>ND - Felt |
| 50 | 50-150 | Exterior Building Caulk | Buildings 1 & 2 | ND - Caulking |
| | 50-151 | Exterior Building Caulk | Buildings 1 & 2 | ND - Caulking |
| | 50-152 | Exterior Building Caulk | Buildings 1 & 2 | ND - Caulking |
| 51 | 51-153 | Exterior Window Caulk (Metal-Frame) | Building 2 | ND - Caulking 1<br>ND – Caulking 2 |
| | 51-154 | Exterior Window Caulk (Metal-Frame) | Building 2 | ND - Caulking 1<br>ND – Caulking 2 |
| | 51-155 | Exterior Window Caulk (Metal-Frame) | Building 2 | ND - Caulking |
| 52 | 52-156 | Interior Window Caulk (Metal-Frame) | Building 2, Ground Floor Lobby Entrances | ND - Caulking |
| | 52-157 | Interior Window Caulk (Metal-Frame) | Building 2, Ground Floor Lobby Entrances | ND - Caulking |
| | 52-158 | Interior Window Caulk (Metal-Frame) | Building 2, Ground Floor Lobby Entrances | ND - Caulking |
| 53 | 53-159 | Exterior Window Caulk (Metal-Frame) | Building 2, Ground Floor Lobby Entrances | ND - Caulking |
| | 53-160 | Exterior Window Caulk (Metal-Frame) | Building 2, Ground Floor Lobby Entrances | ND - Caulking |
| | 53-161 | Exterior Window Caulk (Metal-Frame) | Building 2, Ground Floor Lobby Entrances | ND - Caulking |

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| 2511 Fairlane Drive | | | | |
|---|---|---|---|---|
| **HA** | **Sample No.** | **Description** | **Sample Location** | **Asbestos Content** |
| 1 | 1-1 | 12" x 12" Floor Tile (Beige, Speckled) and Mastic | Offices / Rooms | ND - Floor Tile<br>ND - Yellow Mastic |
| | 1-2 | 12" x 12" Floor Tile (Beige, Speckled) and Mastic | Offices / Rooms | ND - Floor Tile<br>ND - Yellow Mastic |
| | 1-3 | 12" x 12" Floor Tile (Beige, Speckled) and Mastic | Offices / Rooms | ND - Floor Tile<br>ND - Yellow Mastic |
| 2 | 2-4 | 12" x 12" Floor Tile (White, Speckled) and Mastic | Stairwell Landing, West Side | ND - Floor Tile<br>ND - Black Mastic |
| | 2-5 | 12" x 12" Floor Tile (White, Speckled) and Mastic | Stairwell Landing, West Side | ND - Floor Tile<br>ND - Black Mastic |
| | 2-6 | 12" x 12" Floor Tile (White, Speckled) and Mastic | Stairwell Landing, West Side | ND - Floor Tile<br>ND - Black Mastic |
| 3 | 3-7 | 12" x 12" Floor Tile (White, Speckled with Blue Specks) and Mastic | 2nd Floor Break Room | ND - Floor Tile<br>ND - Yellow Mastic |
| | 3-8 | 12" x 12" Floor Tile (White, Speckled with Blue Specks) and Mastic | 2nd Floor Break Room | ND - Floor Tile<br>ND - Yellow Mastic |
| | 3-9 | 12" x 12" Floor Tile (White, Speckled with Blue Specks) and Mastic | 2nd Floor Break Room | ND - Floor Tile<br>ND - Yellow Mastic<br>ND – Leveling Compound |
| 4 | 4-10 | 12" x 12" Floor Tile (Blue) and Mastic | 2nd Floor Break Room | ND - Floor Tile<br>ND - Yellow Mastic<br>ND – Leveling Compound 1<br>ND – Leveling Compound 2 |
| | 4-11 | 12" x 12" Floor Tile (Blue) and Mastic | 2nd Floor Break Room | ND - Floor Tile<br>ND - Yellow Mastic<br>ND – Leveling Compound |
| | 4-12 | 12" x 12" Floor Tile (Blue) and Mastic | 2nd Floor Break Room | ND - Floor Tile<br>ND - Yellow Mastic<br>ND – Leveling Compound |

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| 2511 Fairlane Drive | | | | |
|---|---|---|---|---|
| **HA** | **Sample No.** | **Description** | **Sample Location** | **Asbestos Content** |
| 5 | 5-13 | Metal Sink Undercoating (Grey) | Metal Sinks | ND - Sink Undercoating 1<br>ND - Sink Undercoating 2<br>ND - Tan Masti |
| | 5-14 | Metal Sink Undercoating (Grey) | Metal Sinks | ND - Sink Undercoating 1<br>ND - Sink Undercoating 2<br>ND - Tan Masti |
| | 5-15 | Metal Sink Undercoating (Grey) | Metal Sinks | ND - Sink Undercoating 1<br>ND - Sink Undercoating 2<br>ND - Tan Masti |
| 6 | 6-16 | Metal Sink Undercoating (Beige) | Metal Sinks | ND - Sink Undercoating |
| | 6-17 | Metal Sink Undercoating (Beige) | Metal Sinks | ND - Sink Undercoating |
| | 6-18 | Metal Sink Undercoating (Beige) | Metal Sinks | ND - Sink Undercoating |
| 7 | 7-19 | 2 x 4 Suspended Ceiling Tile | Throughout | ND – Acoustic Tile |
| | 7-20 | 2 x 4 Suspended Ceiling Tile | Throughout | ND – Acoustic Tile |
| | 7-21 | 2 x 4 Suspended Ceiling Tile | Throughout | ND – Acoustic Tile |
| 8 | 8-22 | Cove Base Glue (Beige) | Throughout | ND - Cove Base<br>ND - Cream Glue<br>ND - Yellow Glu |
| | 8-23 | Cove Base Glue (Beige) | Throughout | ND - Cove Base<br>ND - Cream Glue<br>ND - Yellow Glu |
| | 8-24 | Cove Base Glue (Beige) | Throughout | ND - Cove Base<br>ND - Cream Glue<br>ND - Yellow Glu |

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|---|---|---|---|---|
| **HA** | **Sample No.** | **Description** | **Sample Location** | **Asbestos Content** |
| 9 | 9-25 | Drywall and Joint Compound | 1-Story Section | ND - Drywall Material<br>ND - Joint Compound |
| | 9-26 | Drywall and Joint Compound | 1-Story Section | ND - Drywall Material<br>ND - Joint Compound |
| | 9-27 | Drywall and Joint Compound | 1-Story Section | ND - Drywall Material<br>ND - Joint Compound |
| 10 | 10-28 | Drywall and Joint Compound | 2-Story Section | ND - Drywall Material<br>ND - Joint Compound |
| | 10-29 | Drywall and Joint Compound | 2-Story Section | ND - Drywall Material<br>ND - Joint Compound |
| | 10-30 | Drywall and Joint Compound | 2-Story Section | ND - Drywall Material<br>ND - Joint Compound |
| 11 | 11-31 | Cove Base Glue (Black) | Throughout | ND - Cove Base<br>ND - Glue |
| | 11-32 | Cove Base Glue (Black) | Throughout | ND - Cove Base<br>ND - Glue |
| | 11-33 | Cove Base Glue (Black) | Throughout | ND - Cove Base<br>ND - Glue |
| 12 | 12-34 | Cove Base Glue (Black) | Throughout | ND - Cove Base<br>ND - Glue |
| | 12-35 | Cove Base Glue (Black) | Throughout | ND - Cove Base<br>ND - Glue |
| | 12-36 | Cove Base Glue (Black) | Throughout | ND - Cove Base<br>ND - Glue |

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|---|---|---|---|---|
| **HA** | **Sample No.** | **Description** | **Sample Location** | **Asbestos Content** |
| 13 | 13-37 | Ceramic Tile Thinset | Bathrooms | ND - Ceramic Tile<br>ND - Grout<br>ND - Thinset<br>ND - Joint Compound |
| | 13-38 | Ceramic Tile Thinset | Bathrooms | ND - Ceramic Tile<br>ND - Grout<br>ND - Thinset<br>ND - Joint Compound |
| | 13-39 | Ceramic Tile Thinset | Bathrooms | ND - Ceramic Tile<br>ND - Grout<br>ND - Thinset<br>ND - Joint Compound |
| 14 | 14-40 | Ceramic Tile Thinset | Bathrooms | ND - Ceramic Tile<br>ND - Grout<br>ND - Thinset<br>ND - Joint Compound |
| | 14-41 | Ceramic Tile Thinset | Bathrooms | ND - Ceramic Tile<br>ND - Grout<br>ND - Thinset<br>ND - Joint Compound |
| | 14-42 | Ceramic Tile Thinset | Bathrooms | ND - Ceramic Tile<br>ND - Grout<br>ND - Thinset<br>ND - Joint Compound |
| **15** | **15-43** | **Exterior Caulk (Brown)** | **Metal Frame Windows / Doors** | **2% C - Caulking** |
| | **15-44** | **Exterior Caulk (Brown)** | **Metal Frame Windows / Doors** | **NA/PS - Caulking** |
| | **15-45** | **Exterior Caulk (Brown)** | **Metal Frame Windows / Doors** | **NA/PS - Caulking** |

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| 2511 Fairlane Drive | | | | |
|---|---|---|---|---|
| **HA** | **Sample No.** | **Description** | **Sample Location** | **Asbestos Content** |
| 16 | 16-46 | Interior Caulk (Brown) | Metal Frame Windows / Doors | 2% C - Caulking |
| | 16-47 | Interior Caulk (Brown) | Metal Frame Windows / Doors | NA/PS - Caulking |
| | 16-48 | Interior Caulk (Brown) | Metal Frame Windows / Doors | NA/PS - Caulking |
| 17 | 17-49 | Interior Window Caulk | Plate Glass Side Door Windows | 2% C - Caulking |
| | 17-50 | Interior Window Caulk | Plate Glass Side Door Windows | NA/PS - Caulking |
| | 17-51 | Interior Window Caulk | Plate Glass Side Door Windows | NA/PS - Caulking |

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# Appendix C

# 10-Day Notification

NESHAPS #

# STATE OF ALABAMA

## Department of Environmental Management

## Notice of Asbestos Abatement and/or Demolition

**Reason:** ☐ **Original** ☐ **Cancelled** ☐ **Postponed** ☐ **Annual** ☐ **Revision #____**

1. Facility Name: _____
   Facility Physical Address: _____
   City: _____ State: AL Zip: _____ County: _____
   On Site Contact: _____ Title: _____ Phone: _____
   Building Description [size (sf), age, #floors, prior use]: _____
   _____
   Exact Removal Site (room, floor, building #, etc.): _____
   _____

2. Facility Owner: _____
   Owner Address: _____ City: _____ State: ____ Zip: _____
   Contact: _____ Title: _____ Phone: _____
   Owner email: _____

3. Asbestos Inspector Name: _____ Employer: _____
   Inspector Phone: _____ Inspector Email: _____
   Safe State Accreditation No.: AIN _____ Date of Inspection: _____

4. Abatement Contractor: _____ ADEM Certification No.: _____
   Address: _____ City: _____ State: ____ Zip: _____
   Contact Name: _____ Phone: _____ Email: _____

   Demolition Contractor: _____
   Address: _____ City: _____ State: ____ Zip: _____
   Contact Name: _____ Phone: _____ Email: _____

5. ☐ RENOVATION ☐ DEMOLITION ☐ HAS NO ASBESTOS ☐ ORDERED *(attach documentation)*

| Abatement Dates | Demolition Dates |
|---|---|
| Start _____ Finish _____ | Start _____ Finish _____ |
| Start _____ Finish _____ | Start _____ Finish _____ |
| Start _____ Finish _____ | Start _____ Finish _____ |

   Work Days (Mon, Tue, etc.): _____ Work Hours: _____
   Emergency reason(s) for not complying with 10-day notification requirement: _____
   _____

6. **Attach a list that includes the following: Amount(s) and type(s) of ACM to be abated, whether the material is friable or non-friable, and removal methods.** ***Contact ADEM for requirements for demolition by burning.***

7. Waste Disposal Site: _____
   Address: _____ City: _____ State: ____ Zip: _____
   Contact: _____ Phone: _____ Permit No.: _____

8. Procedures for unexpected ACM: _____

I certify the above is correct.

Signature: _____ Date: _____
Print Name: _____ Phone: _____

ADEM Form 496 Revised 1/19/18

WHO MUST SUBMIT A NOTIFICATION FORM?
Regulations require that someone (usually a contractor, property owner or consultant) submit a notification to the appropriate agency 10 weekdays prior to disturbing any regulated asbestos-containing material (RACM) or beginning demolition. Specifically, a notification must be submitted if one of the three following situations exists:

1. It is a renovation project and at least 260 linear feet or 160 square feet or 35 cubic feet of RACM is to be removed.
2. It is a demolition project with or without asbestos-containing material (ACM).
3. A structure is going to be burned for fire training (requires Departmental approval).

WHAT IS REGULATED ASBESTOS-CONTAINING MATERIAL?

RACM has greater than 1% asbestos by weight and includes friable and nonfriable forms. ("Friable" means that it can be crushed to powder by hand pressure.) RACM can include: (1) Friable ACM, such as pipe and elbow insulation, storage vessel insulation, and spray-applied applications such as fireproofing, soundproofing, or decoration. (2) Category I nonfriable ACM such as vinyl floor tile and mastic, asphalt roofing products, gaskets and packing which have become friable or will be subject to sanding, grinding, cutting or abrading. *Please be aware that some older sheet vinyl (linoleum) has an asbestos-containing felt backing which can turn to powder (become friable) under certain circumstances. You must be careful with it.* (3) Category II nonfriable ACM such as transite and cementitious siding or roofing which have a high probability of becoming crumbled, pulverized, or reduced to powder during renovation or demolition activities.

WHAT ARE SOME OTHER REGULATORY REQUIREMENTS?
A structure must be surveyed by an Alabama licensed inspector before renovation or demolition or burning for training. Friable and Category II nonfriable ACM must be removed from a structure before demolishing it. Category I nonfriable ACM can usually be left in the structure during demolition, if no materials are going to be recycled. Friable ACM must be wetted before, during and after removal until soaked through. It should be containerized while wet and properly labeled. Friable ACM must be disposed of as special waste, regardless of amount. Nonfriable ACM can usually be disposed of as general or construction waste. It is best to check with the landfill or waste hauler first. Removed Category II nonfriable ACM must be disposed of separately. RACM must be removed by an organization certified by the Alabama Department of Environmental Management (ADEM). *(NOTE: All ACM must be removed from a structure before burning for training.)*

ARE THERE ANY EXEMPTIONS?
Privately owned residential buildings of 4 or less units that remain residential property are exempt from asbestos regulations, but they must comply with disposal regulations. (This residential exemption puts homeowners at risk!)

HOW ARE NOTIFICATIONS SUBMITTED?
Original notifications may be sent by U.S. Mail, special delivery service, hand-delivered or by e-mail (most common method). Revisions to notifications and courtesy notifications may be sent by facsimile transmission, but usually by e-mail. They must be sent to one of the 3 individuals/organizations below, depending upon the location of the renovation/demolition.

City of Huntsville:
Mr. Scott Cardno
Department of Natural Resources
and Environmental Management
City of Huntsville
P.O. Box 308
Huntsville, AL 35804-0308
PH: 256/427-5750
FAX: 427-5751
(Street Address:)
320 Fountain Circle
Huntsville, AL 35801-4240
E-mail: Scott.Cardno@huntsvilleal.gov

Jefferson County (collects job fees):
Mr. Craig Tucker
Air and Radiation Protection Division
Jefferson County Department of Health
P.O. Box 2648
Birmingham, AL 35202-2648
PH: 205/930-1204
FAX: 939-3019
(Street Address:)
400 6th Avenue South
Birmingham, AL 35233-1598
E-mail: craig.tucker@jcdh.org

All other areas:
Mr. Don Barron
ADEM—Air Division
P.O. Box 301463
Montgomery, AL 36130-1463
PH: 334/271-7879
FAX: 279-3044)
(Street Address:)
1400 Coliseum Boulevard
Montgomery, AL 36110-2059
E-mail:
asbestosmail@adem.alabama.gov

Pre-Renovation Asbestos Inspection Report
4520 Executive Park Dr. & 2511 Fairlane Dr. | Montgomery, AL
January 26, 2023 | Terracon Report No. E1227393

# Appendix D

# Identified Asbestos-Containing Materials

**APPENDIX D**
**Identified Asbestos-Containing Materials**
**4520 Executive Park Drive & 2511 Fairlane Drive**
**Montgomery, AL 36116**
**Terracon Project No. E1227393**

| 4520 Executive Park Drive | | | | | | |
|---|---|---|---|---|---|---|
| **HA** | **Description** | **Material** | **Percent/Type Asbestos** | **NESHAP Classification** | **Condition** | **Estimated Quantity** |
| 3 | Interior Caulk (Brown), Metal-Frame Windows | Building 1, Lobby Rear Windows & Exercise Room | 5% C - Caulking | Category II Non-Friable ACM | Good | 20 ft² |
| 8 & 10 | Sealant (White) on Paper / Foil Pipe Wrap and Tape | Building 1, Mechanical Rooms and Basement Mechanical Areas | ND - TSI<br>ND - Paper/Foil Wrap<br>10% C - Sealant | Category II Non-Friable ACM | Good | 50 ft² |

HA = Homogenous Area
C = Chrysotile Asbestos
ft² = Square Feet
PLM = Polarized Light Microscopy

**Friable ACM** includes those materials that, when dry, may be crumbled, pulverized, or reduced to powder by hand pressure.
**Category I non-friable ACM** includes packings, gaskets, resilient floor coverings and asphalt roofing products containing more than 1% asbestos.
**Category II non-friable ACM** includes all other forms of ACM not defined as friable or Category I non-friable ACM.

Pre-Renovation Asbestos Inspection Report
4520 Executive Park Dr. & 2511 Fairlane Dr. | Montgomery, AL
January 25, 2023 | Terracon Report No. E1227393

| 4520 Executive Park Drive | | | | | | |
|---|---|---|---|---|---|---|
| **HA** | **Description** | **Material** | **Percent/Type Asbestos** | **NESHAP Classification** | **Condition** | **Estimated Quantity** |
| 9 | TSI Wrap on Cellular Glass Insulation | Building 2, Basement Mechanical Area, CentraVac Unit (Joints, Valves, and Elbows) | ND - Glass Foam<br>5% C - Black Mastic<br>ND - Glass Fiber Wrap<br>65% C - TSI<br>ND - Cotton Wrap<br>ND - White Mastic | Category II Non-Friable ACM | Good | 50 ft² |
| 13 | 12 x 12 Floor Tile (Beige Speckled) and Mastic | Building 1, Breakrooms, Janitor's Closets, Storage Rooms, and File Rooms | 3% C - Floor Tile<br>5% C - Black Mastic | Category I Non-Friable ACM | Good | 800 ft² |
| 14 | Remnant Black Mastic Associated w/ Non-Asbestos-Containing 12x12 Floor Tile (Brown Speckled) and Yellow Mastic | Building 1, Corridors | ND - Floor Tile<br>ND – Yellow Mastic<br>5% C - Black Mastic | Category I Non-Friable ACM | Good | 750 ft² |
| 15 | Metal Sink Undercoating (Light Gray) | Building 1 | 5% C - Sink Undercoating | Category II Non-Friable ACM | Good | 40 ft²<br>≈8 Sinks |

HA = Homogenous Area
C = Chrysotile Asbestos
ft² = Square Feet
PLM = Polarized Light Microscopy

**Friable ACM** includes those materials that, when dry, may be crumbled, pulverized, or reduced to powder by hand pressure.
**Category I non-friable ACM** includes packings, gaskets, resilient floor coverings and asphalt roofing products containing more than 1% asbestos.
**Category II non-friable ACM** includes all other forms of ACM not defined as friable or Category I non-friable ACM.

Pre-Renovation Asbestos Inspection Report
4520 Executive Park Dr. & 2511 Fairlane Dr. | Montgomery, AL
January 25, 2023 | Terracon Report No. E1227393

| 4520 Executive Park Drive | | | | | | |
|---|---|---|---|---|---|---|
| **HA** | **Description** | **Material** | **Percent/Type Asbestos** | **NESHAP Classification** | **Condition** | **Estimated Quantity** |
| 23 | 12 x 12 Floor Tile (Brown Speckled) and Mastic | Building 1, Breakroom (2-Story Section) | ND - Floor Tile<br>ND - Yellow Mastic<br>3% C - Black Mastic | Category I Non-Friable ACM | Good | 450 ft² |
| 30 | 12 x 12 Floor Tile (Black) and Mastic | Building 1, Kitchenette (4-Story Section, 4th Floor) | 3% C - Floor Tile<br>5% C - Black Mastic | Category I Non-Friable ACM | Good | 50 ft² |
| 38 | 12 x 12 Floor Tile (Brown Speckled) and Mastic | Building 2, East Stairwell Landings | 5% C - Floor Tile<br>ND - Yellow Mastic<br>5% C - Black Mastic | Category I Non-Friable ACM | Good | 250 ft² |
| 39 | Interior Plate Glass Window Frame Caulk | Building 2, 2-Story Section | 5% C - Caulking | Category II Non-Friable ACM | Good | 50 ft² |
| 43 | Tar Sealant on Paper/Foil Pipe Wrap | Building 2, Above Suspended Ceilings | ND - Paper/Foil Wrap<br>5% C - Tar Wrap | Category I Non-Friable ACM | Good | 25 LF |

HA = Homogenous Area
C = Chrysotile Asbestos
ft² = Square Feet
PLM = Polarized Light Microscopy

**Friable ACM** includes those materials that, when dry, may be crumbled, pulverized, or reduced to powder by hand pressure.
**Category I non-friable ACM** includes packings, gaskets, resilient floor coverings and asphalt roofing products containing more than 1% asbestos.
**Category II non-friable ACM** includes all other forms of ACM not defined as friable or Category I non-friable ACM.

Pre-Renovation Asbestos Inspection Report
4520 Executive Park Dr. & 2511 Fairlane Dr. | Montgomery, AL
January 25, 2023 | Terracon Report No. E1227393

| 4520 Executive Park Drive | | | | | | |
|---|---|---|---|---|---|---|
| **HA** | **Description** | **Material** | **Percent/Type Asbestos** | **NESHAP Classification** | **Condition** | **Estimated Quantity** |
| 45 | Interior Plate Glass Window Caulk | Building 2, 1-Story Section | 2% C - Caulking | Category II Non-Friable ACM | Good | 20 ft² |
| 47 | Drywall and Joint Compound | Building 2, 1-Story Section | ND - Drywall Material<br>2% C - Joint Compound | Category II Non-Friable ACM | Good | 15,00 ft² |
| 48 | Acoustic Texture on Wall and Ceiling | Building 2, 1-Story Section Lobby | 3% C - Acoustic Texture | Friable RACM | Good | 3,500 ft² |

HA = Homogenous Area
C = Chrysotile Asbestos
ft² = Square Feet
PLM = Polarized Light Microscopy

**Friable ACM** includes those materials that, when dry, may be crumbled, pulverized, or reduced to powder by hand pressure.
**Category I non-friable ACM** includes packings, gaskets, resilient floor coverings and asphalt roofing products containing more than 1% asbestos.
**Category II non-friable ACM** includes all other forms of ACM not defined as friable or Category I non-friable ACM.

Pre-Renovation Asbestos Inspection Report
4520 Executive Park Dr. & 2511 Fairlane Dr. | Montgomery, AL
January 25, 2023 | Terracon Report No. E1227393

| 2511 Fairlane Drive | | | | | | |
|---|---|---|---|---|---|---|
| **HA** | **Description** | **Material** | **Percent/Type Asbestos** | **NESHAP Classification** | **Condition** | **Estimated Quantity** |
| 15 | Exterior Caulk (Brown) | Metal Frame Windows / Doors | 2% C - Caulking | Category II Non-Friable ACM | Good | 50 ft² |
| 16 | Interior Caulk (Brown) | Metal Frame Windows / Doors | 2% C - Caulking | Category II Non-Friable ACM | Good | 20 ft² |
| 17 | Interior Window Caulk | Plate Glass Side Door Windows | 2% C - Caulking | Category II Non-Friable ACM | Good | 2 ft² |

HA = Homogenous Area
C = Chrysotile Asbestos
ft² = Square Feet
PLM = Polarized Light Microscopy

**Friable ACM** includes those materials that, when dry, may be crumbled, pulverized, or reduced to powder by hand pressure.
**Category I non-friable ACM** includes packings, gaskets, resilient floor coverings and asphalt roofing products containing more than 1% asbestos.
**Category II non-friable ACM** includes all other forms of ACM not defined as friable or Category I non-friable ACM.

Pre-Renovation Asbestos Inspection Report
4520 Executive Park Dr. & 2511 Fairlane Dr. | Montgomery, AL
January 25, 2023 | Terracon Report No. E1227393

# Appendix E

# Asbestos Analytical Laboratory Data

Moody Labs

## PLM Summary Report

NVLAP Lab Code 102056-0
TDSHS License No. 300084

2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

| | | | |
|---|---|---|---|
| Client : | Terracon - Birmingham | Lab Job No. : | 22B-14185 |
| Project : | 4520 Executive Park Drive | Report Date : | 12/30/2022 |
| Project # : | E1227393 | Sample Date : | 12/20/2022 |
| Identification : | Asbestos, Bulk Sample Analysis | | |
| Test Method : | Polarized Light Microscopy / Dispersion Staining (PLM/DS)<br>EPA Method 600 / R-93 / 116 | | |

Page 1 of 12

On 12/27/2022, one hundred fifty eight (158) bulk material samples were submitted by Stephen Howard of Terracon - Birmingham for asbestos analysis by PLM/DS. The PLM Detail Report is attached; additional information may be found therein. The results are summarized below:

| Sample Number | Client Sample Description / Location | Asbestos Content |
|---|---|---|
| 1-1 | 1 x 1 Acoustical Ceiling Tile (Deep Fissures), Building A | None Detected - Acoustic Tile |
| 1-2 | 1 x 1 Acoustical Ceiling Tile (Deep Fissures), Building A | None Detected - Acoustic Tile |
| 1-3 | 1 x 1 Acoustical Ceiling Tile (Deep Fissures), Building A | None Detected - Acoustic Tile |
| 2-4 | Cove Base Glue (Brown), Building A and B | None Detected - Cove Base<br>None Detected - Yellow Glue<br>None Detected - Brown Glue |
| 2-5 | Cove Base Glue (Brown), Building A and B | None Detected - Cove Base<br>None Detected - Yellow Glue |
| 2-6 | Cove Base Glue (Brown), Building A and B | None Detected - Cove Base<br>None Detected - Yellow Glue<br>None Detected - Brown Glue |
| 3-7 | Interior Caulk (Brown), Metal-Frame Windows / Door, Building A and B | 5% Chrysotile - Caulking |
| 3-8 | Interior Caulk (Brown), Metal-Frame Windows / Door, Building A and B | Not Analyzed - Positive Stop |
| 3-9 | Interior Caulk (Brown), Metal-Frame Windows / Door, Building A and B | Not Analyzed - Positive Stop |
| 4-10 | Interior Caulk (Brown), Metal-Frame Windows / Door, Building A and B | None Detected - Caulking |
| 4-11 | Interior Caulk (Brown), Metal-Frame Windows / Door, Building A and B | None Detected - Caulking |
| 4-12 | Interior Caulk (Brown), Metal-Frame Windows / Door, Building A and B | None Detected - Caulking |
| 5-13 | Carpet Glue, Building A and B | None Detected - Yellow Glue |
| 5-14 | Carpet Glue, Building A and B | None Detected - Yellow Glue |
| 5-15 | Carpet Glue, Building A and B | None Detected - Yellow Glue |

Moody Labs

## PLM Summary Report

NVLAP Lab Code 102056-0
TDSHS License No. 300084

2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

| | | | |
|---|---|---|---|
| Client : | Terracon - Birmingham | Lab Job No. : | 22B-14185 |
| Project : | 4520 Executive Park Drive | Report Date : | 12/30/2022 |
| Project # : | E1227393 | Sample Date : | 12/20/2022 |
| Identification : | Asbestos, Bulk Sample Analysis | | |
| Test Method : | Polarized Light Microscopy / Dispersion Staining (PLM/DS)<br>EPA Method 600 / R-93 / 116 | | |

Page 2 of 12

On 12/27/2022, one hundred fifty eight (158) bulk material samples were submitted by Stephen Howard of Terracon - Birmingham for asbestos analysis by PLM/DS. The PLM Detail Report is attached; additional information may be found therein. The results are summarized below:

| Sample Number | Client Sample Description / Location | Asbestos Content |
|---|---|---|
| 6-16 | Drywall and Joint Compound, Building A | None Detected - Drywall Material<br>None Detected - Joint Compound |
| 6-17 | Drywall and Joint Compound, Building A | None Detected - Drywall Material<br>None Detected - Joint Compound |
| 6-18 | Drywall and Joint Compound, Building A | None Detected - Drywall Material<br>None Detected - Joint Compound |
| 7-19 | Duct Tape (White), Building B | None Detected - Duct Seam Tape |
| 7-20 | Duct Tape (White), Building B | None Detected - Duct Seam Tape |
| 7-21 | Duct Tape (White), Building B | None Detected - Duct Seam Tape |
| 8-22 | Sealant (White) on Paper / Foil Pipe Wrap, Building A and B | None Detected - Thermal Insulation<br>None Detected - Paper / Foil Wrap<br>10% Chrysotile - Sealant |
| 8-23 | Sealant (White) on Paper / Foil Pipe Wrap, Building A and B | No Thermal Insulation<br>None Detected - Paper / Foil Wrap<br>Layer Not Analyzed - Positive Stop |
| 8-24 | Sealant (White) on Paper / Foil Pipe Wrap, Building A and B | None Detected - Thermal Insulation<br>None Detected - Paper / Foil Wrap<br>Layer Not Analyzed - Positive Stop |
| 9-25 | TSI Wrap on Cellular Glass Insulation, Building A - D, Basement Mechanical Areas, CentraVac Unit | None Detected - Glass Foam<br>5% Chrysotile - Black Mastic<br>None Detected - Glass Fiber Wrap<br>65% Chrysotile - Thermal Insulation<br>None Detected - Cotton Wrap<br>None Detected - White Mastic |
| 9-26 | TSI Wrap on Cellular Glass Insulation, Building A - D, Basement Mechanical Areas, CentraVac Unit | None Detected - Glass Foam<br>Layer Not Analyzed - Positive Stop<br>None Detected - Glass Fiber Wrap<br>Layer Not Analyzed - Positive Stop<br>None Detected - Cotton Wrap<br>None Detected - White Mastic |

Moody Labs

## PLM Summary Report

NVLAP Lab Code 102056-0
TDSHS License No. 300084

2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

| | | | |
|---|---|---|---|
| Client : | Terracon - Birmingham | Lab Job No. : | 22B-14185 |
| Project : | 4520 Executive Park Drive | Report Date : | 12/30/2022 |
| Project # : | E1227393 | Sample Date : | 12/20/2022 |
| Identification : | Asbestos, Bulk Sample Analysis | | |
| Test Method : | Polarized Light Microscopy / Dispersion Staining (PLM/DS)<br>EPA Method 600 / R-93 / 116 | | |

Page 3 of 12

On 12/27/2022, one hundred fifty eight (158) bulk material samples were submitted by Stephen Howard of Terracon - Birmingham for asbestos analysis by PLM/DS. The PLM Detail Report is attached; additional information may be found therein. The results are summarized below:

| Sample Number | Client Sample Description / Location | Asbestos Content |
|---|---|---|
| 9-27 | TSI Wrap on Cellular Glass Insulation, Building A - D, Basement Mechanical Areas, CentraVac Unit | None Detected - Glass Foam<br>Layer Not Analyzed - Positive Stop<br>None Detected - Glass Fiber Wrap<br>Layer Not Analyzed - Positive Stop<br>None Detected - Cotton Wrap<br>None Detected - White Mastic |
| 10-28 | Sealant (White) / Tape on Air Return Duct, Building A - D, Basement Mechanical Area | None Detected - Thermal Insulation<br>None Detected - Foil Wrap<br>10% Chrysotile - White Mastic |
| 10-29 | Sealant (White) / Tape on Air Return Duct, Building A - D, Basement Mechanical Area | None Detected - Thermal Insulation<br>None Detected - Foil Wrap<br>Layer Not Analyzed - Positive Stop |
| 10-30 | Sealant (White) / Tape on Air Return Duct, Building A - D, Basement Mechanical Area | None Detected - Thermal Insulation<br>None Detected - Foil Wrap<br>Layer Not Analyzed - Positive Stop |
| 11-31 | Mastic (Brown) on Air Return Duct, Buildings A - D, Basement Mechanical Areas | None Detected - Tan Mastic |
| 11-32 | Mastic (Brown) on Air Return Duct, Buildings A - D, Basement Mechanical Areas | None Detected - Tan Mastic |
| 11-33 | Mastic (Brown) on Air Return Duct, Buildings A - D, Basement Mechanical Areas | None Detected - Tan Mastic |
| 12-34 | Drywall and Joint Compound, Building B | None Detected - Drywall Material<br>None Detected - Joint Compound |
| 12-35 | Drywall and Joint Compound, Building B | None Detected - Drywall Material<br>None Detected - Joint Compound |
| 12-36 | Drywall and Joint Compound, Building B | None Detected - Drywall Material<br>None Detected - Joint Compound |
| 13-37 | 12 x 12 Floor Tile (Beige Speckled) and Mastic, Building B | 3% Chrysotile - Floor Tile<br>5% Chrysotile - Black Mastic |
| 13-38 | 12 x 12 Floor Tile (Beige Speckled) and Mastic, Building B | Not Analyzed - Positive Stop |

Moody Labs

## PLM Summary Report

NVLAP Lab Code 102056-0
TDSHS License No. 300084

2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

| | | | |
|---|---|---|---|
| Client : | Terracon - Birmingham | Lab Job No. : | 22B-14185 |
| Project : | 4520 Executive Park Drive | Report Date : | 12/30/2022 |
| Project # : | E1227393 | Sample Date : | 12/20/2022 |
| Identification : | Asbestos, Bulk Sample Analysis | | |
| Test Method : | Polarized Light Microscopy / Dispersion Staining (PLM/DS)<br>EPA Method 600 / R-93 / 116 | | |

Page 4 of 12

On 12/27/2022, one hundred fifty eight (158) bulk material samples were submitted by Stephen Howard of Terracon - Birmingham for asbestos analysis by PLM/DS. The PLM Detail Report is attached; additional information may be found therein. The results are summarized below:

| Sample Number | Client Sample Description / Location | Asbestos Content |
|---|---|---|
| 13-39 | 12 x 12 Floor Tile (Beige Speckled) and Mastic, Building B | Not Analyzed - Positive Stop |
| 14-40 | 12 x 12 Floor Tile (Brown Speckled) and Mastic, Building B | None Detected - Floor Tile<br>None Detected - Yellow Mastic<br>5% Chrysotile - Black Mastic |
| 14-41 | 12 x 12 Floor Tile (Brown Speckled) and Mastic, Building B | None Detected - Floor Tile<br>None Detected - Yellow Mastic<br>Layer Not Analyzed - Positive Stop |
| 14-42 | 12 x 12 Floor Tile (Brown Speckled) and Mastic, Building B | None Detected - Floor Tile<br>None Detected - Yellow Mastic<br>Layer Not Analyzed - Positive Stop |
| 15-43 | Metal Sink Undercoating (Light Gray), Building B | 5% Chrysotile - Sink Undercoating |
| 15-44 | Metal Sink Undercoating (Light Gray), Building B | Not Analyzed - Positive Stop |
| 15-45 | Metal Sink Undercoating (Light Gray), Building B | Not Analyzed - Positive Stop |
| 16-46 | 2 x 4 Suspended Ceiling Tile, Building A and B | None Detected - Acoustic Tile |
| 16-47 | 2 x 4 Suspended Ceiling Tile, Building A and B | None Detected - Acoustic Tile |
| 16-48 | 2 x 4 Suspended Ceiling Tile, Building A and B | None Detected - Acoustic Tile |
| 17-49 | Fire Door Insulation, Buildings A and B | None Detected - Thermal Insulation |
| 17-50 | Fire Door Insulation, Buildings A and B | None Detected - Thermal Insulation |
| 17-51 | Fire Door Insulation, Buildings A and B | None Detected - Thermal Insulation |
| 18-52 | Cove Base (Tall, Black), Glue, Building B | None Detected - Cove Base<br>None Detected - Tan Mastic |
| 18-53 | Cove Base (Tall, Black), Glue, Building B | None Detected - Cove Base<br>None Detected - Tan Mastic |
| 18-54 | Cove Base (Tall, Black), Glue, Building B | None Detected - Cove Base<br>None Detected - Tan Mastic |

Moody Labs

## PLM Summary Report

NVLAP Lab Code 102056-0
TDSHS License No. 300084

2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

| | | | |
|---|---|---|---|
| Client : | Terracon - Birmingham | Lab Job No. : | 22B-14185 |
| Project : | 4520 Executive Park Drive | Report Date : | 12/30/2022 |
| Project # : | E1227393 | Sample Date : | 12/20/2022 |
| Identification : | Asbestos, Bulk Sample Analysis | | |
| Test Method : | Polarized Light Microscopy / Dispersion Staining (PLM/DS)<br>EPA Method 600 / R-93 / 116 | | |

Page 5 of 12

On 12/27/2022, one hundred fifty eight (158) bulk material samples were submitted by Stephen Howard of Terracon - Birmingham for asbestos analysis by PLM/DS. The PLM Detail Report is attached; additional information may be found therein. The results are summarized below:

| Sample Number | Client Sample Description / Location | Asbestos Content |
|---|---|---|
| 19-55 | 12 x 12 Floor Tile (Beige Speckled with Blue Specks) and Mastic, Building A | None Detected - Floor Tile<br>None Detected - Yellow Mastic |
| 19-56 | 12 x 12 Floor Tile (Beige Speckled with Blue Specks) and Mastic, Building A | None Detected - Floor Tile<br>None Detected - Yellow Mastic |
| 19-57 | 12 x 12 Floor Tile (Beige Speckled with Blue Specks) and Mastic, Building A | None Detected - Floor Tile<br>None Detected - Yellow Mastic |
| 20-58 | Duct Tape (White), Building A | None Detected - Duct Tape |
| 20-59 | Duct Tape (White), Building A | None Detected - Duct Tape |
| 20-60 | Duct Tape (White), Building A | None Detected - Duct Tape |
| 21-61 | Drywall and Joint Compound, Building A | None Detected - Drywall Material<br>None Detected - Joint Compound |
| 21-62 | Drywall and Joint Compound, Building A | None Detected - Drywall Material<br>None Detected - Joint Compound |
| 21-63 | Drywall and Joint Compound, Building A | None Detected - Drywall Material<br>None Detected - Joint Compound |
| 22-64 | Ceramic Tile Thinset, Building A and B, Bathrooms | None Detected - Ceramic Tile<br>None Detected - Grout<br>None Detected - Thinset |
| 22-65 | Ceramic Tile Thinset, Building A and B, Bathrooms | None Detected - Ceramic Tile<br>None Detected - Grout<br>None Detected - Thinset |
| 22-66 | Ceramic Tile Thinset, Building A and B, Bathrooms | None Detected - Ceramic Tile<br>None Detected - Grout<br>None Detected - Thinset |
| 23-67 | 12 x 12 Floor Tile (Brown Speckled) and Mastic, Building A | None Detected - Floor Tile<br>None Detected - Yellow Mastic<br>3% Chrysotile - Black Mastic |

Moody Labs

## PLM Summary Report

NVLAP Lab Code 102056-0
TDSHS License No. 300084

2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

| | | | |
|---|---|---|---|
| Client : | Terracon - Birmingham | Lab Job No. : | 22B-14185 |
| Project : | 4520 Executive Park Drive | Report Date : | 12/30/2022 |
| Project # : | E1227393 | Sample Date : | 12/20/2022 |
| Identification : | Asbestos, Bulk Sample Analysis | | |
| Test Method : | Polarized Light Microscopy / Dispersion Staining (PLM/DS)<br>EPA Method 600 / R-93 / 116 | | |

Page 6 of 12

On 12/27/2022, one hundred fifty eight (158) bulk material samples were submitted by Stephen Howard of Terracon - Birmingham for asbestos analysis by PLM/DS. The PLM Detail Report is attached; additional information may be found therein. The results are summarized below:

| Sample Number | Client Sample Description / Location | Asbestos Content |
|---|---|---|
| 24-68 | 12 x 12 Floor Tile (Brown Speckled) and Mastic, Building A | None Detected - Floor Tile<br>None Detected - Yellow Mastic<br>Layer Not Analyzed - Positive Stop |
| 23-69 | 12 x 12 Floor Tile (Brown Speckled) and Mastic, Building A | None Detected - Floor Tile<br>None Detected - Yellow Mastic<br>Layer Not Analyzed - Positive Stop |
| 24-70 | 12 x 12 Floor Tile (White Speckled) and Mastic, Building A | None Detected - Floor Tile<br>None Detected - Yellow Mastic<br>None Detected - Leveling Compound |
| 24-71 | 12 x 12 Floor Tile (White Speckled) and Mastic, Building A | None Detected - Floor Tile<br>None Detected - Yellow Mastic<br>None Detected - Leveling Compound |
| 24-72 | 12 x 12 Floor Tile (White Speckled) and Mastic, Building A | None Detected - Floor Tile<br>None Detected - Yellow Mastic<br>None Detected - Leveling Compound |
| 25-73 | 12 x 12 Floor Tile (Gray Speckled) and Mastic, Building A | None Detected - Floor Tile<br>None Detected - Yellow Mastic |
| 25-74 | 12 x 12 Floor Tile (Gray Speckled) and Mastic, Building A | None Detected - Floor Tile<br>None Detected - Yellow Mastic |
| 25-75 | 12 x 12 Floor Tile (Gray Speckled) and Mastic, Building A | None Detected - Floor Tile<br>None Detected - Yellow Mastic |
| 26-76 | Staircase Tread Glue, Building A - D | None Detected - Stair Tread<br>None Detected - Yellow Glue<br>None Detected - Brown Glue |
| 26-77 | Staircase Tread Glue, Building A - D | None Detected - Stair Tread<br>None Detected - Yellow Glue<br>None Detected - Brown Glue |
| 26-78 | Staircase Tread Glue, Building A - D | None Detected - Stair Tread<br>None Detected - Yellow Glue<br>None Detected - Brown Glue |

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## PLM Summary Report

NVLAP Lab Code 102056-0
TDSHS License No. 300084

2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

| | | | |
|---|---|---|---|
| Client : | Terracon - Birmingham | Lab Job No. : | 22B-14185 |
| Project : | 4520 Executive Park Drive | Report Date : | 12/30/2022 |
| Project # : | E1227393 | Sample Date : | 12/20/2022 |
| Identification : | Asbestos, Bulk Sample Analysis | | |
| Test Method : | Polarized Light Microscopy / Dispersion Staining (PLM/DS)<br>EPA Method 600 / R-93 / 116 | | |

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On 12/27/2022, one hundred fifty eight (158) bulk material samples were submitted by Stephen Howard of Terracon - Birmingham for asbestos analysis by PLM/DS. The PLM Detail Report is attached; additional information may be found therein. The results are summarized below:

| Sample Number | Client Sample Description / Location | Asbestos Content |
|---|---|---|
| 27-79 | Ceramic Tile Thinset, Buildings A and B, Bathrooms | None Detected - Ceramic Tile<br>None Detected - Orange Grout<br>None Detected - Brown Grout<br>None Detected - Thinset |
| 27-80 | Ceramic Tile Thinset, Buildings A and B, Bathrooms | None Detected - Ceramic Tile<br>None Detected - Orange Grout<br>None Detected - Brown Grout<br>None Detected - Thinset |
| 27-81 | Ceramic Tile Thinset, Buildings A and B, Bathrooms | None Detected - Ceramic Tile<br>None Detected - Orange Grout<br>None Detected - Brown Grout<br>None Detected - Thinset |
| 28-82 | 2 x 2 Suspended Ceiling Tile, Building A and B | None Detected - Acoustic Tile |
| 28-83 | 2 x 2 Suspended Ceiling Tile, Building A and B | None Detected - Acoustic Tile |
| 28-84 | 2 x 2 Suspended Ceiling Tile, Building A and B | None Detected - Acoustic Tile |
| 29-85 | Wood Parquet Flooring Glue, Building B | None Detected - Floor Glue<br>None Detected - Leveling Compound |
| 29-86 | Wood Parquet Flooring Glue, Building B | None Detected - Floor Glue<br>None Detected - Leveling Compound |
| 29-87 | Wood Parquet Flooring Glue, Building B | None Detected - Floor Glue<br>None Detected - Leveling Compound |
| 30-88 | 12 x 12 Floor Tile (Black) and Mastic, Building B | 3% Chrysotile - Floor Tile<br>5% Chrysotile - Black Mastic |
| 30-89 | 12 x 12 Floor Tile (Black) and Mastic, Building B | Layer Not Analyzed - Positive Stop<br>Layer Not Analyzed - Positive Stop |
| 30-90 | 12 x 12 Floor Tile (Black) and Mastic, Building B | Layer Not Analyzed - Positive Stop<br>Layer Not Analyzed - Positive Stop |
| 31-91 | Ceramic Tile Thinset, Building C and D, Bathrooms | None Detected - Ceramic Tile<br>None Detected - Cream Adhesive |

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## PLM Summary Report

NVLAP Lab Code 102056-0
TDSHS License No. 300084

2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

| | | | |
|---|---|---|---|
| Client : | Terracon - Birmingham | Lab Job No. : | 22B-14185 |
| Project : | 4520 Executive Park Drive | Report Date : | 12/30/2022 |
| Project # : | E1227393 | Sample Date : | 12/20/2022 |
| Identification : | Asbestos, Bulk Sample Analysis | | |
| Test Method : | Polarized Light Microscopy / Dispersion Staining (PLM/DS)<br>EPA Method 600 / R-93 / 116 | | |

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On 12/27/2022, one hundred fifty eight (158) bulk material samples were submitted by Stephen Howard of Terracon - Birmingham for asbestos analysis by PLM/DS. The PLM Detail Report is attached; additional information may be found therein. The results are summarized below:

| Sample Number | Client Sample Description / Location | Asbestos Content |
|---|---|---|
| 31-92 | Ceramic Tile Thinset, Building C and D, Bathrooms | None Detected - Ceramic Tile<br>None Detected - Cream Adhesive |
| 31-93 | Ceramic Tile Thinset, Building C and D, Bathrooms | None Detected - Ceramic Tile<br>None Detected - Cream Adhesive |
| 33-97 | 2 x 2 Suspended Ceiling Tile, Building C and D | None Detected - Acoustic Tile |
| 33-98 | 2 x 2 Suspended Ceiling Tile, Building C and D | None Detected - Acoustic Tile |
| 33-99 | 2 x 2 Suspended Ceiling Tile, Building C and D | None Detected - Acoustic Tile |
| 34-100 | Sealant (White) on HVAC Foil Duct Insulation Wrap, Building C and D | None Detected - Thermal Insulation<br>None Detected - Paper / Foil Wrap<br>None Detected - Sealant |
| 34-101 | Sealant (White) on HVAC Foil Duct Insulation Wrap, Building C and D | None Detected - Paper / Foil Wrap<br>None Detected - Sealant |
| 34-102 | Sealant (White) on HVAC Foil Duct Insulation Wrap, Building C and D | None Detected - Thermal Insulation<br>None Detected - Paper / Foil Wrap<br>None Detected - Sealant |
| 35-103 | Cove Base (Brown), Glue, Building C and D | None Detected - Cove Base<br>None Detected - Yellow Glue |
| 35-104 | Cove Base (Brown), Glue, Building C and D | None Detected - Cove Base<br>None Detected - Yellow Glue |
| 35-105 | Cove Base (Brown), Glue, Building C and D | None Detected - Cove Base<br>None Detected - Yellow Glue |
| 36-106 | 2 x 2 Elevated Floor Panels, Building D, Server Room | None Detected - Laminate<br>None Detected - Yellow Mastic |
| 36-107 | 2 x 2 Elevated Floor Panels, Building D, Server Room | None Detected - Laminate<br>None Detected - Yellow Mastic |
| 36-108 | 2 x 2 Elevated Floor Panels, Building D, Server Room | None Detected - Laminate<br>None Detected - Yellow Mastic |

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## PLM Summary Report

NVLAP Lab Code 102056-0
TDSHS License No. 300084

2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

| | | | |
|---|---|---|---|
| Client : | Terracon - Birmingham | Lab Job No. : | 22B-14185 |
| Project : | 4520 Executive Park Drive | Report Date : | 12/30/2022 |
| Project # : | E1227393 | Sample Date : | 12/20/2022 |
| Identification : | Asbestos, Bulk Sample Analysis | | |
| Test Method : | Polarized Light Microscopy / Dispersion Staining (PLM/DS)<br>EPA Method 600 / R-93 / 116 | | |

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On 12/27/2022, one hundred fifty eight (158) bulk material samples were submitted by Stephen Howard of Terracon - Birmingham for asbestos analysis by PLM/DS. The PLM Detail Report is attached; additional information may be found therein. The results are summarized below:

| Sample Number | Client Sample Description / Location | Asbestos Content |
|---|---|---|
| 37-109 | 12 x 12 Floor Tile (Beige Speckled) and Mastic, Building D, West Stairwell Landing | None Detected - Floor Tile<br>None Detected - Yellow Mastic<br>None Detected - Black Mastic |
| 37-110 | 12 x 12 Floor Tile (Beige Speckled) and Mastic, Building D, West Stairwell Landing | None Detected - Floor Tile<br>None Detected - Yellow Mastic<br>None Detected - Black Mastic |
| 37-111 | 12 x 12 Floor Tile (Beige Speckled) and Mastic, Building D, West Stairwell Landing | None Detected - Floor Tile<br>None Detected - Yellow Mastic<br>None Detected - Black Mastic |
| 38-112 | 12 x 12 Floor Tile (Brown Speckled) and Mastic, Building D, East Stairwell Landing | 5% Chrysotile - Floor Tile<br>None Detected - Yellow Mastic<br>5% Chrysotile - Black Mastic |
| 38-113 | 12 x 12 Floor Tile (Brown Speckled) and Mastic, Building D, East Stairwell Landing | Layer Not Analyzed - Positive Stop<br>None Detected - Yellow Mastic<br>Layer Not Analyzed - Positive Stop |
| 38-114 | 12 x 12 Floor Tile (Brown Speckled) and Mastic, Building D, East Stairwell Landing | Layer Not Analyzed - Positive Stop<br>None Detected - Yellow Mastic<br>Layer Not Analyzed - Positive Stop |
| 39-115 | Interior Plate Glass Window Caulk, Building D | 5% Chrysotile - Caulking |
| 39-116 | Interior Plate Glass Window Caulk, Building D | Not Analyzed - Positive Stop |
| 39-117 | Interior Plate Glass Window Caulk, Building D | Not Analyzed - Positive Stop |
| 40-118 | Drywall and Joint Compound, Building D | None Detected - Drywall Material<br>None Detected - Joint Compound |
| 40-119 | Drywall and Joint Compound, Building D | None Detected - Drywall Material<br>None Detected - Joint Compound |
| 40-120 | Drywall and Joint Compound, Building D | None Detected - Drywall Material<br>None Detected - Joint Compound |
| 41-121 | 2 x 2 Suspended Ceiling Tile (Rough Finish), Building D | None Detected - Acoustic Tile |

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## PLM Summary Report

NVLAP Lab Code 102056-0
TDSHS License No. 300084

2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

| | | | |
|---|---|---|---|
| Client : | Terracon - Birmingham | Lab Job No. : | 22B-14185 |
| Project : | 4520 Executive Park Drive | Report Date : | 12/30/2022 |
| Project # : | E1227393 | Sample Date : | 12/20/2022 |
| Identification : | Asbestos, Bulk Sample Analysis | | |
| Test Method : | Polarized Light Microscopy / Dispersion Staining (PLM/DS)<br>EPA Method 600 / R-93 / 116 | | |

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On 12/27/2022, one hundred fifty eight (158) bulk material samples were submitted by Stephen Howard of Terracon - Birmingham for asbestos analysis by PLM/DS. The PLM Detail Report is attached; additional information may be found therein. The results are summarized below:

| Sample Number | Client Sample Description / Location | Asbestos Content |
|---|---|---|
| 41-122 | 2 x 2 Suspended Ceiling Tile (Rough Finish), Building D | None Detected - Acoustic Tile |
| 42-123 | 2 x 2 Suspended Ceiling Tile (Rough Finish), Building D | None Detected - Acoustic Tile |
| 42-124 | 1 x 1 Acoustical Ceiling Tile (Rough Finish), Building D | None Detected - Acoustic Tile |
| 42-125 | 1 x 1 Acoustical Ceiling Tile (Rough Finish), Building D | None Detected - Acoustic Tile |
| 42-126 | 1 x 1 Acoustical Ceiling Tile (Rough Finish), Building D | None Detected - Acoustic Tile |
| 43-127 | 1 x 1 Acoustical Ceiling Tile (Fissures), Building C | No Acoustic Tile<br>None Detected - Paper / Foil Wrap<br>5% Chrysotile - Tar Wrap |
| 43-128 | 1 x 1 Acoustical Ceiling Tile (Fissures), Building C | No Acoustic Tile<br>None Detected - Paper / Foil Wrap<br>Layer Not Analyzed - Positive Stop |
| 43-129 | 1 x 1 Acoustical Ceiling Tile (Fissures), Building C | No Acoustic Tile<br>None Detected - Paper / Foil Wrap<br>Layer Not Analyzed - Positive Stop |
| 44-130 | Firestop Caulk on HVAC Duct Insulation Wrap, Building C | None Detected - Caulking |
| 44-131 | Firestop Caulk on HVAC Duct Insulation Wrap, Building C | None Detected - Caulking |
| 11-132 | Firestop Caulk on HVAC Duct Insulation Wrap, Building C | None Detected - Caulking |
| 45-133- | Interior Plate Glass Window Caulk, Building C | 2% Chrysotile - Caulking |
| 45-134 | Interior Plate Glass Window Caulk, Building C | Not Analyzed - Positive Stop |
| 45-135 | Interior Plate Glass Window Caulk, Building C | Not Analyzed - Positive Stop |
| 46-136 | 2 x 2 Suspended Ceiling Tile (Rough Finish), Building D | None Detected - Acoustic Tile |
| 46-137 | 2 x 2 Suspended Ceiling Tile (Rough Finish), Building D | None Detected - Acoustic Tile |
| 46-138 | 2 x 2 Suspended Ceiling Tile (Rough Finish), Building D | None Detected - Acoustic Tile |
| 47-139 | Drywall and Joint Compound, Building C | None Detected - Drywall Material<br>2% Chrysotile - Joint Compound |

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## PLM Summary Report

NVLAP Lab Code 102056-0
TDSHS License No. 300084

2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

| | | | |
|---|---|---|---|
| Client : | Terracon - Birmingham | Lab Job No. : | 22B-14185 |
| Project : | 4520 Executive Park Drive | Report Date : | 12/30/2022 |
| Project # : | E1227393 | Sample Date : | 12/20/2022 |
| Identification : | Asbestos, Bulk Sample Analysis | | |
| Test Method : | Polarized Light Microscopy / Dispersion Staining (PLM/DS)<br>EPA Method 600 / R-93 / 116 | | |

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On 12/27/2022, one hundred fifty eight (158) bulk material samples were submitted by Stephen Howard of Terracon - Birmingham for asbestos analysis by PLM/DS. The PLM Detail Report is attached; additional information may be found therein. The results are summarized below:

| Sample Number | Client Sample Description / Location | Asbestos Content |
|---|---|---|
| 47-140 | Drywall and Joint Compound, Building C | None Detected - Drywall Material<br>Layer Not Analyzed - Positive Stop |
| 47-141 | Drywall and Joint Compound, Building C | None Detected - Drywall Material<br>Layer Not Analyzed - Positive Stop |
| 48-142 | Acoustic Texture on Wall and Ceiling, Building C, Lobby | 3% Chrysotile - Acoustic Texture |
| 48-143 | Acoustic Texture on Wall and Ceiling, Building C, Lobby | Not Analyzed - Positive Stop |
| 48-144 | Acoustic Texture on Wall and Ceiling, Building C, Lobby | Not Analyzed - Positive Stop |
| 48-145 | Acoustic Texture on Wall and Ceiling, Building C, Lobby | Not Analyzed - Positive Stop |
| 48-146 | Acoustic Texture on Wall and Ceiling, Building C, Lobby | Not Analyzed - Positive Stop |
| 49-147 | Exterior Wall Base Flashing, Building C and D | None Detected - Flashing<br>None Detected - Felt |
| 49-148 | Exterior Wall Base Flashing, Building C and D | None Detected - Flashing<br>None Detected - Felt |
| 49-149 | Exterior Wall Base Flashing, Building C and D | None Detected - Flashing<br>None Detected - Felt |
| 50-150 | Exterior Building Caulk, Buildings C and D | None Detected - Caulking |
| 50-151 | Exterior Building Caulk, Buildings C and D | None Detected - Caulking |
| 50-152 | Exterior Building Caulk, Buildings C and D | None Detected - Caulking |
| 51-153 | Exterior Window Caulk (Metal-Frame), Building C and D | None Detected - Caulking 1<br>None Detected - Caulking 2 |
| 51-154 | Exterior Window Caulk (Metal-Frame), Building C and D | None Detected - Caulking 1<br>None Detected - Caulking 2 |
| 51-155 | Exterior Window Caulk (Metal-Frame), Building C and D | None Detected - Caulking |
| 52-156 | Interior Window Caulk (Metal-Frame), Building C and D. Entrances | None Detected - Caulking |

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# PLM Summary Report

NVLAP Lab Code 102056-0
TDSHS License No. 300084

2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

| | | | |
|---|---|---|---|
| Client : | Terracon - Birmingham | Lab Job No. : | 22B-14185 |
| Project : | 4520 Executive Park Drive | Report Date : | 12/30/2022 |
| Project # : | E1227393 | Sample Date : | 12/20/2022 |
| Identification : | Asbestos, Bulk Sample Analysis | | |
| Test Method : | Polarized Light Microscopy / Dispersion Staining (PLM/DS)<br>EPA Method 600 / R-93 / 116 | | |

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On 12/27/2022, one hundred fifty eight (158) bulk material samples were submitted by Stephen Howard of Terracon - Birmingham for asbestos analysis by PLM/DS. The PLM Detail Report is attached; additional information may be found therein. The results are summarized below:

| Sample Number | Client Sample Description / Location | Asbestos Content |
|---|---|---|
| 52-157 | Interior Window Caulk (Metal-Frame), Building C and D. Entrances | None Detected - Caulking |
| 52-158 | Interior Window Caulk (Metal-Frame), Building C and D. Entrances | None Detected - Caulking |
| 53-159 | Exterior Window Caulk (Metal-Frame), Building C and D, Entrances | None Detected - Caulking |
| 53-160 | Exterior Window Caulk (Metal-Frame), Building C and D, Entrances | None Detected - Caulking |
| 53-161 | Exterior Window Caulk (Metal-Frame), Building C and D, Entrances | None Detected - Caulking |

These samples were analyzed by layers. Quantification, unless otherwise noted, is performed by calibrated visual estimate. The test report shall not be reproduced except in full without written approval of the laboratory. The results relate only to the items tested. These test results do not imply endorsement by NVLAP or any agency of the U.S. Government. Accredited by the National Voluntary Laboratory Accreditation Program for Bulk Asbestos Fiber Analysis under Lab Code 102056-0.

NVLAP Testing NVLAP Lab Code 102056-0

Analyst(s): Brian R. Schmidt, Clayton Koop, Debra O'Sullivan, Shaun Wilkerson

Lab Manager : Heather Lopez Approved Signatory : Heather Lopez

Lab Director : Bruce Crabb Approved Signatory : Bruce Crabb

Thank you for choosing Moody Labs

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**PLM Detail Report**
**Supplement to PLM Summary Report**

NVLAP Lab Code 102056-0
TDSHS License No. 300084

Client : Terracon - Birmingham
Project : 4520 Executive Park Drive
Project # : E1227393

Lab Job No. : 22B-14185
Report Date : 12/30/2022

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| Sample Number | Layer | % Of Sample | Components | % of Layer | Analysis Date | Analyst |
|---|---|---|---|---|---|---|
| 1-1 | Acoustic Tile (Light Grey) | 100% | Mineral Wool Fibers | 75% | 12/30 | CK |
| | | | Cellulose Fibers | 25% | | |
| 1-2 | Acoustic Tile (Light Grey) | 100% | Mineral Wool Fibers | 75% | 12/30 | CK |
| | | | Cellulose Fibers | 25% | | |
| 1-3 | Acoustic Tile (Light Grey) | 100% | Mineral Wool Fibers | 75% | 12/30 | CK |
| | | | Cellulose Fibers | 25% | | |
| 2-4 | Cove Base (Brown) | 95% | Vinyl Binders | 100% | 12/30 | CK |
| | Yellow Glue (Yellow) | 3% | Calcite | 40% | | |
| | | | Glue Binders | 60% | | |
| | Brown Glue (Brown) | 2% | Glue Binders | 100% | | |
| 2-5 | Cove Base (Brown) | 95% | Vinyl Binders | 100% | 12/30 | CK |
| | Yellow Glue (Yellow) | 5% | Calcite | 40% | | |
| | | | Glue Binders | 60% | | |
| 2-6 | Cove Base (Brown) | 97% | Vinyl Binders | 100% | 12/30 | CK |
| | Yellow Glue (Yellow) | 2% | Calcite | 40% | | |
| | | | Glue Binders | 60% | | |
| | Brown Glue (Brown) | 1% | Glue Binders | 100% | | |
| 3-7 | Caulking (Black) | 100% | Chrysotile | 5% | 12/30 | CK |
| | | | Calcite | 50% | | |
| | | | Binders / Fillers | 45% | | |
| 3-8 | Not Analyzed - Positive Stop | 100% | | | 12/30 | CK |
| 3-9 | Not Analyzed - Positive Stop | 100% | | | 12/30 | CK |
| 4-10 | Caulking (Brown) | 100% | Glass Wool Fibers | 5% | 12/30 | CK |
| | | | Calcite | 50% | | |
| | | | Binders / Fillers | 45% | | |
| 4-11 | Caulking (Brown) | 100% | Glass Wool Fibers | 5% | 12/30 | CK |
| | | | Calcite | 50% | | |
| | | | Binders / Fillers | 45% | | |

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**PLM Detail Report**
**Supplement to PLM Summary Report**

NVLAP Lab Code 102056-0
TDSHS License No. 300084

Client : Terracon - Birmingham
Project : 4520 Executive Park Drive
Project # : E1227393

Lab Job No. : 22B-14185
Report Date : 12/30/2022



| Sample Number | Layer | % Of Sample | Components | % of Layer | Analysis Date | Analyst |
|---|---|---|---|---|---|---|
| 4-12 | Caulking (Brown) | 100% | Glass Wool Fibers | 5% | 12/30 | CK |
| | | | Calcite | 50% | | |
| | | | Binders / Fillers | 45% | | |
| 5-13 | Yellow Glue (Yellow) | 100% | Glue Binders | 100% | 12/30 | CK |
| 5-14 | Yellow Glue (Yellow) | 100% | Glue Binders | 100% | 12/30 | CK |
| 5-15 | Yellow Glue (Yellow) | 100% | Glue Binders | 100% | 12/30 | CK |
| 6-16 | Drywall Material (White) | 75% | Glass Wool Fibers | 2% | 12/30 | CK |
| | | | Cellulose Fibers | 1% | | |
| | | | Gypsum / Binders | 97% | | |
| | DW Paper / Tape (Tan / White) | 20% | Cellulose Fibers | 100% | | |
| | Joint Compound (White) | 5% | Calcite / Talc / Binders | 100% | | |
| 6-17 | Drywall Material (White) | 70% | Glass Wool Fibers | 2% | 12/30 | CK |
| | | | Cellulose Fibers | 1% | | |
| | | | Gypsum / Binders | 97% | | |
| | DW Paper / Tape (Tan / White) | 25% | Cellulose Fibers | 100% | | |
| | Joint Compound (White) | 5% | Calcite / Talc / Binders | 100% | | |
| 6-18 | Drywall Material (White) | 70% | Glass Wool Fibers | 2% | 12/30 | CK |
| | | | Cellulose Fibers | 1% | | |
| | | | Gypsum / Binders | 97% | | |
| | DW Paper / Tape (Tan / White) | 25% | Cellulose Fibers | 100% | | |
| | Joint Compound (White) | 5% | Calcite / Talc / Binders | 100% | | |
| 7-19 | Duct Seam Tape (White) | 100% | Cotton Fibers | 75% | 12/30 | CK |
| | | | Binders / Fillers | 25% | | |
| 7-20 | Duct Seam Tape (White) | 100% | Cotton Fibers | 75% | 12/30 | CK |
| | | | Binders / Fillers | 25% | | |
| 7-21 | Duct Seam Tape (White) | 100% | Cotton Fibers | 75% | 12/30 | CK |
| | | | Binders / Fillers | 25% | | |

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**PLM Detail Report**
**Supplement to PLM Summary Report**

NVLAP Lab Code 102056-0
TDSHS License No. 300084

Client : Terracon - Birmingham
Project : 4520 Executive Park Drive
Project # : E1227393

Lab Job No. : 22B-14185
Report Date : 12/30/2022

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| Sample Number | Layer | % Of Sample | Components | % of Layer | Analysis Date | Analyst |
|---|---|---|---|---|---|---|
| 8-22 | Thermal Insulation (Yellow) | 50% | Mineral Wool Fibers | 95% | 12/30 | CK |
| | | | Resin Binders | 5% | | |
| | Paper / Foil Wrap (White / Silver) | 20% | Cellulose Fibers | 60% | | |
| | | | Glass Wool Fibers | 20% | | |
| | | | Metal Foil | 20% | | |
| | Sealant (White) | 30% | Chrysotile | 10% | | |
| | | | Binders / Fillers | 90% | | |
| 8-23 | No Thermal Insulation | | | | 12/30 | CK |
| | Paper / Foil Wrap (White / Silver) | 65% | Cellulose Fibers | 60% | | |
| | | | Glass Wool Fibers | 20% | | |
| | | | Metal Foil | 20% | | |
| | Layer Not Analyzed - Positive Stop | 35% | | | | |
| 8-24 | Thermal Insulation (Yellow) | 40% | Mineral Wool Fibers | 95% | 12/30 | CK |
| | | | Resin Binders | 5% | | |
| | Paper / Foil Wrap (White / Silver) | 40% | Cellulose Fibers | 60% | | |
| | | | Glass Wool Fibers | 20% | | |
| | | | Metal Foil | 20% | | |
| | Layer Not Analyzed - Positive Stop | 20% | | | | |
| 9-25 | Glass Foam (Black) | 10% | Glass Foam | 100% | 12/30 | CK |
| | Black Mastic (Black) | 5% | Chrysotile | 5% | | |
| | | | Tar Binders | 95% | | |
| | Glass Fiber Wrap (White) | 10% | Glass Wool Fibers | 100% | | |
| | Thermal Insulation (Off-White) | 25% | Chrysotile | 65% | | |
| | | | Binders / Fillers | 35% | | |
| | Cotton Wrap (Off-White) | 45% | Cotton Fibers | 100% | | |
| | White Mastic (White) | 5% | Cellulose Fibers | 5% | | |
| | | | Binders / Fillers | 95% | | |

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**PLM Detail Report**
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TDSHS License No. 300084

Client : Terracon - Birmingham
Project : 4520 Executive Park Drive
Project # : E1227393

Lab Job No. : 22B-14185
Report Date : 12/30/2022



| Sample Number | Layer | % Of Sample | Components | % of Layer | Analysis Date | Analyst |
|---|---|---|---|---|---|---|
| 9-26 | Glass Foam (Black) | 10% | Glass Foam | 100% | 12/30 | CK |
| | Layer Not Analyzed - Positive Stop | 5% | | | | |
| | Glass Fiber Wrap (White) | 5% | Glass Wool Fibers | 100% | | |
| | Layer Not Analyzed - Positive Stop | 35% | | | | |
| | Cotton Wrap (Off-White) | 40% | Cotton Fibers | 100% | | |
| | White Mastic (White) | 5% | Cellulose Fibers | 5% | | |
| | | | Binders / Fillers | 95% | | |
| 9-27 | Glass Foam (Black) | 5% | Glass Foam | 100% | 12/30 | CK |
| | Layer Not Analyzed - Positive Stop | 5% | | | | |
| | Glass Fiber Wrap (White) | 5% | Glass Wool Fibers | 100% | | |
| | Layer Not Analyzed - Positive Stop | 45% | | | | |
| | Cotton Wrap (Off-White) | 35% | Cotton Fibers | 100% | | |
| | White Mastic (White) | 5% | Cellulose Fibers | 5% | | |
| | | | Binders / Fillers | 95% | | |
| 10-28 | Thermal Insulation (Yellow) | 2% | Mineral Wool Fibers | 95% | 12/30 | CK |
| | | | Resin Binders | 5% | | |
| | Foil Wrap (White / Silver) | 85% | Glass Wool Mesh | 80% | | |
| | | | Metal Foil | 20% | | |
| | White Mastic (White) | 13% | Chrysotile | 10% | | |
| | | | Binders / Fillers | 90% | | |
| 10-29 | Thermal Insulation (Yellow) | 3% | Mineral Wool Fibers | 95% | 12/30 | CK |
| | | | Resin Binders | 5% | | |
| | Foil Wrap (White / Silver) | 85% | Glass Wool Mesh | 80% | | |
| | | | Metal Foil | 20% | | |
| | Layer Not Analyzed - Positive Stop | 12% | | | | |
| 10-30 | Thermal Insulation (Yellow) | <1% | Mineral Wool Fibers | 95% | 12/30 | CK |
| | | | Resin Binders | 5% | | |
| | Foil Wrap (White / Silver) | 85% | Glass Wool Mesh | 80% | | |
| | | | Metal Foil | 20% | | |
| | Layer Not Analyzed - Positive Stop | 15% | | | | |

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**PLM Detail Report**
**Supplement to PLM Summary Report**

NVLAP Lab Code 102056-0
TDSHS License No. 300084

Client : Terracon - Birmingham
Project : 4520 Executive Park Drive
Project # : E1227393

Lab Job No. : 22B-14185
Report Date : 12/30/2022



| Sample Number | Layer | % Of Sample | Components | % of Layer | Analysis Date | Analyst |
|---|---|---|---|---|---|---|
| 11-31 | Tan Mastic (Tan) | 100% | Glue Binders | 100% | 12/30 | CK |
| 11-32 | Tan Mastic (Tan) | 100% | Glue Binders | 100% | 12/30 | CK |
| 11-33 | Tan Mastic (Tan) | 100% | Glue Binders | 100% | 12/30 | CK |
| 12-34 | Drywall Material (Tan) | 65% | Glass Wool Fibers | 2% | 12/30 | CK |
| | | | Cellulose Fibers | 1% | | |
| | | | Gypsum / Binders | 97% | | |
| | DW Paper Facing (Tan) | 20% | Cellulose Fibers | 100% | | |
| | Joint Compound (Off-White) | 15% | Calcite / Talc / Binders | 100% | | |
| 12-35 | Drywall Material (Tan) | 70% | Glass Wool Fibers | 2% | 12/30 | CK |
| | | | Cellulose Fibers | 1% | | |
| | | | Gypsum / Binders | 97% | | |
| | DW Paper Facing (Tan) | 20% | Cellulose Fibers | 100% | | |
| | Joint Compound (Off-White) | 10% | Calcite / Talc / Binders | 100% | | |
| 12-36 | Drywall Material (Tan) | 80% | Glass Wool Fibers | 2% | 12/30 | CK |
| | | | Cellulose Fibers | 1% | | |
| | | | Gypsum / Binders | 97% | | |
| | DW Paper Facing (Tan) | 15% | Cellulose Fibers | 100% | | |
| | Joint Compound (Off-White) | 5% | Calcite / Talc / Binders | 100% | | |
| 13-37 | Floor Tile (Off-White) | 97% | Chrysotile | 3% | 12/30 | CK |
| | | | Calcite / Vinyl Binders | 97% | | |
| | Black Mastic (Black) | 3% | Chrysotile | 5% | | |
| | | | Tar Binders | 95% | | |
| 13-38 | Not Analyzed - Positive Stop | 100% | | | 12/30 | CK |
| 13-39 | Not Analyzed - Positive Stop | 100% | | | 12/30 | CK |
| 14-40 | Floor Tile (Beige) | 99% | Calcite / Vinyl Binders | 100% | 12/30 | CK |
| | Yellow Mastic (Yellow) | <1% | Glue Binders | 100% | | |
| | Black Mastic (Black) | 1% | Chrysotile | 5% | | |
| | | | Tar Binders | 95% | | |
| | | | | | | |

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Client : Terracon - Birmingham
Project : 4520 Executive Park Drive
Project # : E1227393

Lab Job No. : 22B-14185
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| Sample Number | Layer | % Of Sample | Components | % of Layer | Analysis Date | Analyst |
|---|---|---|---|---|---|---|
| 14-41 | Floor Tile (Beige) | 100% | Calcite / Vinyl Binders | 100% | 12/30 | CK |
| | Yellow Mastic (Yellow) | <1% | Glue Binders | 100% | | |
| | Layer Not Analyzed - Positive Stop | <1% | | | | |
| 14-42 | Floor Tile (Beige) | 98% | Calcite / Vinyl Binders | 100% | 12/30 | CK |
| | Yellow Mastic (Yellow) | <1% | Glue Binders | 100% | | |
| | Layer Not Analyzed - Positive Stop | 2% | | | | |
| 15-43 | Sink Undercoating (Purple) | 100% | Chrysotile | 5% | 12/30 | SW |
| | | | Calcite / Talc | 40% | | |
| | | | Binders / Fillers | 55% | | |
| 15-44 | Not Analyzed - Positive Stop | 100% | | | 12/30 | SW |
| 15-45 | Not Analyzed - Positive Stop | 100% | | | 12/30 | SW |
| 16-46 | Acoustic Tile (Light Tan) | 100% | Cellulose Fibers | 50% | 12/30 | SW |
| | | | Mineral Wool Fibers | 30% | | |
| | | | Perlite | 20% | | |
| 16-47 | Acoustic Tile (Light Tan) | 100% | Cellulose Fibers | 50% | 12/30 | SW |
| | | | Mineral Wool Fibers | 30% | | |
| | | | Perlite | 20% | | |
| 16-48 | Acoustic Tile (Light Tan) | 100% | Cellulose Fibers | 50% | 12/30 | SW |
| | | | Mineral Wool Fibers | 30% | | |
| | | | Perlite | 20% | | |
| 17-49 | Thermal Insulation (White) | 100% | Glass Wool Fibers | 10% | 12/30 | SW |
| | | | Perlite | 85% | | |
| | | | Binders / Fillers | 5% | | |
| 17-50 | Thermal Insulation (White) | 100% | Glass Wool Fibers | 10% | 12/30 | SW |
| | | | Perlite | 85% | | |
| | | | Binders / Fillers | 5% | | |
| 17-51 | Thermal Insulation (White) | 100% | Glass Wool Fibers | 10% | 12/30 | SW |
| | | | Perlite | 85% | | |
| | | | Binders / Fillers | 5% | | |

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| Sample Number | Layer | % Of Sample | Components | % of Layer | Analysis Date | Analyst |
|---|---|---|---|---|---|---|
| 18-52 | Cove Base (Black) | 95% | Vinyl Binders | 100% | 12/30 | SW |
| | Tan Mastic (Tan) | 5% | Glue Binders | 100% | | |
| 18-53 | Cove Base (Black) | 95% | Vinyl Binders | 100% | 12/30 | SW |
| | Tan Mastic (Tan) | 5% | Glue Binders | 100% | | |
| 18-54 | Cove Base (Black) | 95% | Vinyl Binders | 100% | 12/30 | SW |
| | Tan Mastic (Tan) | 5% | Glue Binders | 100% | | |
| 19-55 | Floor Tile (Beige) | 99% | Calcite / Vinyl Binders | 100% | 12/30 | SW |
| | Yellow Mastic (Yellow) | 1% | Glue Binders | 100% | | |
| 19-56 | Floor Tile (Beige) | 99% | Calcite / Vinyl Binders | 100% | 12/30 | SW |
| | Yellow Mastic (Yellow) | 1% | Glue Binders | 100% | | |
| 19-57 | Floor Tile (Beige) | 99% | Calcite / Vinyl Binders | 100% | 12/30 | SW |
| | Yellow Mastic (Yellow) | 1% | Glue Binders | 100% | | |
| 20-58 | Duct Tape (White) | 100% | Cotton Fibers | 25% | 12/30 | SW |
| | | | Vinyl Binders | 50% | | |
| | | | Glue Binders | 25% | | |
| 20-59 | Duct Tape (White) | 100% | Cotton Fibers | 25% | 12/30 | SW |
| | | | Vinyl Binders | 50% | | |
| | | | Glue Binders | 25% | | |
| 20-60 | Duct Tape (White) | 100% | Cotton Fibers | 25% | 12/30 | SW |
| | | | Vinyl Binders | 50% | | |
| | | | Glue Binders | 25% | | |
| 21-61 | Drywall Material (White) | 70% | Glass Wool Fibers | 2% | 12/30 | SW |
| | | | Cellulose Fibers | 1% | | |
| | | | Gypsum / Binders | 97% | | |
| | DW Paper / Tape (Tan / White) | 10% | Cellulose Fibers | 100% | | |
| | Joint Compound (White) | 20% | Calcite / Talc / Binders | 100% | | |

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Lab Job No. : 22B-14185
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| Sample Number | Layer | % Of Sample | Components | % of Layer | Analysis Date | Analyst |
|---|---|---|---|---|---|---|
| 21-62 | Drywall Material (White) | 80% | Glass Wool Fibers | 2% | 12/30 | SW |
| | | | Cellulose Fibers | 1% | | |
| | | | Gypsum / Binders | 97% | | |
| | DW Paper / Tape (Tan / White) | 10% | Cellulose Fibers | 100% | | |
| | Joint Compound (White) | 10% | Calcite / Talc / Binders | 100% | | |
| 21-63 | Drywall Material (White) | 80% | Glass Wool Fibers | 2% | 12/30 | SW |
| | | | Cellulose Fibers | 1% | | |
| | | | Gypsum / Binders | 97% | | |
| | DW Paper / Tape (Tan / White) | 10% | Cellulose Fibers | 100% | | |
| | Joint Compound (White) | 10% | Calcite / Talc / Binders | 100% | | |
| 22-64 | Ceramic Tile (Tan) | 75% | Sintered Clays | 100% | 12/30 | SW |
| | Grout (Tan) | 5% | Aggregate | 65% | | |
| | | | Cement Binders | 35% | | |
| | Thinset (Gray) | 10% | Aggregate | 65% | | |
| | | | Cement Binders | 35% | | |
| | Joint Compound (White) | 10% | Calcite / Talc / Binders | 100% | | |
| 22-65 | Ceramic Tile (Tan) | 70% | Sintered Clays | 100% | 12/30 | SW |
| | Grout (Tan) | 10% | Aggregate | 65% | | |
| | | | Cement Binders | 35% | | |
| | Thinset (Gray) | 10% | Aggregate | 65% | | |
| | | | Cement Binders | 35% | | |
| | Joint Compound (White) | 10% | Calcite / Talc / Binders | 100% | | |
| 22-66 | Ceramic Tile (Tan) | 75% | Sintered Clays | 100% | 12/30 | SW |
| | Grout (Tan) | 5% | Aggregate | 65% | | |
| | | | Cement Binders | 35% | | |
| | Thinset (Gray) | 10% | Aggregate | 65% | | |
| | | | Cement Binders | 35% | | |
| | Joint Compound (White) | 10% | Calcite / Talc / Binders | 100% | | |

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| Sample Number | Layer | % Of Sample | Components | % of Layer | Analysis Date | Analyst |
|---|---|---|---|---|---|---|
| 23-67 | Floor Tile (Brown) | 98% | Calcite / Vinyl Binders | 100% | 12/30 | SW |
| | Yellow Mastic (Yellow) | 1% | Glue Binders | 100% | | |
| | Black Mastic (Black) | 1% | Chrysotile | 3% | | |
| | | | Tar Binders | 97% | | |
| 24-68 | Floor Tile (Brown) | 98% | Calcite / Vinyl Binders | 100% | 12/30 | SW |
| | Yellow Mastic (Yellow) | 1% | Glue Binders | 100% | | |
| | Layer Not Analyzed - Positive Stop | 1% | | | | |
| 23-69 | Floor Tile (Brown) | 98% | Calcite / Vinyl Binders | 100% | 12/30 | SW |
| | Yellow Mastic (Yellow) | 1% | Glue Binders | 100% | | |
| | Layer Not Analyzed - Positive Stop | 1% | | | | |
| 24-70 | Floor Tile (White) | 90% | Calcite / Vinyl Binders | 100% | 12/30 | SW |
| | Yellow Mastic (Yellow) | 5% | Glue Binders | 100% | | |
| | Leveling Compound (White) | 5% | Calcite / Binders | 100% | | |
| 24-71 | Floor Tile (White) | 90% | Calcite / Vinyl Binders | 100% | 12/30 | SW |
| | Yellow Mastic (Yellow) | 5% | Glue Binders | 100% | | |
| | Leveling Compound (White) | 5% | Calcite / Binders | 100% | | |
| 24-72 | Floor Tile (White) | 90% | Calcite / Vinyl Binders | 100% | 12/30 | SW |
| | Yellow Mastic (Yellow) | 5% | Glue Binders | 100% | | |
| | Leveling Compound (White) | 5% | Calcite / Binders | 100% | | |
| 25-73 | Floor Tile (Gray) | 95% | Calcite / Vinyl Binders | 100% | 12/30 | SW |
| | Yellow Mastic (Yellow) | 5% | Glue Binders | 100% | | |
| 25-74 | Floor Tile (Gray) | 95% | Calcite / Vinyl Binders | 100% | 12/30 | SW |
| | Yellow Mastic (Yellow) | 5% | Glue Binders | 100% | | |
| 25-75 | Floor Tile (Gray) | 95% | Calcite / Vinyl Binders | 100% | 12/30 | SW |
| | Yellow Mastic (Yellow) | 5% | Glue Binders | 100% | | |
| 26-76 | Stair Tread (Red) | 90% | Calcite / Vinyl Binders | 100% | 12/30 | SW |
| | Yellow Glue (Yellow) | 5% | Glue Binders | 100% | | |
| | Brown Glue (Brown) | 5% | Glue Binders | 100% | | |

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**PLM Detail Report**
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NVLAP Lab Code 102056-0
TDSHS License No. 300084

Client : Terracon - Birmingham
Project : 4520 Executive Park Drive
Project # : E1227393

Lab Job No. : 22B-14185
Report Date : 12/30/2022



| Sample Number | Layer | % Of Sample | Components | % of Layer | Analysis Date | Analyst |
|---|---|---|---|---|---|---|
| 26-77 | Stair Tread (Red) | 90% | Calcite / Vinyl Binders | 100% | 12/30 | SW |
| | Yellow Glue (Yellow) | 5% | Glue Binders | 100% | | |
| | Brown Glue (Brown) | 5% | Glue Binders | 100% | | |
| 26-78 | Stair Tread (Red) | 90% | Calcite / Vinyl Binders | 100% | 12/30 | SW |
| | Yellow Glue (Yellow) | 5% | Glue Binders | 100% | | |
| | Brown Glue (Brown) | 5% | Glue Binders | 100% | | |
| 27-79 | Ceramic Tile (White) | 85% | Sintered Clays | 100% | 12/30 | SW |
| | Orange Grout (Orange) | 5% | Aggregate | 65% | | |
| | | | Cement Binders | 35% | | |
| | Brown Grout (Brown) | 5% | Calcite / Binders | 100% | | |
| | Thinset (White) | 5% | Aggregate | 65% | | |
| | | | Cement Binders | 35% | | |
| 27-80 | Ceramic Tile (White) | 85% | Sintered Clays | 100% | 12/30 | SW |
| | Orange Grout (Orange) | 5% | Aggregate | 65% | | |
| | | | Cement Binders | 35% | | |
| | Brown Grout (Brown) | 5% | Calcite / Binders | 100% | | |
| | Thinset (White) | 5% | Aggregate | 65% | | |
| | | | Cement Binders | 35% | | |
| 27-81 | Ceramic Tile (White) | 85% | Sintered Clays | 100% | 12/30 | SW |
| | Orange Grout (Orange) | 5% | Aggregate | 65% | | |
| | | | Cement Binders | 35% | | |
| | Brown Grout (Brown) | 5% | Calcite / Binders | 100% | | |
| | Thinset (White) | 5% | Aggregate | 65% | | |
| | | | Cement Binders | 35% | | |
| 28-82 | Acoustic Tile (Tan) | 100% | Cellulose Fibers | 80% | 12/30 | BS |
| | | | Perlite | 20% | | |
| 28-83 | Acoustic Tile (Tan) | 100% | Cellulose Fibers | 80% | 12/30 | BS |
| | | | Perlite | 20% | | |

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| Sample Number | Layer | % Of Sample | Components | % of Layer | Analysis Date | Analyst |
|---|---|---|---|---|---|---|
| 28-84 | Acoustic Tile (Tan) | 100% | Cellulose Fibers | 80% | 12/30 | BS |
| | | | Perlite | 20% | | |
| 29-85 | Floor Glue (Yellow) | 15% | Glue Binders | 100% | 12/30 | BS |
| | Leveling Compound (Light Grey) | 85% | Aggregate | 40% | | |
| | | | Calcite / Binders | 60% | | |
| 29-86 | Floor Glue (Yellow) | 10% | Glue Binders | 100% | 12/30 | BS |
| | Leveling Compound (Light Grey) | 90% | Aggregate | 40% | | |
| | | | Calcite / Binders | 60% | | |
| 29-87 | Floor Glue (Yellow) | 10% | Glue Binders | 100% | 12/30 | BS |
| | Leveling Compound (Light Grey) | 90% | Aggregate | 40% | | |
| | | | Calcite / Binders | 60% | | |
| 30-88 | Floor Tile (Dark Grey) | 98% | Chrysotile | 3% | 12/30 | BS |
| | | | Calcite / Vinyl Binders | 97% | | |
| | Black Mastic (Black) | 2% | Chrysotile | 5% | | |
| | | | Tar Binders | 95% | | |
| 30-89 | Layer Not Analyzed - Positive Stop | 100% | | | 12/30 | BS |
| | Layer Not Analyzed - Positive Stop | | | | | |
| 30-90 | Layer Not Analyzed - Positive Stop | 100% | | | 12/30 | BS |
| | Layer Not Analyzed - Positive Stop | | | | | |
| 31-91 | Ceramic Tile (White) | 97% | Sintered Clays | 100% | 12/30 | BS |
| | Cream Adhesive (Cream) | 3% | Calcite | 50% | | |
| | | | Glue Binders | 50% | | |
| 31-92 | Ceramic Tile (White) | 97% | Sintered Clays | 100% | 12/30 | BS |
| | Cream Adhesive (Cream) | 3% | Calcite | 50% | | |
| | | | Glue Binders | 50% | | |
| 31-93 | Ceramic Tile (White) | 97% | Sintered Clays | 100% | 12/30 | BS |
| | Cream Adhesive (Cream) | 3% | Calcite | 50% | | |
| | | | Glue Binders | 50% | | |

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| Sample Number | Layer | % Of Sample | Components | % of Layer | Analysis Date | Analyst |
|---|---|---|---|---|---|---|
| 33-97 | Acoustic Tile (Light Tan) | 100% | Cellulose Fibers | 65% | 12/30 | BS |
| | | | Mineral Wool Fibers | 15% | | |
| | | | Perlite | 20% | | |
| 33-98 | Acoustic Tile (Light Tan) | 100% | Cellulose Fibers | 65% | 12/30 | BS |
| | | | Mineral Wool Fibers | 15% | | |
| | | | Perlite | 20% | | |
| 33-99 | Acoustic Tile (Light Tan) | 100% | Cellulose Fibers | 65% | 12/30 | BS |
| | | | Mineral Wool Fibers | 15% | | |
| | | | Perlite | 20% | | |
| 34-100 | Thermal Insulation (Yellow) | <1% | Mineral Wool Fibers | 95% | 12/30 | BS |
| | | | Resin Binders | 5% | | |
| | Paper / Foil Wrap (Tan / Silver) | 40% | Cellulose Fibers | 60% | | |
| | | | Glass Wool Fibers | 20% | | |
| | | | Metal Foil | 20% | | |
| | Sealant (Off-White) | 60% | Wollastonite | 3% | | |
| | | | Polyethylene Fibers | 2% | | |
| | | | Calcite / Binders | 95% | | |
| 34-101 | Paper / Foil Wrap (Tan / Silver) | 3% | Cellulose Fibers | 60% | 12/30 | BS |
| | | | Glass Wool Fibers | 20% | | |
| | | | Metal Foil | 20% | | |
| | Sealant (Off-White) | 97% | Wollastonite | 3% | | |
| | | | Polyethylene Fibers | 2% | | |
| | | | Calcite / Binders | 95% | | |

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| Sample Number | Layer | % Of Sample | Components | % of Layer | Analysis Date | Analyst |
|---|---|---|---|---|---|---|
| 34-102 | Thermal Insulation (Yellow) | 55% | Mineral Wool Fibers | 95% | 12/30 | BS |
| | | | Resin Binders | 5% | | |
| | Paper / Foil Wrap (Tan / Silver) | 10% | Cellulose Fibers | 60% | | |
| | | | Glass Wool Fibers | 20% | | |
| | | | Metal Foil | 20% | | |
| | Sealant (Off-White) | 35% | Wollastonite | 3% | | |
| | | | Polyethylene Fibers | 2% | | |
| | | | Calcite / Binders | 95% | | |
| 35-103 | Cove Base (Grey) | 97% | Calcite / Vinyl Binders | 100% | 12/30 | CK |
| | Yellow Glue (Yellow) | 3% | Glue Binders | 100% | | |
| 35-104 | Cove Base (Grey) | 96% | Calcite / Vinyl Binders | 100% | 12/30 | CK |
| | Yellow Glue (Yellow) | 4% | Glue Binders | 100% | | |
| 35-105 | Cove Base (Grey) | 97% | Calcite / Vinyl Binders | 100% | 12/30 | CK |
| | Yellow Glue (Yellow) | 3% | Glue Binders | 100% | | |
| 36-106 | Laminate (Brown) | 98% | Cellulose Fibers | 80% | 12/30 | CK |
| | | | Resin Binders | 20% | | |
| | Yellow Mastic (Yellow) | 2% | Glue Binders | 100% | | |
| 36-107 | Laminate (Brown) | 98% | Cellulose Fibers | 80% | 12/30 | CK |
| | | | Resin Binders | 20% | | |
| | Yellow Mastic (Yellow) | 2% | Glue Binders | 100% | | |
| 36-108 | Laminate (Brown) | 98% | Cellulose Fibers | 80% | 12/30 | CK |
| | | | Resin Binders | 20% | | |
| | Yellow Mastic (Yellow) | 2% | Glue Binders | 100% | | |
| 37-109 | Floor Tile (Light Beige) | 99% | Cellulose Fibers | 5% | 12/30 | CK |
| | | | Calcite / Vinyl Binders | 95% | | |
| | Yellow Mastic (Yellow) | <1% | Glue Binders | 100% | | |
| | Black Mastic (Black) | 1% | Polyethylene Fibers | 5% | | |
| | | | Tar Binders | 95% | | |

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| Sample Number | Layer | % Of Sample | Components | % of Layer | Analysis Date | Analyst |
|---|---|---|---|---|---|---|
| 37-110 | Floor Tile (Light Beige) | 100% | Cellulose Fibers | 5% | 12/30 | CK |
| | | | Calcite / Vinyl Binders | 95% | | |
| | Yellow Mastic (Yellow) | <1% | Glue Binders | 100% | | |
| | Black Mastic (Black) | <1% | Polyethylene Fibers | 5% | | |
| | | | Tar Binders | 95% | | |
| 37-111 | Floor Tile (Light Beige) | 100% | Cellulose Fibers | 5% | 12/30 | CK |
| | | | Calcite / Vinyl Binders | 95% | | |
| | Yellow Mastic (Yellow) | <1% | Glue Binders | 100% | | |
| | Black Mastic (Black) | <1% | Polyethylene Fibers | 5% | | |
| | | | Tar Binders | 95% | | |
| 38-112 | Floor Tile (Tan) | 95% | Chrysotile | 5% | 12/30 | CK |
| | | | Calcite / Vinyl Binders | 95% | | |
| | Yellow Mastic (Yellow) | 2% | Glue Binders | 100% | | |
| | Black Mastic (Black) | 3% | Chrysotile | 5% | | |
| | | | Tar Binders | 95% | | |
| 38-113 | Layer Not Analyzed - Positive Stop | 96% | | | 12/30 | CK |
| | Yellow Mastic (Yellow) | 2% | Glue Binders | 100% | | |
| | Layer Not Analyzed - Positive Stop | 2% | | | | |
| 38-114 | Layer Not Analyzed - Positive Stop | 95% | | | 12/30 | CK |
| | Yellow Mastic (Yellow) | 2% | Glue Binders | 100% | | |
| | Layer Not Analyzed - Positive Stop | 3% | | | | |
| 39-115 | Caulking (Black) | 100% | Chrysotile | 5% | 12/30 | CK |
| | | | Binders / Fillers | 95% | | |
| 39-116 | Not Analyzed - Positive Stop | 100% | | | 12/30 | CK |
| 39-117 | Not Analyzed - Positive Stop | 100% | | | 12/30 | CK |

*Moody Labs*
2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

**PLM Detail Report**
**Supplement to PLM Summary Report**

NVLAP Lab Code 102056-0
TDSHS License No. 300084

Client : Terracon - Birmingham
Project : 4520 Executive Park Drive
Project # : E1227393

Lab Job No. : 22B-14185
Report Date : 12/30/2022



| Sample Number | Layer | % Of Sample | Components | % of Layer | Analysis Date | Analyst |
|---|---|---|---|---|---|---|
| 40-118 | Drywall Material (White) | 90% | Glass Wool Fibers | 2% | 12/30 | CK |
| | | | Cellulose Fibers | 1% | | |
| | | | Gypsum / Binders | 97% | | |
| | DW Paper / Tape (Tan / White) | 8% | Cellulose Fibers | 100% | | |
| | Joint Compound (White) | 2% | Calcite / Talc / Binders | 100% | | |
| 40-119 | Drywall Material (White) | 85% | Glass Wool Fibers | 2% | 12/30 | CK |
| | | | Cellulose Fibers | 1% | | |
| | | | Gypsum / Binders | 97% | | |
| | DW Paper / Tape (Tan / White) | 13% | Cellulose Fibers | 100% | | |
| | Joint Compound (White) | 2% | Calcite / Talc / Binders | 100% | | |
| 40-120 | Drywall Material (White) | 90% | Glass Wool Fibers | 2% | 12/30 | CK |
| | | | Cellulose Fibers | 1% | | |
| | | | Gypsum / Binders | 97% | | |
| | DW Paper / Tape (Tan / White) | 8% | Cellulose Fibers | 100% | | |
| | Joint Compound (White) | 2% | Calcite / Talc / Binders | 100% | | |
| 41-121 | Acoustic Tile (Light Grey) | 100% | Mineral Wool Fibers | 95% | 12/30 | CK |
| | | | Binders / Fillers | 5% | | |
| 41-122 | Acoustic Tile (Light Grey) | 100% | Mineral Wool Fibers | 95% | 12/30 | CK |
| | | | Binders / Fillers | 5% | | |
| 42-123 | Acoustic Tile (Light Grey) | 100% | Mineral Wool Fibers | 95% | 12/30 | CK |
| | | | Binders / Fillers | 5% | | |
| 42-124 | Acoustic Tile (Off-White) | 100% | Mineral Wool Fibers | 95% | 12/30 | CK |
| | | | Binders / Fillers | 5% | | |
| 42-125 | Acoustic Tile (Off-White) | 100% | Mineral Wool Fibers | 95% | 12/30 | CK |
| | | | Binders / Fillers | 5% | | |
| 42-126 | Acoustic Tile (Off-White) | 100% | Mineral Wool Fibers | 95% | 12/30 | CK |
| | | | Binders / Fillers | 5% | | |

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**PLM Detail Report**
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NVLAP Lab Code 102056-0
TDSHS License No. 300084

Client : Terracon - Birmingham
Project : 4520 Executive Park Drive
Project # : E1227393

Lab Job No. : 22B-14185
Report Date : 12/30/2022



| Sample Number | Layer | % Of Sample | Components | % of Layer | Analysis Date | Analyst |
|---|---|---|---|---|---|---|
| 43-127 | No Acoustic Tile | | | | 12/30 | CK |
| | Paper / Foil Wrap (Tan / Silver) | 40% | Cellulose Fibers | 60% | | |
| | | | Glass Wool Fibers | 20% | | |
| | | | Metal Foil | 20% | | |
| | Tar Wrap (Black) | 60% | Chrysotile | 5% | | |
| | | | Tar Binders | 95% | | |
| 43-128 | No Acoustic Tile | | | | 12/30 | CK |
| | Paper / Foil Wrap (Tan / Silver) | 40% | Cellulose Fibers | 60% | | |
| | | | Glass Wool Fibers | 20% | | |
| | | | Metal Foil | 20% | | |
| | Layer Not Analyzed - Positive Stop | 60% | | | | |
| 43-129 | No Acoustic Tile | | | | 12/30 | CK |
| | Paper / Foil Wrap (Tan / Silver) | 40% | Cellulose Fibers | 60% | | |
| | | | Glass Wool Fibers | 20% | | |
| | | | Metal Foil | 20% | | |
| | Layer Not Analyzed - Positive Stop | 60% | | | | |
| 44-130 | Caulking (Red / Brown) | 100% | Polyethylene Fibers | 10% | 12/30 | DO |
| | | | Calcite | 20% | | |
| | | | Wollastonite | 5% | | |
| | | | Binders / Fillers | 65% | | |
| 44-131 | Caulking (Red) | 100% | Polyethylene Fibers | 10% | 12/30 | DO |
| | | | Calcite | 20% | | |
| | | | Wollastonite | 5% | | |
| | | | Binders / Fillers | 65% | | |
| 11-132 | Caulking (Red) | 100% | Polyethylene Fibers | 10% | 12/30 | DO |
| | | | Calcite | 20% | | |
| | | | Wollastonite | 5% | | |
| | | | Binders / Fillers | 65% | | |

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**PLM Detail Report**
**Supplement to PLM Summary Report**

NVLAP Lab Code 102056-0
TDSHS License No. 300084

Client : Terracon - Birmingham
Project : 4520 Executive Park Drive
Project # : E1227393

Lab Job No. : 22B-14185
Report Date : 12/30/2022



| Sample Number | Layer | % Of Sample | Components | % of Layer | Analysis Date | Analyst |
|---|---|---|---|---|---|---|
| 45-133- | Caulking (Black) | 100% | Chrysotile | 2% | 12/30 | DO |
| | | | Calcite | 48% | | |
| | | | Binders / Fillers | 50% | | |
| 45-134 | Not Analyzed - Positive Stop | 100% | | | 12/30 | DO |
| 45-135 | Not Analyzed - Positive Stop | 100% | | | 12/30 | DO |
| 46-136 | Acoustic Tile (Off-White) | 98% | Mineral Wool Fibers | 95% | 12/30 | DO |
| | | | Binders / Fillers | 5% | | |
| | Painted Facing (White) | 2% | Pigment / Binders | 100% | | |
| 46-137 | Acoustic Tile (Off-White) | 98% | Mineral Wool Fibers | 95% | 12/30 | DO |
| | | | Binders / Fillers | 5% | | |
| | Painted Facing (White) | 2% | Pigment / Binders | 100% | | |
| 46-138 | Acoustic Tile (Off-White) | 98% | Mineral Wool Fibers | 95% | 12/30 | DO |
| | | | Binders / Fillers | 5% | | |
| | Painted Facing (White) | 2% | Pigment / Binders | 100% | | |
| 47-139 | Drywall Material (White) | 93% | Cellulose Fibers | 5% | 12/30 | DO |
| | | | Gypsum / Binders | 95% | | |
| | DW Paper Facing (Tan) | 5% | Cellulose Fibers | 100% | | |
| | Joint Compound (Off-White) | 2% | Chrysotile | 2% | | |
| | | | Calcite / Talc / Binders | 98% | | |
| 47-140 | Drywall Material (White) | 93% | Cellulose Fibers | 5% | 12/30 | DO |
| | | | Gypsum / Binders | 95% | | |
| | DW Paper Facing (Tan) | 5% | Cellulose Fibers | 100% | | |
| | Layer Not Analyzed - Positive Stop | 2% | | | | |
| 47-141 | Drywall Material (White) | 93% | Cellulose Fibers | 5% | 12/30 | DO |
| | | | Gypsum / Binders | 95% | | |
| | DW Paper Facing (Tan) | 5% | Cellulose Fibers | 100% | | |
| | Layer Not Analyzed - Positive Stop | 2% | | | | |

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**PLM Detail Report**
**Supplement to PLM Summary Report**

NVLAP Lab Code 102056-0
TDSHS License No. 300084

Client : Terracon - Birmingham
Project : 4520 Executive Park Drive
Project # : E1227393

Lab Job No. : 22B-14185
Report Date : 12/30/2022

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| Sample Number | Layer | % Of Sample | Components | % of Layer | Analysis Date | Analyst |
|---|---|---|---|---|---|---|
| 48-142 | Acoustic Texture (Off-White) | 100% | Chrysotile | 3% | 12/30 | DO |
| | | | Perlite | 82% | | |
| | | | Calcite / Gypsum Binders | 15% | | |
| 48-143 | Not Analyzed - Positive Stop | 100% | | | 12/30 | DO |
| 48-144 | Not Analyzed - Positive Stop | 100% | | | 12/30 | DO |
| 48-145 | Not Analyzed - Positive Stop | 100% | | | 12/30 | DO |
| 48-146 | Not Analyzed - Positive Stop | 100% | | | 12/30 | DO |
| 49-147 | Flashing (Black) | 75% | Cellulose Fibers | 15% | 12/30 | DO |
| | | | Tar Binders | 85% | | |
| | Felt (Black) | 25% | Cellulose Fibers | 85% | | |
| | | | Tar Binders | 15% | | |
| 49-148 | Flashing (Black) | 75% | Cellulose Fibers | 15% | 12/30 | DO |
| | | | Tar Binders | 85% | | |
| | Felt (Black) | 25% | Cellulose Fibers | 85% | | |
| | | | Tar Binders | 15% | | |
| 49-149 | Flashing (Black) | 75% | Cellulose Fibers | 15% | 12/30 | DO |
| | | | Tar Binders | 85% | | |
| | Felt (Black) | 25% | Cellulose Fibers | 85% | | |
| | | | Tar Binders | 15% | | |
| 50-150 | Caulking (Tan / Gray) | 100% | Calcite | 50% | 12/30 | DO |
| | | | Binders / Fillers | 50% | | |
| 50-151 | Caulking (Tan / Gray) | 100% | Calcite | 50% | 12/30 | DO |
| | | | Binders / Fillers | 50% | | |
| 50-152 | Caulking (Tan / Gray) | 100% | Calcite | 50% | 12/30 | DO |
| | | | Binders / Fillers | 50% | | |

*Moody Labs*
2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

**PLM Detail Report**
**Supplement to PLM Summary Report**

NVLAP Lab Code 102056-0
TDSHS License No. 300084

Client : Terracon - Birmingham
Project : 4520 Executive Park Drive
Project # : E1227393

Lab Job No. : 22B-14185
Report Date : 12/30/2022



| Sample Number | Layer | % Of Sample | Components | % of Layer | Analysis Date | Analyst |
|---|---|---|---|---|---|---|
| 51-153 | Caulking 1 (Dark Gray) | 65% | Glass Wool Fibers | <1% | 12/30 | DO |
| | | | Calcite | 50% | | |
| | | | Binders / Fillers | 50% | | |
| | Caulking 2 (Light Gray) | 35% | Calcite | 50% | | |
| | | | Binders / Fillers | 50% | | |
| 51-154 | Caulking 1 (Dark Gray) | 95% | Glass Wool Fibers | <1% | 12/30 | DO |
| | | | Calcite | 50% | | |
| | | | Binders / Fillers | 50% | | |
| | Caulking 2 (Light Gray) | 5% | Calcite | 50% | | |
| | | | Binders / Fillers | 50% | | |
| 51-155 | Caulking (Dark Gray) | 100% | Glass Wool Fibers | <1% | 12/30 | DO |
| | | | Calcite | 50% | | |
| | | | Binders / Fillers | 50% | | |
| 52-156 | Caulking (Dark Gray) | 100% | Calcite | 50% | 12/30 | DO |
| | | | Binders / Fillers | 50% | | |
| 52-157 | Caulking (Dark Gray) | 100% | Calcite | 50% | 12/30 | DO |
| | | | Binders / Fillers | 50% | | |
| 52-158 | Caulking (Dark Gray) | 100% | Calcite | 50% | 12/30 | DO |
| | | | Binders / Fillers | 50% | | |
| 53-159 | Caulking (Dark Gray) | 100% | Calcite | 50% | 12/30 | DO |
| | | | Binders / Fillers | 50% | | |
| 53-160 | Caulking (Dark Gray) | 100% | Calcite | 50% | 12/30 | DO |
| | | | Binders / Fillers | 50% | | |
| 53-161 | Caulking (Dark Gray) | 100% | Calcite | 50% | 12/30 | DO |
| | | | Binders / Fillers | 50% | | |

Moody Labs

## Chain of Custody

Lab Job # 22B-14185
Lab Job # 158 PCM
Lab Job #

AFTER HOURS / WEEKEND WORK: ☐ YES ☐ NO
*Please call in advance for after hours / immediate pricing & availability*

Page 1 of 10

**ASBESTOS PLM**

Bulk ☐ Immediate ☐ 1 day ☐ 2 day ☒ 3 day ☐ 5 day
☐ **Analyze All** ☒ **Positive Stop**

**PCM Air (7400)**

☐ Immediate ☐ 1 day ☐ 2 day ☐ 3 day ☐ 5 day
**Analyze Blanks** ☐ **Yes** ☐ **No**

**TOTAL DUST(0500/0600)**

☐ 1 day ☐ 2 day

**ASBESTOS TEM**

Air AHERA Method ☐ Late Night* ☐ 6 hr ☐ 12 hr ☐ 24 hr
Air 7402 (Modified) ☐ 1 day ☐ 2 day ☐ 3 day
Bulk ☐ 1 day ☐ 2 day ☐ 3 day ☐ 5 day
Water/Wipe/Micro Vac ☐ 1 day ☐ 2 day ☐ 3 day
**Analyze Blanks** ☐ **Yes** ☐ **No**
*Late night analysis surcharges apply

**MOLD**

Direct Exam ☐ Immed ☐ 1 day ☐ 2 day ☐ 5 day
Standard Air ☐ Immed ☐ 1 day ☐ 2 day ☐ 5 day
Expanded Air ☐ Immed ☐ 1 day ☐ 2 day ☐ 5 day
Culture** ☐ 10-14 days
TPC w/ Yeast & Mold (TYMC)** ☐ 5 day
**Analyze Blanks** ☐ **Yes** ☐ **No**

**BACTERIA****

Total Plate Count (TAMC) ☐ 2 day
Coliform & E. coli (P/A) ☐ 1 day
Staphylococcus aureus ☐ 1 day
**Please note Bateria / Mold Culture turnarounds are approximate and subject to analytical requirements**

**OTHER:**

**Billing Company / City:** Terracon Consultants / Birmingham # of Samples: 158 Sample Date: 12/20/22
Project: 4520 Executive Park Drive Project #: E1227393
**Contact Information:** Name: Stephen Howard Phone #: (205) 443-5224
E-mail Results to: Stephen.howard@terracon.com Mobile #:
Invoice Address: P.O. #:
*Please review paperwork and samples before submitting to lab. Unsealed / improperly packaged / damaged / expired samples or excessive administrative requests may incur additional fees*
Notes:

| Sample # | Sample Description | Vol. / Area (if applicable) | Location / Notes |
|---|---|---|---|
| | See attached Bulk Sampling Log | | |
| | | | |
| | | | |
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| | | | |
| | | | |

| Released By: | Date / Time: 12/22/22 | Received By: | Date / Time: 12/23/22 1153 |
|---|---|---|---|
| Released By: | Date / Time: | Received By: | Date / Time: |

228-14185

Terracon
2147 Riverchase Office Road
Birmingham, AL 35244
(205) 942-1289

Collection Date: 12/20/2022 Inspector: Stephen Howard

Project Name: 4520 Executive Park Drive Project #: E1227393

## Asbestos Bulk Sampling Log

| HA | Sample No. | Sample Description | Location / Notes |
|---|---|---|---|
| 1 | 1-1 | 1x1-foot acoustical ceiling tile w/ deep fissures | Building A |
| ↓ | 1-2 | ↓ | ↓ |
| ↓ | 1-3 | ↓ | ↓ |
| 2 | 2-4 | Brown cove base glue | Buildings A & B |
| ↓ | 2-5 | ↓ | ↓ |
| ↓ | 2-6 | ↓ | ↓ |
| 3 | 3-7 | Interior caulk (brown), metal-frame windows/door | Buildings A & B |
| ↓ | 3-8 | ↓ | ↓ |
| ↓ | 3-9 | ↓ | ↓ |
| 4 | 4-10 | Interior caulk (brown), metal-frame windows/doors | Buildings A & B |
| ↓ | 4-11 | ↓ | ↓ |
| ↓ | 4-12 | ↓ | ↓ |
| 5 | 5-13 | Carpet glue | Buildings A & B |
| ↓ | 5-14 | ↓ | ↓ |
| ↓ | 5-15 | ↓ | ↓ |
| 6 | 6-16 | Drywall & Joint Compound | Building A |
| ↓ | 6-17 | ↓ | ↓ |
| ↓ | 6-18 | ↓ | |

Page: 2 of 10

226-14/25

## Asbestos Bulk Sampling Log

| HA | Sample No. | Sample Description | Location / Notes |
|---|---|---|---|
| 7 | 7-19 | White Duct Tape | Building B |
| ↓ | 7-20 | ↓ | ↓ |
| ↓ | 7-21 | ↓ | ↓ |
| 8 | 8-22 | White Sealant on Paper/Foil Pipe Wrap | Buildings A & B |
| ↓ | 8-23 | ↓ | ↓ |
| ↓ | 8-24 | ↓ | ↓ |
| 9 | 9-25 | TSI Wrap on Cellular Glass Insulation | Buildings A-D, Basement Mechanical Areas, CentraVac Unit |
| ↓ | 9-26 | ↓ | ↓ |
| ↓ | 9-27 | ↓ | ↓ |
| 10 | 10-28 | White Sealant/Tape on Air Return Duct | Buildings A-D, Basement Mechanical Areas |
| ↓ | 10-29 | ↓ | ↓ |
| ↓ | 10-30 | ↓ | ↓ |
| 11 | 11-31 | Brown Mastic on Air Return Duct | Buildings A-D, Basement Mechanical Areas |
| ↓ | 11-32 | ↓ | ↓ |
| ↓ | 11-33 | ↓ | ↓ |
| 12 | 12-34 | Drywall & Joint Compound | Building B |
| ↓ | 12-35 | ↓ | ↓ |
| ↓ | 12-36 | ↓ | ↓ |
| 13 | 13-37 | 12x12-Inch Beige-Speckled Floor Tile & Mastic | Building B |
| ↓ | 13-38 | ↓ | ↓ |

Page: 3 of 10

225-14185

## Asbestos Bulk Sampling Log

| HA | Sample No. | Sample Description | Location / Notes |
|---|---|---|---|
| 13 | 13-39 | 12x12-Inch Beige-Speckled Floor Tile & Mastic | Building B |
| 14 | 14-40 | 12x12-Inch Brown-Speckled Floor Tile & Mastic | Building B |
| ↓ | 14-41 | ↓ | ↓ |
| ↓ | 14-42 | ↓ | ↓ |
| 15 | 15-43 | Light-Gray Metal Sink Undercoating | Building B |
| ↓ | 15-44 | ↓ | ↓ |
| ↓ | 15-45 | ↓ | ↓ |
| 16 | 16-46 | 2x4-Foot Suspended Ceiling Tile | Buildings A & B |
| ↓ | 16-47 | ↓ | ↓ |
| ↓ | 16-48 | ↓ | ↓ |
| 17 | 17-49 | Fire Door Insulation | Buildings A & B |
| ↓ | 17-50 | ↓ | ↓ |
| ↓ | 17-51 | ↓ | ↓ |
| 18 | 18-52 | Tall Black Cove Base Glue | Building B |
| ↓ | 18-53 | ↓ | ↓ |
| ↓ | 18-54 | ↓ | ↓ |
| 19 | 19-55 | 12x12-Inch Beige-Speckled (w/ Blue Specks) Floor Tile & Mastic | Building A |
| ↓ | 19-56 | ↓ | ↓ |
| ↓ | 19-57 | ↓ | ↓ |
| 20 | 20-58 | White Duct Tape | Building A |

Page: 4 of 10

225-M185

## Asbestos Bulk Sampling Log

| HA | Sample No. | Sample Description | Location / Notes |
|---|---|---|---|
| 20 | 20-59 | White Duct Tape | Building A |
| ↓ | 20-60 | ↓ | ↓ |
| 21 | 21-61 | Drywall & Joint Compound | Building A |
| ↓ | 21-62 | ↓ | ↓ |
| ↓ | 21-63 | ↓ | ↓ |
| 22 | 22-64 | Ceramic Tile Thinset | Buildings A & B, Bathrooms |
| ↓ | 22-65 | ↓ | ↓ |
| ↓ | 22-66 | ↓ | ↓ |
| 23 | 23-67 | 12x12-Inch Brown-Speckled Floor Tile & Mastic | Building A |
| ↓ | 23-68 | ↓ | ↓ |
| ↓ | 23-69 | ↓ | ↓ |
| 24 | 24-70 | 12x12-Inch White-Speckled Floor Tile & Mastic | Building A |
| ↓ | 24-71 | ↓ | ↓ |
| ↓ | 24-72 | ↓ | ↓ |
| 25 | 25-73 | 12x12-Inch Gray-Speckled Floor Tile & Mastic | Building A |
| ↓ | 25-74 | ↓ | ↓ |
| ↓ | 25-75 | ↓ | ↓ |
| 26 | 26-76 | Staircase Tread Glue | Building A-D |
| ↓ | 26-77 | ↓ | ↓ |
| ↓ | 26-78 | ↓ | ↓ |

Page: 5 of 10

225-1418

## Asbestos Bulk Sampling Log

| HA | Sample No. | Sample Description | Location / Notes |
|---|---|---|---|
| 27 | 27-79 | Ceramic Tile Thinset | Buildings A & B, Bathrooms |
| ↓ | 27-80 | ↓ | ↓ |
| ↓ | 27-81 | ↓ | ↓ |
| 28 | 28-82 | 2x2-Foot Suspended Ceiling Tile | Buildings A & B |
| ↓ | 28-83 | ↓ | ↓ |
| ↓ | 28-84 | ↓ | ↓ |
| 29 | 29-85 | Wood Parquet Flooring Glue | Building B |
| ↓ | 29-86 | ↓ | ↓ |
| ↓ | 29-87 | ↓ | ↓ |
| 30 | 30-88 | 12x12-Inch Black Floor Tile & Mastic | Building B |
| ↓ | 30-89 | ↓ | ↓ |
| ↓ | 30-90 | ↓ | ↓ |
| 31 | 31-91 | Ceramic Tile Thinset | Buildings C & D, Bathrooms |
| ↓ | 31-92 | ↓ | ↓ |
| ↓ | 31-93 | ↓ | ↓ |
| 33* | 33-97 | 2x2-Foot Suspended Ceiling Tile | Buildings C & D |
| ↓ | 33-98 | ↓ | ↓ |
| ↓ | 33-99 | ↓ | ↓ |
| 34 | 34-100 | White Sealant on HVAC Foil Duct Insulation Wrap | Buildings C & D |

* *Samples 32-94 through 32-95 purposefully omitted.*

Page: 6 of 10

225-19195

## Asbestos Bulk Sampling Log

| HA | Sample No. | Sample Description | Location / Notes |
|---|---|---|---|
| 34 | 34-101 | White Sealant on HVAC Foil Duct Insulation Wrap | Buildings C & D |
| ↓ | 34-102 | ↓ | ↓ |
| 35 | 35-103 | Cove Base (Brown) Glue | Buildings C & D |
| ↓ | 35-104 | ↓ | ↓ |
| ↓ | 35-105 | ↓ | ↓ |
| 36 | 36-106 | 2x2-Foot Elevated Floor Panels | Building D, Server Room |
| ↓ | 36-107 | ↓ | ↓ |
| ↓ | 36-108 | ↓ | ↓ |
| 37 | 37-109 | 12x12-Inch Beige-Speckled Floor Tile & Mastic | Building D, West Stairwell Landing |
| ↓ | 37-110 | ↓ | ↓ |
| ↓ | 37-111 | ↓ | ↓ |
| 38 | 38-112 | 12x12-Inch Brown-Speckled Floor Tile & Mastic | Building D, East Stairwell Landing |
| ↓ | 38-113 | ↓ | ↓ |
| ↓ | 38-114 | ↓ | ↓ |
| 39 | 39-115 | Interior Plate Glass Window Caulk | Building D |
| ↓ | 39-116 | ↓ | ↓ |
| ↓ | 39-117 | ↓ | ↓ |

Page: 7 of 10

## Asbestos Bulk Sampling Log

| HA | Sample No. | Sample Description | Location / Notes |
|---|---|---|---|
| 40 | 40-118 | Drywall & Joint Compound | Building D |
| 〃 | 40-119 | 〃 | 〃 |
| 〃 | 40-120 | 〃 | 〃 |
| 41 | 41-121 | Rough-Finish 2x2-Foot Suspended Ceiling Tile | Building D |
| 〃 | 41-122 | 〃 | 〃 |
| 〃 | 42-123 | 〃 | 〃 |
| 42 | 42-124 | Rough-Finish 1x1-Foot Acoustical Ceiling Tile | Building D |
| 〃 | 42-125 | 〃 | 〃 |
| 〃 | 42-126 | 〃 | 〃 |
| 43 | 43-127 | 1x1-Foot Acoustical Ceiling Tile w/ Fissures | Building C |
| 〃 | 43-128 | 〃 | 〃 |
| 〃 | 43-129 | 〃 | 〃 |
| 44 | 44-130 | Fire-Stop Caulk on HVAC Duct Insulation Wrap | Building C |
| 〃 | 44-131 | 〃 | 〃 |
| 〃 | 44-132 | 〃 | 〃 |
| 45 | 45-133 | Interior Plate Glass Window Caulk | Building C |
| 〃 | 45-134 | 〃 | 〃 |
| 〃 | 45-135 | 〃 | 〃 |
| 46 | 46-136 | Rough-Finish 2x2-Foot Suspended Ceiling Tile | Building D |
| 〃 | 46-137 | 〃 | 〃 |

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225.14185

## Asbestos Bulk Sampling Log

| HA | Sample No. | Sample Description | Location / Notes |
|---|---|---|---|
| 46 | 46-138 | Rough-Finish 2x2-Foot Suspended Ceiling Tile | Building D |
| 47 | 47-139 | Drywall & Joint Compound | Building C |
| ↓ | 47-140 | ↓ | ↓ |
| ↓ | 47-141 | ↓ | ↓ |
| 48 | 48-142 | Acoustic Texture on Walls & Ceiling | Building C, Lobby |
| ↓ | 48-143 | ↓ | ↓ |
| ↓ | 48-144 | ↓ | ↓ |
| ↓ | 48-145 | ↓ | ↓ |
| ↓ | 48-146 | ↓ | ↓ |
| 49 | 49-147 | Exterior Wall Base Flashing | Buildings C & D |
| ↓ | 49-148 | ↓ | ↓ |
| ↓ | 49-149 | ↓ | ↓ |
| 50 | 50-150 | Exterior Building Caulk | Buildings C & D |
| ↓ | 50-151 | ↓ | ↓ |
| ↓ | 50-152 | ↓ | ↓ |
| 51 | 51-153 | Exterior Window Caulk (Metal-Frame) | Buildings C & D |
| ↓ | 51-154 | ↓ | ↓ |
| ↓ | 51-155 | ↓ | ↓ |
| 52 | 52-156 | Interior Window Caulk (Metal-Frame) | Buildings C & D, Entrances |
| ↓ | 52-157 | ↓ | ↓ |

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226-14195

## Asbestos Bulk Sampling Log

| HA | Sample No. | Sample Description | Location / Notes |
|---|---|---|---|
| 52 | 52-158 | Interior Window Caulk (Metal-Frame) | Buildings C & D, Entrances |
| 53 | 53-159 | Exterior Window Caulk (Metal-Frame) | Buildings C & D, Entrances |
| ↓ | 53-160 | ↓ | ↓ |
| ↓ | 53-161 | ↓ | ↓ |
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Moody Labs

## PLM Summary Report

NVLAP Lab Code 102056-0
TDSHS License No. 300084

2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

| | | | |
|---|---|---|---|
| Client : | Terracon - Birmingham | Lab Job No. : | 22B-14190 |
| Project : | 2511 Fairlane Park Drive | Report Date : | 12/30/2022 |
| Project # : | E1227393 | Sample Date : | 12/20/2022 |
| Identification : | Asbestos, Bulk Sample Analysis | | |
| Test Method : | Polarized Light Microscopy / Dispersion Staining (PLM/DS)<br>EPA Method 600 / R-93 / 116 | | |

Page 1 of 5

On 12/27/2022, fifty one (51) bulk material samples were submitted by Stephen Howard of Terracon - Birmingham for asbestos analysis by PLM/DS. The PLM Detail Report is attached; additional information may be found therein. The results are summarized below:

| Sample Number | Client Sample Description / Location | Asbestos Content |
|---|---|---|
| 1-1 | 12" x 12" Floor Tile (Beige, Speckled) and Mastic, Offices / Rooms | None Detected - Floor Tile<br>None Detected - Yellow Mastic |
| 1-2 | 12" x 12" Floor Tile (Beige, Speckled) and Mastic, Offices / Rooms | None Detected - Floor Tile<br>None Detected - Yellow Mastic |
| 1-3 | 12" x 12" Floor Tile (Beige, Speckled) and Mastic, Offices / Rooms | None Detected - Floor Tile<br>None Detected - Yellow Mastic |
| 2-4 | 12" x 12" Floor Tile (White, Speckled) and Mastic, Stairwell Landing, West Side | None Detected - Floor Tile<br>None Detected - Black Mastic |
| 2-5 | 12" x 12" Floor Tile (White, Speckled) and Mastic, Stairwell Landing, West Side | None Detected - Floor Tile<br>None Detected - Black Mastic |
| 2-6 | 12" x 12" Floor Tile (White, Speckled) and Mastic, Stairwell Landing, West Side | None Detected - Floor Tile<br>None Detected - Black Mastic |
| 3-7 | 12" x 12" Floor Tile (White, Speckled with Blue Specks) and Mastic, 2nd Floor Break Room | None Detected - Floor Tile<br>None Detected - Yellow Mastic |
| 3-8 | 12" x 12" Floor Tile (White, Speckled with Blue Specks) and Mastic, 2nd Floor Break Room | None Detected - Floor Tile<br>None Detected - Yellow Mastic |
| 3-9 | 12" x 12" Floor Tile (White, Speckled with Blue Specks) and Mastic, 2nd Floor Break Room | None Detected - Floor Tile<br>None Detected - Yellow Mastic<br>None Detected - Leveling Compound |
| 4-10 | 12" x 12" Floor Tile (Blue) and Mastic, 2nd Floor Break Room | None Detected - Floor Tile<br>None Detected - Yellow Mastic<br>None Detected - Leveling Compound 1<br>None Detected - Leveling Compound 2 |
| 4-11 | 12" x 12" Floor Tile (Blue) and Mastic, 2nd Floor Break Room | None Detected - Floor Tile<br>None Detected - Yellow Mastic<br>None Detected - Leveling Compound |
| 4-12 | 12" x 12" Floor Tile (Blue) and Mastic, 2nd Floor Break Room | None Detected - Floor Tile<br>None Detected - Yellow Mastic<br>None Detected - Leveling Compound |

Moody Labs

## PLM Summary Report

NVLAP Lab Code 102056-0
TDSHS License No. 300084

2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

| | | | |
|---|---|---|---|
| Client : | Terracon - Birmingham | Lab Job No. : | 22B-14190 |
| Project : | 2511 Fairlane Park Drive | Report Date : | 12/30/2022 |
| Project # : | E1227393 | Sample Date : | 12/20/2022 |
| Identification : | Asbestos, Bulk Sample Analysis | | |
| Test Method : | Polarized Light Microscopy / Dispersion Staining (PLM/DS)<br>EPA Method 600 / R-93 / 116 | | |

Page 2 of 5

On 12/27/2022, fifty one (51) bulk material samples were submitted by Stephen Howard of Terracon - Birmingham for asbestos analysis by PLM/DS. The PLM Detail Report is attached; additional information may be found therein. The results are summarized below:

| Sample Number | Client Sample Description / Location | Asbestos Content |
|---|---|---|
| 5-13 | Metal Sink Undercoating (Grey), Metal Sinks | None Detected - Sink Undercoating 1<br>None Detected - Sink Undercoating 2<br>None Detected - Tan Mastic |
| 5-14 | Metal Sink Undercoating (Grey), Metal Sinks | None Detected - Sink Undercoating 1<br>None Detected - Sink Undercoating 2<br>None Detected - Tan Mastic |
| 5-15 | Metal Sink Undercoating (Grey), Metal Sinks | None Detected - Sink Undercoating 1<br>None Detected - Sink Undercoating 2<br>None Detected - Tan Mastic |
| 6-16 | Metal Sink Undercoating (Beige), Metal Sinks | None Detected - Sink Undercoating |
| 6-17 | Metal Sink Undercoating (Beige), Metal Sinks | None Detected - Sink Undercoating |
| 6-18 | Metal Sink Undercoating (Beige), Metal Sinks | None Detected - Sink Undercoating |
| 7-19 | 2 x 4 Suspended Ceiling Tile, Throughout | None Detected - Acoustic Tile |
| 7-20 | 2 x 4 Suspended Ceiling Tile, Throughout | None Detected - Acoustic Tile |
| 7-21 | 2 x 4 Suspended Ceiling Tile, Throughout | None Detected - Acoustic Tile |
| 8-22 | Cove Base Glue (Beige), Throughout | None Detected - Cove Base<br>None Detected - Cream Glue<br>None Detected - Yellow Glue |
| 8-23 | Cove Base Glue (Beige), Throughout | None Detected - Cove Base<br>None Detected - Cream Glue<br>None Detected - Yellow Glue |
| 8-24 | Cove Base Glue (Beige), Throughout | None Detected - Cove Base<br>None Detected - Cream Glue<br>None Detected - Yellow Glue |
| 9-25 | Drywall and Joint Compound, 1 Story Section | None Detected - Drywall Material<br>None Detected - Joint Compound |
| 9-26 | Drywall and Joint Compound, 1 Story Section | None Detected - Drywall Material<br>None Detected - Joint Compound |

Moody Labs

## PLM Summary Report

NVLAP Lab Code 102056-0
TDSHS License No. 300084

2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

| | | | |
|---|---|---|---|
| Client : | Terracon - Birmingham | Lab Job No. : | 22B-14190 |
| Project : | 2511 Fairlane Park Drive | Report Date : | 12/30/2022 |
| Project # : | E1227393 | Sample Date : | 12/20/2022 |
| Identification : | Asbestos, Bulk Sample Analysis | | |
| Test Method : | Polarized Light Microscopy / Dispersion Staining (PLM/DS)<br>EPA Method 600 / R-93 / 116 | | |

Page 3 of 5

On 12/27/2022, fifty one (51) bulk material samples were submitted by Stephen Howard of Terracon - Birmingham for asbestos analysis by PLM/DS. The PLM Detail Report is attached; additional information may be found therein. The results are summarized below:

| Sample Number | Client Sample Description / Location | Asbestos Content |
|---|---|---|
| 9-27 | Drywall and Joint Compound, 1 Story Section | None Detected - Drywall Material<br>None Detected - Joint Compound |
| 10-28 | Drywall and Joint Compound, 2 Story Section | None Detected - Drywall Material<br>None Detected - Joint Compound |
| 10-29 | Drywall and Joint Compound, 2 Story Section | None Detected - Drywall Material<br>None Detected - Joint Compound |
| 10-30 | Drywall and Joint Compound, 2 Story Section | None Detected - Drywall Material<br>None Detected - Joint Compound |
| 11-31 | Cove Base Glue (Black), Throughout | None Detected - Cove Base<br>None Detected - Glue |
| 11-32 | Cove Base Glue (Black), Throughout | None Detected - Cove Base<br>None Detected - Glue |
| 11-33 | Cove Base Glue (Black), Throughout | None Detected - Cove Base<br>None Detected - Glue |
| 12-34 | Cove Base Glue (Black), Throughout | None Detected - Cove Base<br>None Detected - Glue |
| 12-35 | Cove Base Glue (Black), Throughout | None Detected - Cove Base<br>None Detected - Glue |
| 12-36 | Cove Base Glue (Black), Throughout | None Detected - Cove Base<br>None Detected - Glue |
| 13-37 | Ceramic Tile Thinset, Bathrooms | None Detected - Ceramic Tile<br>None Detected - Grout<br>None Detected - Thinset<br>None Detected - Joint Compound |
| 13-38 | Ceramic Tile Thinset, Bathrooms | None Detected - Ceramic Tile<br>None Detected - Grout<br>None Detected - Thinset<br>None Detected - Joint Compound |

Moody Labs

## PLM Summary Report

NVLAP Lab Code 102056-0
TDSHS License No. 300084

2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

| | | | |
|---|---|---|---|
| Client : | Terracon - Birmingham | Lab Job No. : | 22B-14190 |
| Project : | 2511 Fairlane Park Drive | Report Date : | 12/30/2022 |
| Project # : | E1227393 | Sample Date : | 12/20/2022 |
| Identification : | Asbestos, Bulk Sample Analysis | | |
| Test Method : | Polarized Light Microscopy / Dispersion Staining (PLM/DS)<br>EPA Method 600 / R-93 / 116 | | |

Page 4 of 5

On 12/27/2022, fifty one (51) bulk material samples were submitted by Stephen Howard of Terracon - Birmingham for asbestos analysis by PLM/DS. The PLM Detail Report is attached; additional information may be found therein. The results are summarized below:

| Sample Number | Client Sample Description / Location | Asbestos Content |
|---|---|---|
| 13-39 | Ceramic Tile Thinset, Bathrooms | None Detected - Ceramic Tile<br>None Detected - Grout<br>None Detected - Thinset<br>None Detected - Joint Compound |
| 14-40 | Ceramic Tile Thinset, Bathrooms | None Detected - Ceramic Tile<br>None Detected - Grout<br>None Detected - Thinset<br>None Detected - Joint Compound |
| 14-41 | Ceramic Tile Thinset, Bathrooms | None Detected - Ceramic Tile<br>None Detected - Grout<br>None Detected - Thinset<br>None Detected - Joint Compound |
| 14-42 | Ceramic Tile Thinset, Bathrooms | None Detected - Ceramic Tile<br>None Detected - Grout<br>None Detected - Thinset<br>None Detected - Joint Compound |
| 15-43 | Exterior Caulk (Brown), Metal Frame Windows / Doors | 2% Chrysotile - Caulking |
| 15-44 | Exterior Caulk (Brown), Metal Frame Windows / Doors | Not Analyzed - Positive Stop |
| 15-45 | Exterior Caulk (Brown), Metal Frame Windows / Doors | Not Analyzed - Positive Stop |
| 16-46 | Interior Caulk (Brown), Metal Frame Windows / Doors | 2% Chrysotile - Caulking |
| 16-47 | Interior Caulk (Brown), Metal Frame Windows / Doors | Not Analyzed - Positive Stop |
| 16-48 | Interior Caulk (Brown), Metal Frame Windows / Doors | Not Analyzed - Positive Stop |
| 17-49 | Interior Window Caulk, Plate Glass Side Door Windows | 2% Chrysotile - Caulking |
| 17-50 | Interior Window Caulk, Plate Glass Side Door Windows | Not Analyzed - Positive Stop |
| 17-51 | Interior Window Caulk, Plate Glass Side Door Windows | Not Analyzed - Positive Stop |

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# PLM Summary Report

NVLAP Lab Code 102056-0
TDSHS License No. 300084

2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

| | | | |
|---|---|---|---|
| Client : | Terracon - Birmingham | Lab Job No. : | 22B-14190 |
| Project : | 2511 Fairlane Park Drive | Report Date : | 12/30/2022 |
| Project # : | E1227393 | Sample Date : | 12/20/2022 |
| Identification : | Asbestos, Bulk Sample Analysis | | |
| Test Method : | Polarized Light Microscopy / Dispersion Staining (PLM/DS)<br>EPA Method 600 / R-93 / 116 | | |

Page 5 of 5

On 12/27/2022, fifty one (51) bulk material samples were submitted by Stephen Howard of Terracon - Birmingham for asbestos analysis by PLM/DS. The PLM Detail Report is attached; additional information may be found therein. The results are summarized below:

| Sample Number | Client Sample Description / Location | Asbestos Content |
|---|---|---|
| | | |

These samples were analyzed by layers. Quantification, unless otherwise noted, is performed by calibrated visual estimate. The test report shall not be reproduced except in full without written approval of the laboratory. The results relate only to the items tested. These test results do not imply endorsement by NVLAP or any agency of the U.S. Government. Accredited by the National Voluntary Laboratory Accreditation Program for Bulk Asbestos Fiber Analysis under Lab Code 102056-0.

NVLAP Testing NVLAP Lab Code 102056-0

Analyst(s): Debra O'Sullivan

Lab Manager : Heather Lopez — Approved Signatory : Heather Lopez

Lab Director : Bruce Crabb — Approved Signatory : Bruce Crabb

Thank you for choosing Moody Labs

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*Moody Labs*
2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

**PLM Detail Report**
**Supplement to PLM Summary Report**

NVLAP Lab Code 102056-0
TDSHS License No. 300084

Client : Terracon - Birmingham
Project : 2511 Fairlane Park Drive
Project # : E1227393

Lab Job No. : 22B-14190
Report Date : 12/30/2022

Page 1 of 7

| Sample Number | Layer | % Of Sample | Components | % of Layer | Analysis Date | Analyst |
|---|---|---|---|---|---|---|
| 1-1 | Floor Tile (Beige) | 99% | Calcite / Vinyl Binders | 100% | 12/30 | DO |
| | Yellow Mastic (Yellow) | 1% | Glue Binders | 100% | | |
| 1-2 | Floor Tile (Beige) | 99% | Calcite / Vinyl Binders | 100% | 12/30 | DO |
| | Yellow Mastic (Yellow) | 1% | Glue Binders | 100% | | |
| 1-3 | Floor Tile (Beige) | 100% | Calcite / Vinyl Binders | 100% | 12/30 | DO |
| | Yellow Mastic (Yellow) | <1% | Glue Binders | 100% | | |
| 2-4 | Floor Tile (Off-White) | 98% | Calcite / Vinyl Binders | 100% | 12/30 | DO |
| | Black Mastic (Black) | 2% | Polyethylene Fibers | 5% | | |
| | | | Tar Binders | 95% | | |
| 2-5 | Floor Tile (Off-White) | 98% | Calcite / Vinyl Binders | 100% | 12/30 | DO |
| | Black Mastic (Black) | 2% | Polyethylene Fibers | 5% | | |
| | | | Tar Binders | 95% | | |
| 2-6 | Floor Tile (Off-White) | 98% | Calcite / Vinyl Binders | 100% | 12/30 | DO |
| | Black Mastic (Black) | 2% | Polyethylene Fibers | 5% | | |
| | | | Tar Binders | 95% | | |
| 3-7 | Floor Tile (Off-White / Blue Speckles) | 98% | Calcite / Vinyl Binders | 100% | 12/30 | DO |
| | Yellow Mastic (Yellow) | 2% | Glue Binders | 100% | | |
| 3-8 | Floor Tile (Off-White / Blue Speckles) | 98% | Calcite / Vinyl Binders | 100% | 12/30 | DO |
| | Yellow Mastic (Yellow) | 2% | Glue Binders | 100% | | |
| 3-9 | Floor Tile (Off-White / Blue Speckles) | 96% | Calcite / Vinyl Binders | 100% | 12/30 | DO |
| | Yellow Mastic (Yellow) | 2% | Glue Binders | 100% | | |
| | Leveling Compound (Gray) | 2% | Calcite / Binders | 100% | | |
| 4-10 | Floor Tile (Blue) | 95% | Calcite / Vinyl Binders | 100% | 12/30 | DO |
| | Yellow Mastic (Yellow) | 2% | Glue Binders | 100% | | |
| | Leveling Compound 1 (Gray) | 2% | Calcite / Binders | 100% | | |
| | Leveling Compound 2 (White) | 1% | Calcite / Gypsum Binders | 100% | | |
| 4-11 | Floor Tile (Blue) | 97% | Calcite / Vinyl Binders | 100% | 12/30 | DO |
| | Yellow Mastic (Yellow) | 2% | Glue Binders | 100% | | |
| | Leveling Compound (White) | 1% | Calcite / Gypsum Binders | 100% | | |

*Moody Labs*
2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

**PLM Detail Report**
**Supplement to PLM Summary Report**

NVLAP Lab Code 102056-0
TDSHS License No. 300084

Client : Terracon - Birmingham
Project : 2511 Fairlane Park Drive
Project # : E1227393

Lab Job No. : 22B-14190
Report Date : 12/30/2022



| Sample Number | Layer | % Of Sample | Components | % of Layer | Analysis Date | Analyst |
|---|---|---|---|---|---|---|
| 4-12 | Floor Tile (Blue) | 95% | Calcite / Vinyl Binders | 100% | 12/30 | DO |
| | Yellow Mastic (Yellow) | 2% | Glue Binders | 100% | | |
| | Leveling Compound (White) | 3% | Calcite / Gypsum Binders | 100% | | |
| 5-13 | Sink Undercoating 1 (Gray) | 30% | Cellulose Fibers | 10% | 12/30 | DO |
| | | | Calcite / Talc | 50% | | |
| | | | Binders / Fillers | 40% | | |
| | Sink Undercoating 2 (Black) | 70% | Cellulose Fibers | 10% | | |
| | | | Calcite / Talc | 50% | | |
| | | | Binders / Fillers | 40% | | |
| | Tan Mastic (Tan) | <1% | Glue Binders | 100% | | |
| 5-14 | Sink Undercoating 1 (Gray) | 30% | Cellulose Fibers | 10% | 12/30 | DO |
| | | | Calcite / Talc | 50% | | |
| | | | Binders / Fillers | 40% | | |
| | Sink Undercoating 2 (Black) | 70% | Cellulose Fibers | 10% | | |
| | | | Calcite / Talc | 50% | | |
| | | | Binders / Fillers | 40% | | |
| | Tan Mastic (Tan) | <1% | Glue Binders | 100% | | |
| 5-15 | Sink Undercoating 1 (Gray) | 30% | Cellulose Fibers | 10% | 12/30 | DO |
| | | | Calcite / Talc | 50% | | |
| | | | Binders / Fillers | 40% | | |
| | Sink Undercoating 2 (Black) | 70% | Cellulose Fibers | 10% | | |
| | | | Calcite / Talc | 50% | | |
| | | | Binders / Fillers | 40% | | |
| | Tan Mastic (Tan) | <1% | Glue Binders | 100% | | |
| 6-16 | Sink Undercoating (Light Beige) | 100% | Cellulose Fibers | 10% | 12/30 | DO |
| | | | Calcite / Talc | 50% | | |
| | | | Binders / Fillers | 40% | | |
| 6-17 | Sink Undercoating (Light Beige) | 100% | Cellulose Fibers | 10% | 12/30 | DO |
| | | | Calcite / Talc | 50% | | |
| | | | Binders / Fillers | 40% | | |

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2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

**PLM Detail Report**
**Supplement to PLM Summary Report**

NVLAP Lab Code 102056-0
TDSHS License No. 300084

Client : Terracon - Birmingham
Project : 2511 Fairlane Park Drive
Project # : E1227393

Lab Job No. : 22B-14190
Report Date : 12/30/2022



| Sample Number | Layer | % Of Sample | Components | % of Layer | Analysis Date | Analyst |
|---|---|---|---|---|---|---|
| 6-18 | Sink Undercoating (Light Beige) | 100% | Cellulose Fibers | 10% | 12/30 | DO |
| | | | Calcite / Talc | 50% | | |
| | | | Binders / Fillers | 40% | | |
| 7-19 | Acoustic Tile (Light Gray) | 100% | Cellulose Fibers | 50% | 12/30 | DO |
| | | | Mineral Wool Fibers | 30% | | |
| | | | Perlite | 20% | | |
| 7-20 | Acoustic Tile (Light Gray) | 100% | Cellulose Fibers | 50% | 12/30 | DO |
| | | | Mineral Wool Fibers | 30% | | |
| | | | Perlite | 20% | | |
| 7-21 | Acoustic Tile (Light Gray) | 100% | Cellulose Fibers | 50% | 12/30 | DO |
| | | | Mineral Wool Fibers | 30% | | |
| | | | Perlite | 20% | | |
| 8-22 | Cove Base (Beige) | 70% | Calcite / Vinyl Binders | 100% | 12/30 | DO |
| | Cream Glue (Cream) | 29% | Calcite | 50% | | |
| | | | Glue Binders | 50% | | |
| | Yellow Glue (Yellow) | 1% | Glue Binders | 100% | | |
| 8-23 | Cove Base (Beige) | 75% | Calcite / Vinyl Binders | 100% | 12/30 | DO |
| | Cream Glue (Cream) | 24% | Calcite | 50% | | |
| | | | Glue Binders | 50% | | |
| | Yellow Glue (Yellow) | 1% | Glue Binders | 100% | | |
| 8-24 | Cove Base (Beige) | 90% | Calcite / Vinyl Binders | 100% | 12/30 | DO |
| | Cream Glue (Cream) | 10% | Calcite | 50% | | |
| | | | Glue Binders | 50% | | |
| | Yellow Glue (Yellow) | <1% | Glue Binders | 100% | | |
| 9-25 | Drywall Material (White) | 85% | Glass Wool Fibers | 2% | 12/30 | DO |
| | | | Mica | 1% | | |
| | | | Gypsum / Binders | 97% | | |
| | DW Paper / Tape (Tan / White) | 10% | Cellulose Fibers | 100% | | |
| | Joint Compound (White) | 5% | Calcite / Talc / Binders | 100% | | |

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**PLM Detail Report**
**Supplement to PLM Summary Report**

NVLAP Lab Code 102056-0
TDSHS License No. 300084

Client : Terracon - Birmingham
Project : 2511 Fairlane Park Drive
Project # : E1227393

Lab Job No. : 22B-14190
Report Date : 12/30/2022



| Sample Number | Layer | % Of Sample | Components | % of Layer | Analysis Date | Analyst |
|---|---|---|---|---|---|---|
| 9-26 | Drywall Material (White) | 90% | Glass Wool Fibers | 2% | 12/30 | DO |
| | | | Mica | 1% | | |
| | | | Gypsum / Binders | 97% | | |
| | DW Paper Facing (Tan) | 5% | Cellulose Fibers | 100% | | |
| | Joint Compound (White) | 5% | Calcite / Talc / Binders | 100% | | |
| 9-27 | Drywall Material (White) | 85% | Glass Wool Fibers | 2% | 12/30 | DO |
| | | | Mica | 1% | | |
| | | | Gypsum / Binders | 97% | | |
| | DW Paper / Tape (Tan / White) | 10% | Cellulose Fibers | 100% | | |
| | Joint Compound (White) | 5% | Calcite / Talc / Binders | 100% | | |
| 10-28 | Drywall Material (White) | 90% | Glass Wool Fibers | 2% | 12/30 | DO |
| | | | Cellulose Fibers | 1% | | |
| | | | Gypsum / Binders | 97% | | |
| | DW Paper / Tape (Tan / White) | 7% | Cellulose Fibers | 100% | | |
| | Joint Compound (White) | 3% | Calcite / Talc / Binders | 100% | | |
| 10-29 | Drywall Material (White) | 85% | Glass Wool Fibers | 2% | 12/30 | DO |
| | | | Cellulose Fibers | 1% | | |
| | | | Gypsum / Binders | 97% | | |
| | DW Paper / Tape (Tan / White) | 10% | Cellulose Fibers | 100% | | |
| | Joint Compound (White) | 5% | Calcite / Talc / Binders | 100% | | |
| 10-30 | Drywall Material (White) | 85% | Glass Wool Fibers | 2% | 12/30 | DO |
| | | | Cellulose Fibers | 1% | | |
| | | | Gypsum / Binders | 97% | | |
| | DW Paper / Tape (Tan / White) | 10% | Cellulose Fibers | 100% | | |
| | Joint Compound (White) | 5% | Calcite / Talc / Binders | 100% | | |
| 11-31 | Cove Base (Black) | 95% | Calcite / Vinyl Binders | 100% | 12/30 | DO |
| | Glue (Cream) | 5% | Calcite | 50% | | |
| | | | Glue Binders | 50% | | |

*Moody Labs*
2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

**PLM Detail Report**
**Supplement to PLM Summary Report**

NVLAP Lab Code 102056-0
TDSHS License No. 300084

Client : Terracon - Birmingham
Project : 2511 Fairlane Park Drive
Project # : E1227393

Lab Job No. : 22B-14190
Report Date : 12/30/2022

Page 5 of 7

| Sample Number | Layer | % Of Sample | Components | % of Layer | Analysis Date | Analyst |
|---|---|---|---|---|---|---|
| 11-32 | Cove Base (Black) | 98% | Calcite / Vinyl Binders | 100% | 12/30 | DO |
| | Glue (Cream) | 2% | Calcite | 50% | | |
| | | | Glue Binders | 50% | | |
| 11-33 | Cove Base (Black) | 95% | Calcite / Vinyl Binders | 100% | 12/30 | DO |
| | Glue (Cream) | 5% | Calcite | 50% | | |
| | | | Glue Binders | 50% | | |
| 12-34 | Cove Base (Gray) | 95% | Calcite / Vinyl Binders | 100% | 12/30 | DO |
| | Glue (Brown) | 5% | Glue Binders | 100% | | |
| 12-35 | Cove Base (Gray) | 95% | Calcite / Vinyl Binders | 100% | 12/30 | DO |
| | Glue (Brown) | 5% | Glue Binders | 100% | | |
| 12-36 | Cove Base (Gray) | 95% | Calcite / Vinyl Binders | 100% | 12/30 | DO |
| | Glue (Brown) | 5% | Glue Binders | 100% | | |
| 13-37 | Ceramic Tile (Pink) | 75% | Sintered Clays | 100% | 12/30 | DO |
| | Grout (Off-White) | 10% | Calcite / Binders | 100% | | |
| | Thinset (Cream) | 5% | Calcite | 50% | | |
| | | | Glue Binders | 50% | | |
| | Joint Compound (White) | 10% | Calcite / Talc / Binders | 100% | | |
| 13-38 | Ceramic Tile (Pink) | 80% | Sintered Clays | 100% | 12/30 | DO |
| | Grout (Off-White) | <1% | Calcite / Binders | 100% | | |
| | Thinset (Cream) | 5% | Calcite | 50% | | |
| | | | Glue Binders | 50% | | |
| | Joint Compound (White) | 15% | Calcite / Talc / Binders | 100% | | |
| 13-39 | Ceramic Tile (Pink) | 75% | Sintered Clays | 100% | 12/30 | DO |
| | Grout (Off-White) | 5% | Calcite / Binders | 100% | | |
| | Thinset (Cream) | 5% | Calcite | 50% | | |
| | | | Glue Binders | 50% | | |
| | Joint Compound (White) | 15% | Calcite / Talc / Binders | 100% | | |

*Moody Labs*
2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

**PLM Detail Report**
**Supplement to PLM Summary Report**

NVLAP Lab Code 102056-0
TDSHS License No. 300084

Client : Terracon - Birmingham
Project : 2511 Fairlane Park Drive
Project # : E1227393

Lab Job No. : 22B-14190
Report Date : 12/30/2022



| Sample Number | Layer | % Of Sample | Components | % of Layer | Analysis Date | Analyst |
|---|---|---|---|---|---|---|
| 14-40 | Ceramic Tile (Pink) | 80% | Sintered Clays | 100% | 12/30 | DO |
| | Grout (Off-White) | 10% | Calcite / Binders | 100% | | |
| | Thinset (Cream) | 5% | Calcite | 50% | | |
| | | | Glue Binders | 50% | | |
| | Joint Compound (White) | 5% | Calcite / Talc / Binders | 100% | | |
| 14-41 | Ceramic Tile (Pink) | 80% | Sintered Clays | 100% | 12/30 | DO |
| | Grout (Off-White) | 5% | Calcite / Binders | 100% | | |
| | Thinset (Cream) | 5% | Calcite | 50% | | |
| | | | Glue Binders | 50% | | |
| | Joint Compound (White) | 10% | Calcite / Talc / Binders | 100% | | |
| 14-42 | Ceramic Tile (Pink) | 80% | Sintered Clays | 100% | 12/30 | DO |
| | Grout (Off-White) | <1% | Calcite / Binders | 100% | | |
| | Thinset (Cream) | 10% | Calcite | 50% | | |
| | | | Glue Binders | 50% | | |
| | Joint Compound (White) | 10% | Calcite / Talc / Binders | 100% | | |
| 15-43 | Caulking (Dark Brown) | 100% | Chrysotile | 2% | 12/30 | DO |
| | | | Polyethylene Fibers | 5% | | |
| | | | Binders / Fillers | 93% | | |
| 15-44 | Not Analyzed - Positive Stop | 100% | | | 12/30 | DO |
| 15-45 | Not Analyzed - Positive Stop | 100% | | | 12/30 | DO |
| 16-46 | Caulking (Dark Brown) | 100% | Chrysotile | 2% | 12/30 | DO |
| | | | Polyethylene Fibers | 5% | | |
| | | | Binders / Fillers | 93% | | |
| 16-47 | Not Analyzed - Positive Stop | 100% | | | 12/30 | DO |
| 16-48 | Not Analyzed - Positive Stop | 100% | | | 12/30 | DO |
| 17-49 | Caulking (Black) | 100% | Chrysotile | 2% | 12/30 | DO |
| | | | Calcite | 25% | | |
| | | | Binders / Fillers | 73% | | |
| 17-50 | Not Analyzed - Positive Stop | 100% | | | 12/30 | DO |

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2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

**PLM Detail Report**
**Supplement to PLM Summary Report**

NVLAP Lab Code 102056-0
TDSHS License No. 300084

Client : Terracon - Birmingham
Project : 2511 Fairlane Park Drive
Project # : E1227393

Lab Job No. : 22B-14190
Report Date : 12/30/2022

Page 7 of 7

| Sample Number | Layer | % Of Sample | Components | % of Layer | Analysis Date | Analyst |
|---|---|---|---|---|---|---|
| 17-51 | Not Analyzed - Positive Stop | 100% | | | 12/30 | DO |

Moody Labs

# Chain of Custody

Lab Job # 22B - 14196
Lab Job # SI PLM
Lab Job #

AFTER HOURS / WEEKEND WORK: ☐ YES ☐ NO
*Please call in advance for after hours / immediate pricing & availability*

Page 1 of 4

**ASBESTOS PLM**

Bulk ☐ Immediate ☐ 1 day ☐ 2 day ☒ 3 day ☐ 5 day
☐ **Analyze All** ☒ **Positive Stop**

**PCM Air (7400)**

☐ Immediate ☐ 1 day ☐ 2 day ☐ 3 day ☐ 5 day
**Analyze Blanks** ☐ **Yes** ☐ **No**

**TOTAL DUST(0500/0600)**

☐ 1 day ☐ 2 day

**ASBESTOS TEM**

Air AHERA Method ☐ Late Night* ☐ 6 hr ☐ 12 hr ☐ 24 hr
Air 7402 (Modified) ☐ 1 day ☐ 2 day ☐ 3 day
Bulk ☐ 1 day ☐ 2 day ☐ 3 day ☐ 5 day
Water/Wipe/Micro Vac ☐ 1 day ☐ 2 day ☐ 3 day
**Analyze Blanks** ☐ **Yes** ☐ **No**

*Late night analysis surcharges apply

**MOLD**

Direct Exam ☐ Immed ☐ 1 day ☐ 2 day ☐ 5 day
Standard Air ☐ Immed ☐ 1 day ☐ 2 day ☐ 5 day
Expanded Air ☐ Immed ☐ 1 day ☐ 2 day ☐ 5 day
Culture** ☐ 10-14 days
TPC w/ Yeast & Mold (TYMC)** ☐ 5 day
**Analyze Blanks** ☐ **Yes** ☐ **No**

**BACTERIA****

Total Plate Count (TAMC) ☐ 2 day
Coliform & E. coli (P/A) ☐ 1 day
Staphylococcus aureus ☐ 1 day
**Please note Bateria / Mold Culture turnarounds are approximate and subject to analytical requirements**

**OTHER:**

**Billing Company / City:** Terracon Consultants / Birmingham # of Samples: 51 Sample Date: 12/20/22
Project: 2511 Fairlane Park Drive Project #: E1227393
**Contact Information:** Name: Stephen Howard Phone #: (205) 443-5224
E-mail Results to: Stephen.howard@terracon.com Mobile #:
Invoice Address: P.O. #:

*Please review paperwork and samples before submitting to lab. Unsealed / improperly packaged / damaged / expired samples or excessive administrative requests may incur additional fees*

Notes:

| Sample # | Sample Description | Vol. / Area (if applicable) | Location / Notes |
|---|---|---|---|
| | See attached Bulk Sampling Log | | |
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| Released By: | Date / Time: 12/22/22 | Received By: | Date / Time: 12/27/22 1:39 |
|---|---|---|---|
| Released By: | Date / Time: | Received By: | Date / Time: |

**Moody Labs, LLC** ♦ 2051 Valley View Ln. ♦ Farmers Branch, TX 75234 ♦ (972) 241-8460 ♦ Customerservice@moodylabs.com
www.moodylabs.com
MLQ-0315-2022

Terracon
2147 Riverchase Office Road
Birmingham, AL 35244
(205) 942-1289

228-14980

Collection Date: 12/21/2022 Inspector: Stephen Howard

Project Name: 2511 Fairlane Drive Project #: E1227393

## Asbestos Bulk Sampling Log

| HA | Sample No. | Sample Description | Location / Notes |
|---|---|---|---|
| 1 | 1-1 | 12x12-Inch Beige-Speckled Floor Tile & Mastic | Offices/Rooms |
| ↓ | 1-2 | ↓ | ↓ |
| ↓ | 1-3 | ↓ | ↓ |
| 2 | 2-4 | 12x12-Inch White-Speckled (Light-Brown) Floor Tile & Mastic | Stairwell Landing, West Side |
| ↓ | 2-5 | ↓ | ↓ |
| ↓ | 2-6 | ↓ | ↓ |
| 3 | 3-7 | 12x12-Inch White-Speckled (w/ Blue Specks) Floor Tile & Mastic | 2nd Floor Break Room |
| ↓ | 3-8 | ↓ | ↓ |
| ↓ | 3-9 | ↓ | ↓ |
| 4 | 4-10 | 12x12-Inch Blue Floor Tile & Mastic | 2nd Floor Break Room |
| ↓ | 4-11 | ↓ | ↓ |
| ↓ | 4-12 | ↓ | ↓ |
| 5 | 5-13 | Gray Metal Sink Undercoating | Metal Sinks |
| ↓ | 5-14 | ↓ | ↓ |
| ↓ | 5-15 | ↓ | ↓ |
| 6 | 6-16 | Beige Metal Sink Undercoating | Metal Sinks |
| ↓ | 6-17 | ↓ | ↓ |
| ↓ | 6-18 | ↓ | ↓ |

226490

## Asbestos Bulk Sampling Log

| HA | Sample No. | Sample Description | Location / Notes |
|---|---|---|---|
| 7 | 7-19 | 2x4-Foot Suspended Ceiling Tile | Throughout |
| ↓ | 7-20 | ↓ | ↓ |
| ↓ | 7-21 | ↓ | ↓ |
| 8 | 8-22 | Beige Cove Base Glue | Throughout |
| ↓ | 8-23 | ↓ | ↓ |
| ↓ | 8-24 | ↓ | ↓ |
| 9 | 9-25 | Drywall & Joint Compound | 1-Story Section |
| ↓ | 9-26 | ↓ | ↓ |
| ↓ | 9-27 | ↓ | ↓ |
| 10 | 10-28 | Drywall & Joint Compound | 2-Story Section |
| ↓ | 10-29 | ↓ | ↓ |
| ↓ | 10-30 | ↓ | ↓ |
| 11 | 11-31 | Black Cove Base Glue | Throughout |
| ↓ | 11-32 | ↓ | ↓ |
| ↓ | 11-33 | ↓ | ↓ |
| 12 | 12-34 | Black Cove Base Glue | Throughout |
| ↓ | 12-35 | ↓ | ↓ |
| ↓ | 12-36 | ↓ | ↓ |
| 13 | 13-37 | Ceramic Tile Thinset | Bathrooms |
| ↓ | 13-38 | ↓ | ↓ |

Page: 3 of 4

226-14 PAO

## Asbestos Bulk Sampling Log

| HA | Sample No. | Sample Description | | Location / Notes |
|---|---|---|---|---|
| 13 | 13-39 | Ceramic Tile Thinset | | Bathrooms |
| 14 | 14-40 | Ceramic Tile Thinset | | Bathrooms |
| 〃 | 14-41 | 〃 | | 〃 |
| 〃 | 14-42 | 〃 | | 〃 |
| 15 | 15-43 | Exterior Brown Caulk | | Metal-Frame Windows/Doors |
| 〃 | 15-44 | 〃 | | 〃 |
| 〃 | 15-45 | 〃 | | 〃 |
| 16 | 16-46 | Interior Brown Caulk | | Metal-Frame Windows/Doors |
| 〃 | 16-47 | 〃 | | 〃 |
| 〃 | 16-48 | 〃 | | 〃 |
| 17 | 17-49 | Interior Window Caulk | | Plate Glass Side Door Windows |
| 〃 | 17-50 | 〃 | | 〃 |
| 〃 | 17-51 | 〃 | | 〃 |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

Page: 4 of 4

Pre-Renovation Asbestos Inspection Report
4520 Executive Park Dr. & 2511 Fairlane Dr. | Montgomery, AL
January 25, 2023 | Terracon Report No. E1227393

# Appendix F

# Photographs

Pre-Renovation Asbestos Inspection Report
4520 Executive Park Dr. & 2511 Fairlane Dr. | Montgomery, AL
Photos Taken Dec. 20 & 21, 2022 | Terracon Report No. E1227393



**Photo #1** Example view of 4520 Executive Park Drive, Buildings 1 & 2.



**Photo #2** Example view of 4520 Executive Park Drive, Building 1.



**Photo #3** Example view of interior metal window framing w/ asbestos-containing caulk, 4520 Executive Park Drive, Building 1.



**Photo #4** Example view of interior metal window framing w/ asbestos-containing caulk, 4520 Executive Park Drive, Building 1.



**Photo #5** Example view of asbestos-containing white sealant/mastic, 4520 Executive Park Drive, Building 1 mechanical rooms and basement mechanical areas.



**Photo #6** Example view of asbestos-containing TSI wrap on cellular glass insulation, 4520 Executive Park Drive, Building 2, basement mechanical area, CentraVac Unit (joints, valves, and elbows).



**Photo #7** Example view of asbestos-containing white sealant/mastic, 4520 Executive Park Drive, Buildings 1 & 2, mechanical areas air return.



**Photo #8** Example view of asbestos-containing 12x12 floor tile (beige speckled) and black mastic, 4520 Executive Park Drive, Building 1.



**Photo #9** Example view of 12x12 floor tile (brown speckled) w/ asbestos-containing remnant black mastic, 4520 Executive Park Drive, Building 1.



**Photo #10** Example view of asbestos-containing metal sink undercoating, 4520 Executive Park Drive, Building 1.



**Photo #11** Example view of asbestos-containing 12x12 floor tile (brown speckled) and black mastic, 4520 Executive Park Drive, Building 2, east stairwell landings.



**Photo #12** Example view of asbestos-containing tar sealant, 4520 Executive Park Drive, Building 2, above suspended ceilings.



**Photo #13** Example view of asbestos-containing interior plate glass window caulking, 4520 Executive Park Drive, Building 2.



**Photo #14** Example view of asbestos-containing acoustical ceiling/wall texture, 4520 Executive Park Drive, Building 2.



**Photo #15** Example view of the 2511 Fairlane Drive building.



**Photo #16** Example view of metal frame windows w/ asbestos-containing caulk (interior & exterior), 2511 Fairlane Drive.



**Photo #17** Example view of metal frame windows w/ asbestos-containing caulk (interior & exterior), 2511 Fairlane Drive.



**Photo #18** Example view of interior plate glass side door windows w/ asbestos-containing caulk, 2511 Fairlane Drive.

Moody Labs

# PLM Summary Report

NVLAP Lab Code 102056-0
TDSHS License No. 300084

2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

| | | | |
|---|---|---|---|
| Client : | Terracon - Birmingham | Lab Job No. : | 23B-13215 |
| Project : | Trenholm State, Executive Park | Report Date : | 11/02/2023 |
| Project # : | E1227393 | Sample Date : | 11/01/2023 |
| Identification : | Asbestos, Bulk Sample Analysis | | |
| Test Method : | Polarized Light Microscopy / Dispersion Staining (PLM/DS)<br>EPA Method 600 / R-93 / 116 | | |

Page 1 of 2

On 11/2/2023, twelve (12) bulk material samples were submitted by Stephen Howard of Terracon - Birmingham for asbestos analysis by PLM/DS. The PLM Detail Report is attached; additional information may be found therein. The results are summarized below:

| Sample Number | Client Sample Description / Location | Asbestos Content |
|---|---|---|
| 1-1 | Stucco Soffit, Building D South Side | None Detected - Concrete<br>None Detected - Stucco |
| 1-2 | Stucco Soffit, Building D East Side | None Detected - Concrete<br>None Detected - Stucco |
| 1-3 | Stucco Soffit, Building D North Side | None Detected - Concrete<br>None Detected - Stucco |
| 2-4 | Stucco Soffit, Building C West Side | None Detected - Concrete<br>None Detected - Stucco |
| 2-5 | Stucco Soffit, Building C North Side | None Detected - Concrete<br>None Detected - Stucco |
| 2-6 | Stucco Soffit, Building C East Side | None Detected - Concrete<br>None Detected - Stucco |
| 3-7 | Stucco Soffit, Building B West Side | None Detected - Concrete<br>2% Chrysotile - Mortar<br>None Detected - Stucco |
| 3-8 | Stucco Soffit, Building B North Side | 2% Chrysotile - Mortar<br>None Detected - Stucco |
| 3-9 | Stucco Soffit, Building B East Side | 2% Chrysotile - Mortar<br>None Detected - Stucco |
| 4-10 | Stucco Soffit, Building A West Side | 2% Chrysotile - Mortar<br>None Detected - Stucco |
| 4-11 | Stucco Soffit, Building A North Side | 2% Chrysotile - Mortar<br>None Detected - Stucco |
| 4-12 | Stucco Soffit, Building A East Side | 2% Chrysotile - Mortar<br>None Detected - Stucco |

Moody Labs

# PLM Summary Report

NVLAP Lab Code 102056-0
TDSHS License No. 300084

2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

| | | | |
|---|---|---|---|
| Client : | Terracon - Birmingham | Lab Job No. : | 23B-13215 |
| Project : | Trenholm State, Executive Park | Report Date : | 11/02/2023 |
| Project # : | E1227393 | Sample Date : | 11/01/2023 |
| Identification : | Asbestos, Bulk Sample Analysis | | |
| Test Method : | Polarized Light Microscopy / Dispersion Staining (PLM/DS)<br>EPA Method 600 / R-93 / 116 | | |

Page 2 of 2

On 11/2/2023, twelve (12) bulk material samples were submitted by Stephen Howard of Terracon - Birmingham for asbestos analysis by PLM/DS. The PLM Detail Report is attached; additional information may be found therein. The results are summarized below:

| Sample Number | Client Sample Description / Location | Asbestos Content |
|---|---|---|
| | | |

These samples were analyzed by layers. Quantification, unless otherwise noted, is performed by calibrated visual estimate. The test report shall not be reproduced except in full without written approval of the laboratory. The results relate only to the items tested. These test results do not imply endorsement by NVLAP or any agency of the U.S. Government. Accredited by the National Voluntary Laboratory Accreditation Program for Bulk Asbestos Fiber Analysis under Lab Code 102056-0.

NVLAP Testing NVLAP Lab Code 102056-0

Analyst(s): Jared Martin

Lab Manager : Heather Lopez — Approved Signatory : Heather Lopez

Lab Director : Bruce Crabb — Approved Signatory : Bruce Crabb

Thank you for choosing Moody Labs

*Moody Labs*
2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

**PLM Detail Report**
**Supplement to PLM Summary Report**

NVLAP Lab Code 102056-0
TDSHS License No. 300084

Client : Terracon - Birmingham
Project : Trenholm State, Executive Park
Project # : E1227393

Lab Job No. : 23B-13215
Report Date : 11/02/2023



| Sample Number | Layer | % Of Sample | Components | % of Layer | Analysis Date | Analyst |
|---|---|---|---|---|---|---|
| 1-1 | Concrete (Grey) | 70% | Aggregate | 65% | 11/02 | JM |
| | | | Cement Binders | 35% | | |
| | Stucco (White) | 30% | Aggregate | 65% | | |
| | | | Binders / Fillers | 35% | | |
| 1-2 | Concrete (Grey) | 80% | Aggregate | 65% | 11/02 | JM |
| | | | Cement Binders | 35% | | |
| | Stucco (White) | 20% | Aggregate | 65% | | |
| | | | Binders / Fillers | 35% | | |
| 1-3 | Concrete (Grey) | 85% | Aggregate | 65% | 11/02 | JM |
| | | | Cement Binders | 35% | | |
| | Stucco (White) | 15% | Aggregate | 65% | | |
| | | | Binders / Fillers | 35% | | |
| 2-4 | Concrete (Grey) | 50% | Aggregate | 65% | 11/02 | JM |
| | | | Cement Binders | 35% | | |
| | Stucco (White) | 50% | Aggregate | 65% | | |
| | | | Binders / Fillers | 35% | | |
| 2-5 | Concrete (Grey) | 65% | Aggregate | 65% | 11/02 | JM |
| | | | Cement Binders | 35% | | |
| | Stucco (White) | 35% | Aggregate | 65% | | |
| | | | Binders / Fillers | 35% | | |
| 2-6 | Concrete (Grey) | 60% | Aggregate | 65% | 11/02 | JM |
| | | | Cement Binders | 35% | | |
| | Stucco (White) | 40% | Aggregate | 65% | | |
| | | | Binders / Fillers | 35% | | |

*Moody Labs*
2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

**PLM Detail Report**
**Supplement to PLM Summary Report**

NVLAP Lab Code 102056-0
TDSHS License No. 300084

Client : Terracon - Birmingham
Project : Trenholm State, Executive Park
Project # : E1227393

Lab Job No. : 23B-13215
Report Date : 11/02/2023

Page 2 of 3

| Sample Number | Layer | % Of Sample | Components | % of Layer | Analysis Date | Analyst |
|---|---|---|---|---|---|---|
| 3-7 | Concrete (Grey) | 25% | Aggregate | 65% | 11/02 | JM |
| | | | Cement Binders | 35% | | |
| | Mortar (Grey) | 10% | Chrysotile | 2% | | |
| | | | Aggregate | 63% | | |
| | | | Cement Binders | 35% | | |
| | Stucco (White) | 65% | Aggregate | 65% | | |
| | | | Binders / Fillers | 35% | | |
| 3-8 | Mortar (Grey) | 35% | Chrysotile | 2% | 11/02 | JM |
| | | | Aggregate | 63% | | |
| | | | Cement Binders | 35% | | |
| | Stucco (White) | 65% | Aggregate | 65% | | |
| | | | Binders / Fillers | 35% | | |
| 3-9 | Mortar (Grey) | 15% | Chrysotile | 2% | 11/02 | JM |
| | | | Aggregate | 63% | | |
| | | | Cement Binders | 35% | | |
| | Stucco (White) | 85% | Aggregate | 65% | | |
| | | | Binders / Fillers | 35% | | |
| 4-10 | Mortar (Grey) | 40% | Chrysotile | 2% | 11/02 | JM |
| | | | Aggregate | 63% | | |
| | | | Cement Binders | 35% | | |
| | Stucco (White) | 60% | Aggregate | 65% | | |
| | | | Binders / Fillers | 35% | | |
| 4-11 | Mortar (Grey) | 50% | Chrysotile | 2% | 11/02 | JM |
| | | | Aggregate | 63% | | |
| | | | Cement Binders | 35% | | |
| | Stucco (White) | 50% | Aggregate | 65% | | |
| | | | Binders / Fillers | 35% | | |

*Moody Labs*
2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

**PLM Detail Report**
**Supplement to PLM Summary Report**

NVLAP Lab Code 102056-0
TDSHS License No. 300084

Client : Terracon - Birmingham
Project : Trenholm State, Executive Park
Project # : E1227393

Lab Job No. : 23B-13215
Report Date : 11/02/2023

Page 3 of 3

| Sample Number | Layer | % Of Sample | Components | % of Layer | Analysis Date | Analyst |
|---|---|---|---|---|---|---|
| 4-12 | Mortar (Grey) | 50% | Chrysotile | 2% | 11/02 | JM |
| | | | Aggregate | 63% | | |
| | | | Cement Binders | 35% | | |
| | Stucco (White) | 50% | Aggregate | 65% | | |
| | | | Binders / Fillers | 35% | | |

Moody Labs

## Chain of Custody

Lab Job # 23B-132157LM12
Lab Job # _____
Lab Job # _____

AFTER HOURS / WEEKEND WORK: ☐ YES ☐ NO
*Please call in advance for after hours / immediate pricing & availability*

Page 1 of 1

**ASBESTOS PLM**

Bulk ☒ Immediate ☐ 1 day ☐ 2 day ☐ 3 day ☐ 5-7 day
☒ **Analyze All** ☐ **Positive Stop**

**PCM Air (7400)**

☐ Immediate ☐ 1 day ☐ 2 day ☐ 3 day ☐ 5 day
**Analyze Blanks** ☐ **Yes** ☐ **No**

**TOTAL DUST(0500/0600)**

☐ 1 day ☐ 2 day

**ASBESTOS TEM**

| | | | | |
|---|---|---|---|---|
| Air AHERA Method | ☐ Late Night* | ☐ 6 hr | ☐ 12 hr | ☐ 24 hr |
| Air 7402 (Modified) | ☐ 1 day | ☐ 2 day | ☐ 3 day | |
| Bulk | ☐ 1 day | ☐ 2 day | ☐ 3 day | ☐ 5 day |
| Water/Wipe/Micro Vac | ☐ 1 day | ☐ 2 day | ☐ 3 day | |
| **Analyze Blanks** | ☐ **Yes** | ☐ **No** | | |

*Late night analysis surcharges apply

**MOLD**

| | | | | |
|---|---|---|---|---|
| Direct Exam | ☐ Immed | ☐ 1 day | ☐ 2 day | ☐ 5 day |
| Standard Air | ☐ Immed | ☐ 1 day | ☐ 2 day | ☐ 5 day |
| Expanded Air | ☐ Immed | ☐ 1 day | ☐ 2 day | ☐ 5 day |
| TPC w/ Yeast & Mold (TYMC)** | | | | ☐ 5 day |
| Culture** | | ☐ 10-14 days | | |

**Analyze Blanks** ☐ **Yes** ☐ **No**

**BACTERIA****

| | |
|---|---|
| Total Plate Count (TAMC) | ☐ 2 day |
| Coliform & E. coli (P/A) | ☐ 1 day |
| Coliform & E. coli (Q) | ☐ 1 day |
| Enterococci (P/A) | ☐ 1 day |

**Please note Bateria / Mold Culture turnarounds are approximate and subject to analytical requirements**

**OTHER:** _____

**Billing Company / City:** Terracon / Birmingham # of Samples: 12 Sample Date: 11/1/23
Project: Trenholm State / Executive Park Project #: E1227393
**Contact Information:** Name: Stephen Howard Phone #: (205)475-8003
E-mail Results to: Stephen.howard@terracon.com Mobile #: (205) 903-0581
Invoice Address: _____ P.O. #: _____

*Please review paperwork and samples before submitting to lab. Unsealed / improperly packaged / damaged / expired samples or excessive administrative requests may incur additional fees*

Notes: Results needed 11/2/23 by 12 pm CST.

| Sample # | Sample Description | Vol. / Area (if applicable) | Location / Notes |
|---|---|---|---|
| 1-1 | Stucco Soffit | | Building D South Side |
| 1-2 | ↓ | | ↓ East Side |
| 1-3 | ↓ | | ↓ North Side |
| 2-4 | Stucco Soffit | | Building C West Side |
| 2-5 | ↓ | | ↓ North Side |
| 2-6 | ↓ | | ↓ East Side |
| 3-7 | Stucco Soffit | | Building B West Side |
| 3-8 | ↓ | | ↓ North Side |
| 3-9 | ↓ | | ↓ East Side |
| 4-10 | Stucco Soffit | | Building A West Side |
| 4-11 | ↓ | | ↓ North Side |
| 4-12 | ↓ | | ↓ East Side |
| | | | |
| | | | |
| | | | |

| Released By: | Date / Time: | Received By: | Date / Time: |
|---|---|---|---|
| | (11/1/23)(17:00) | Rad Ct | 11/2/23 8:00A |
| Released By: | Date / Time: | Received By: | Date / Time: |

**Moody Labs, LLC** ♦ 2051 Valley View Ln. ♦ Farmers Branch, TX 75234 ♦ (972) 241-8460 ♦ Customerservice@moodylabs.com
www.moodylabs.com
MLQ-0315-2023

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## PLM Summary Report

NVLAP Lab Code 102056-0
TDSHS License No. 300084

2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

| | | | |
|---|---|---|---|
| Client : | Terracon - Birmingham | Lab Job No. : | 23B-13423 |
| Project : | Trenholm, Executive Park Property | Report Date : | 11/08/2023 |
| Project # : | E1227393 | Sample Date : | 11/03/2023 |
| Identification : | Asbestos, Bulk Sample Analysis | | |
| Test Method : | Polarized Light Microscopy / Dispersion Staining (PLM/DS)<br>EPA Method 600 / R-93 / 116 | | |

Page 1 of 5

On 11/7/2023, fifty four (54) bulk material samples were submitted by Stephen Howard of Terracon - Birmingham for asbestos analysis by PLM/DS. The PLM Detail Report is attached; additional information may be found therein. The results are summarized below:

| Sample Number | Client Sample Description / Location | Asbestos Content |
|---|---|---|
| 1 | Pipe Wrap (Green), Building A, Mechanical Room, Main Level | None Detected - Paper / Foil Wrap<br>None Detected - White Mastic<br>5% Chrysotile - Black Mastic |
| 2 | Pipe Wrap (Green), Building A, Mechanical Room, Main Level | None Detected - Paper / Foil Wrap<br>None Detected - White Mastic<br>Layer Not Analyzed - Positive Stop |
| 3 | Pipe Wrap (Green), Building A, Mechanical Room, Main Level | None Detected - Paper / Foil Wrap<br>None Detected - White Mastic<br>Layer Not Analyzed - Positive Stop<br>65% Chrysotile - Thermal Insulation |
| 4 | Pipe Insulation (Green), End Caps, Building A, Mechanical Room, Main Level | 90% Chrysotile - Thermal Insulation |
| 5 | Pipe Insulation (Green), End Caps, Building A, Mechanical Room, Main Level | Layer Not Analyzed - Positive Stop<br>None Detected - Cotton Wrap<br>None Detected - White Mastic |
| 6 | Pipe Insulation (Green), End Caps, Building A, Mechanical Room, Main Level | Layer Not Analyzed - Positive Stop<br>None Detected - Cotton Wrap<br>None Detected - White Mastic |
| 7 | Pipe Insulation (Green), Elbows, Building A, Mechanical Room, Main Level | 50% Chrysotile - Thermal Insulation<br>None Detected - Cotton Wrap<br>None Detected - Paint |
| 8 | Pipe Insulation (Green), Elbows, Building A, Mechanical Room, Main Level | Layer Not Analyzed - Positive Stop<br>None Detected - Cotton Wrap<br>None Detected - White Mastic |
| 9 | Pipe Insulation (Green), Elbows, Building A, Mechanical Room, Main Level | Layer Not Analyzed - Positive Stop<br>None Detected - Cotton Wrap<br>None Detected - White Mastic |
| 10 | Window Caulk (Black), Buildings A-B Mezzanine | 3% Chrysotile - Caulking |
| 11 | Window Caulk (Black), Buildings A-B Mezzanine | Not Analyzed - Positive Stop |
| 12 | Window Caulk (Black), Buildings A-B Mezzanine | Not Analyzed - Positive Stop |

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## PLM Summary Report

NVLAP Lab Code 102056-0
TDSHS License No. 300084

2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

| | | | |
|---|---|---|---|
| Client : | Terracon - Birmingham | Lab Job No. : | 23B-13423 |
| Project : | Trenholm, Executive Park Property | Report Date : | 11/08/2023 |
| Project # : | E1227393 | Sample Date : | 11/03/2023 |
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Page 2 of 5

On 11/7/2023, fifty four (54) bulk material samples were submitted by Stephen Howard of Terracon - Birmingham for asbestos analysis by PLM/DS. The PLM Detail Report is attached; additional information may be found therein. The results are summarized below:

| Sample Number | Client Sample Description / Location | Asbestos Content |
|---|---|---|
| 13 | Window Frame Caulk (Hard, Brown), Buildings A-B Mezzanine | None Detected - Caulking |
| 14 | Window Frame Caulk (Hard, Brown), Buildings A-B Mezzanine | None Detected - Caulking |
| 15 | Window Frame Caulk (Hard, Brown), Buildings A-B Mezzanine | None Detected - Caulking |
| 16 | Window Frame Caulk (Hard, Brown), Building B | None Detected - Caulking |
| 17 | Window Frame Caulk (Hard, Brown), Building B | None Detected - Caulking |
| 18 | Window Frame Caulk (Hard, Brown), Building B | None Detected - Caulking |
| 19 | 9" x 9" Floor Tile (Maroon), Building B, 1st Floor | 3% Chrysotile - Floor Tile<br>5% Chrysotile - Black Mastic |
| 20 | 9" x 9" Floor Tile (Maroon), Building B, 1st Floor | Layer Not Analyzed - Positive Stop<br>Layer Not Analyzed - Positive Stop |
| 21 | 9" x 9" Floor Tile (Maroon), Building B, 1st Floor | Layer Not Analyzed - Positive Stop<br>Layer Not Analyzed - Positive Stop |
| 22 | 12" x 12" Floor Tile (Beige Speckled), Building B, 1st Floor | 3% Chrysotile - Floor Tile<br>5% Chrysotile - Black Mastic |
| 23 | 12" x 12" Floor Tile (Beige Speckled), Building B, 1st Floor | Layer Not Analyzed - Positive Stop<br>Layer Not Analyzed - Positive Stop |
| 24 | 12" x 12" Floor Tile (Beige Speckled), Building B, 1st Floor | Layer Not Analyzed - Positive Stop<br>Layer Not Analyzed - Positive Stop |
| 25 | 12" x 12" Floor Tile (Beige Streaked), Building B, West Stairwell | None Detected - Floor Tile<br>3% Chrysotile - Black Mastic |
| 26 | 12" x 12" Floor Tile (Beige Streaked), Building B, West Stairwell | None Detected - Floor Tile<br>Layer Not Analyzed - Positive Stop |
| 27 | 12" x 12" Floor Tile (Beige Streaked), Building B, West Stairwell | None Detected - Floor Tile<br>Layer Not Analyzed - Positive Stop |

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## PLM Summary Report

NVLAP Lab Code 102056-0
TDSHS License No. 300084

2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

| | | | |
|---|---|---|---|
| Client : | Terracon - Birmingham | Lab Job No. : | 23B-13423 |
| Project : | Trenholm, Executive Park Property | Report Date : | 11/08/2023 |
| Project # : | E1227393 | Sample Date : | 11/03/2023 |
| Identification : | Asbestos, Bulk Sample Analysis | | |
| Test Method : | Polarized Light Microscopy / Dispersion Staining (PLM/DS)<br>EPA Method 600 / R-93 / 116 | | |



On 11/7/2023, fifty four (54) bulk material samples were submitted by Stephen Howard of Terracon - Birmingham for asbestos analysis by PLM/DS. The PLM Detail Report is attached; additional information may be found therein. The results are summarized below:

| Sample Number | Client Sample Description / Location | Asbestos Content |
|---|---|---|
| 28 | 12" x 12" Floor Tile, Building B Elevator Cabin | None Detected - Floor Tile<br>None Detected - Yellow Mastic |
| 29 | 12" x 12" Floor Tile, Building B Elevator Cabin | None Detected - Floor Tile<br>None Detected - Yellow Mastic |
| 30 | 12" x 12" Floor Tile, Building B Elevator Cabin | None Detected - Floor Tile<br>None Detected - Yellow Mastic |
| 31 | Carpet Glue, Building B | None Detected - Yellow Glue |
| 32 | Carpet Glue, Building B | None Detected - Yellow Glue |
| 33 | Carpet Glue, Building B | None Detected - Yellow Glue |
| 34 | 12" x 12" Floor Tile (Beige with Brown Streaks), Building C, 2nd Floor | 5% Chrysotile - Floor Tile<br>None Detected - Yellow Mastic<br>5% Chrysotile - Black Mastic |
| 35 | 12" x 12" Floor Tile (Beige with Brown Streaks), Building C, 2nd Floor | Layer Not Analyzed - Positive Stop<br>None Detected - Yellow Mastic<br>Layer Not Analyzed - Positive Stop |
| 36 | 12" x 12" Floor Tile (Beige with Brown Streaks), Building C, 2nd Floor | Layer Not Analyzed - Positive Stop<br>None Detected - Yellow Mastic<br>Layer Not Analyzed - Positive Stop |
| 37 | Carpet Glue, Building D | None Detected - Yellow Glue |
| 38 | Carpet Glue, Building D | None Detected - Yellow Glue |
| 39 | Carpet Glue, Building D | None Detected - Yellow Glue |
| 40 | Pipe Wrap (Green), Building D, Mechanical Rooms | None Detected - Black Mastic<br>None Detected - Paper / Foil Wrap<br>None Detected - Paint |
| 41 | Pipe Wrap (Green), Building D, Mechanical Rooms | None Detected - Black Mastic<br>None Detected - Paper / Foil Wrap<br>None Detected - Paint |

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## PLM Summary Report

NVLAP Lab Code 102056-0
TDSHS License No. 300084

2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

| | | | |
|---|---|---|---|
| Client : | Terracon - Birmingham | Lab Job No. : | 23B-13423 |
| Project : | Trenholm, Executive Park Property | Report Date : | 11/08/2023 |
| Project # : | E1227393 | Sample Date : | 11/03/2023 |
| Identification : | Asbestos, Bulk Sample Analysis | | |
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Page 4 of 5

On 11/7/2023, fifty four (54) bulk material samples were submitted by Stephen Howard of Terracon - Birmingham for asbestos analysis by PLM/DS. The PLM Detail Report is attached; additional information may be found therein. The results are summarized below:

| Sample Number | Client Sample Description / Location | Asbestos Content |
|---|---|---|
| 42 | Pipe Wrap (Green), Building D, Mechanical Rooms | None Detected - Black Mastic<br>None Detected - Paper / Foil Wrap<br>None Detected - Paint |
| 43 | Window Frame Caulk (Brown), Building C, Lobby | None Detected - Caulking |
| 44 | Window Frame Caulk (Brown), Building C, Lobby | None Detected - Caulking |
| 45 | Window Frame Caulk (Brown), Building C, Lobby | None Detected - Caulking |
| 46 | Window Caulk (Black), Building C, Lobby | 2% Chrysotile - Caulking |
| 47 | Window Caulk (Black), Building C, Lobby | Not Analyzed - Positive Stop |
| 48 | Window Caulk (Black), Building C, Lobby | Not Analyzed - Positive Stop |
| 49 | Pipe Wrap (White), Building D | None Detected - Insulation<br>None Detected - Paper / Foil Wrap<br>None Detected - White Mastic |
| 50 | Pipe Wrap (White), Building D | No Insulation<br>None Detected - Paper / Foil Wrap<br>None Detected - White Mastic |
| 51 | Pipe Wrap (White), Building D | None Detected - Insulation<br>None Detected - Paper / Foil Wrap<br>None Detected - White Mastic |
| 52 | Pipe Wrap (Green), Building C, Basement | None Detected - Glass Foam<br>None Detected - Paper / Foil Wrap<br>None Detected - Green Mastic |
| 53 | Pipe Wrap (Green), Building C, Basement | None Detected - Glass Foam<br>None Detected - Paper / Foil Wrap<br>None Detected - Green Mastic |
| 54 | Pipe Wrap (Green), Building C, Basement | None Detected - Glass Foam<br>None Detected - Paper / Foil Wrap<br>None Detected - Green Mastic |

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# PLM Summary Report

NVLAP Lab Code 102056-0
TDSHS License No. 300084

2051 Valley View Lane
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| | | | |
|---|---|---|---|
| Client : | Terracon - Birmingham | Lab Job No. : | 23B-13423 |
| Project : | Trenholm, Executive Park Property | Report Date : | 11/08/2023 |
| Project # : | E1227393 | Sample Date : | 11/03/2023 |
| Identification : | Asbestos, Bulk Sample Analysis | | |
| Test Method : | Polarized Light Microscopy / Dispersion Staining (PLM/DS)<br>EPA Method 600 / R-93 / 116 | | |

Page 5 of 5

On 11/7/2023, fifty four (54) bulk material samples were submitted by Stephen Howard of Terracon - Birmingham for asbestos analysis by PLM/DS. The PLM Detail Report is attached; additional information may be found therein. The results are summarized below:

| Sample Number | Client Sample Description / Location | Asbestos Content |
|---|---|---|
| | | |

These samples were analyzed by layers. Quantification, unless otherwise noted, is performed by calibrated visual estimate. The test report shall not be reproduced except in full without written approval of the laboratory. The results relate only to the items tested. These test results do not imply endorsement by NVLAP or any agency of the U.S. Government. Accredited by the National Voluntary Laboratory Accreditation Program for Bulk Asbestos Fiber Analysis under Lab Code 102056-0.

NVLAP Testing NVLAP Lab Code 102056-0

Analyst(s): Amy Le, Hannah Wall, Shaun Wilkerson

Lab Manager : Heather Lopez — Approved Signatory : Heather Lopez

Lab Director : Bruce Crabb — Approved Signatory : Bruce Crabb

Thank you for choosing Moody Labs

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Farmers Branch, TX 75234 Phone: (972) 241-8460

**PLM Detail Report**
**Supplement to PLM Summary Report**

NVLAP Lab Code 102056-0
TDSHS License No. 300084

Client : Terracon - Birmingham
Project : Trenholm, Executive Park Property
Project # : E1227393

Lab Job No. : 23B-13423
Report Date : 11/08/2023

Page 1 of 7

| Sample Number | Layer | % Of Sample | Components | % of Layer | Analysis Date | Analyst |
|---|---|---|---|---|---|---|
| 1 | Paper / Foil Wrap (Tan / Silver) | 92% | Cellulose Fibers | 60% | 11/07 | HW |
| | | | Glass Wool Fibers | 20% | | |
| | | | Metal Foil | 20% | | |
| | White Mastic (White) | 3% | Calcite | 50% | | |
| | | | Binders / Fillers | 50% | | |
| | Black Mastic (Black) | 5% | Chrysotile | 5% | | |
| | | | Tar Binders | 95% | | |
| 2 | Paper / Foil Wrap (Tan / Silver) | 97% | Cellulose Fibers | 60% | 11/07 | HW |
| | | | Glass Wool Fibers | 20% | | |
| | | | Metal Foil | 20% | | |
| | White Mastic (White) | 3% | Calcite | 50% | | |
| | | | Binders / Fillers | 50% | | |
| | Layer Not Analyzed - Positive Stop | | | | | |
| 3 | Paper / Foil Wrap (Tan / Silver) | 87% | Cellulose Fibers | 60% | 11/07 | HW |
| | | | Glass Wool Fibers | 20% | | |
| | | | Metal Foil | 20% | | |
| | White Mastic (White) | 3% | Calcite | 50% | | |
| | | | Binders / Fillers | 50% | | |
| | Layer Not Analyzed - Positive Stop | | | | | |
| | Thermal Insulation (Grey) | 10% | Chrysotile | 65% | | |
| | | | Binders / Fillers | 35% | | |
| 4 | Thermal Insulation (Light Grey) | 100% | Chrysotile | 90% | 11/07 | HW |
| | | | Binders / Fillers | 10% | | |
| 5 | Layer Not Analyzed - Positive Stop | | | | 11/08 | SW |
| | Cotton Wrap (Off-White) | 50% | Cotton Fibers | 100% | | |
| | White Mastic (White) | 50% | Calcite | 50% | | |
| | | | Binders / Fillers | 50% | | |

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**PLM Detail Report**
**Supplement to PLM Summary Report**

NVLAP Lab Code 102056-0
TDSHS License No. 300084

Client : Terracon - Birmingham
Project : Trenholm, Executive Park Property
Project # : E1227393

Lab Job No. : 23B-13423
Report Date : 11/08/2023

Page 2 of 7

| Sample Number | Layer | % Of Sample | Components | % of Layer | Analysis Date | Analyst |
|---|---|---|---|---|---|---|
| 6 | Layer Not Analyzed - Positive Stop | | | | 11/08 | SW |
| | Cotton Wrap (Off-White) | 50% | Cotton Fibers | 100% | | |
| | White Mastic (White) | 50% | Calcite | 50% | | |
| | | | Binders / Fillers | 50% | | |
| 7 | Thermal Insulation (White) | 89% | Chrysotile | 50% | 11/08 | SW |
| | | | Cellulose Fibers | 40% | | |
| | | | Binders / Fillers | 10% | | |
| | Cotton Wrap (Off-White) | 10% | Cotton Fibers | 100% | | |
| | Paint (Green) | 1% | Pigment / Binders | 100% | | |
| 8 | Layer Not Analyzed - Positive Stop | | | | 11/08 | SW |
| | Cotton Wrap (Off-White) | 50% | Cotton Fibers | 100% | | |
| | White Mastic (White) | 50% | Calcite | 50% | | |
| | | | Binders / Fillers | 50% | | |
| 9 | Layer Not Analyzed - Positive Stop | | | | 11/08 | SW |
| | Cotton Wrap (Off-White) | 50% | Cotton Fibers | 100% | | |
| | White Mastic (White) | 50% | Calcite | 50% | | |
| | | | Binders / Fillers | 50% | | |
| 10 | Caulking (Black) | 100% | Chrysotile | 3% | 11/07 | HW |
| | | | Binders / Fillers | 97% | | |
| 11 | Not Analyzed - Positive Stop | 100% | | | 11/07 | HW |
| 12 | Not Analyzed - Positive Stop | 100% | | | 11/07 | HW |
| 13 | Caulking (Brown) | 100% | Polyethylene Fibers | 3% | 11/07 | HW |
| | | | Binders / Fillers | 97% | | |
| 14 | Caulking (Brown) | 100% | Polyethylene Fibers | 3% | 11/07 | HW |
| | | | Binders / Fillers | 97% | | |
| 15 | Caulking (Brown) | 100% | Polyethylene Fibers | 3% | 11/07 | HW |
| | | | Binders / Fillers | 97% | | |
| 16 | Caulking (Brown) | 100% | Calcite | 50% | 11/07 | HW |
| | | | Binders / Fillers | 50% | | |

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**PLM Detail Report**
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NVLAP Lab Code 102056-0
TDSHS License No. 300084

Client : Terracon - Birmingham
Project : Trenholm, Executive Park Property
Project # : E1227393

Lab Job No. : 23B-13423
Report Date : 11/08/2023



| Sample Number | Layer | % Of Sample | Components | % of Layer | Analysis Date | Analyst |
|---|---|---|---|---|---|---|
| 17 | Caulking (Brown) | 100% | Calcite | 50% | 11/07 | HW |
| | | | Binders / Fillers | 50% | | |
| 18 | Caulking (Brown) | 100% | Calcite | 50% | 11/07 | HW |
| | | | Binders / Fillers | 50% | | |
| 19 | Floor Tile (Red) | 95% | Chrysotile | 3% | 11/07 | HW |
| | | | Calcite / Vinyl Binders | 97% | | |
| | Black Mastic (Black) | 5% | Chrysotile | 5% | | |
| | | | Tar Binders | 95% | | |
| 20 | Layer Not Analyzed - Positive Stop | 100% | | | 11/07 | HW |
| | Layer Not Analyzed - Positive Stop | | | | | |
| 21 | Layer Not Analyzed - Positive Stop | 100% | | | 11/07 | HW |
| | Layer Not Analyzed - Positive Stop | | | | | |
| 22 | Floor Tile (Beige) | 95% | Chrysotile | 3% | 11/07 | HW |
| | | | Calcite / Vinyl Binders | 97% | | |
| | Black Mastic (Black) | 5% | Chrysotile | 5% | | |
| | | | Tar Binders | 95% | | |
| 23 | Layer Not Analyzed - Positive Stop | 100% | | | 11/07 | HW |
| | Layer Not Analyzed - Positive Stop | | | | | |
| 24 | Layer Not Analyzed - Positive Stop | 100% | | | 11/07 | HW |
| | Layer Not Analyzed - Positive Stop | | | | | |
| 25 | Floor Tile (Beige) | 95% | Cellulose Fibers | 5% | 11/07 | SW |
| | | | Calcite / Vinyl Binders | 95% | | |
| | Black Mastic (Black) | 5% | Chrysotile | 3% | | |
| | | | Polyethylene Fibers | 5% | | |
| | | | Tar Binders | 92% | | |
| 26 | Floor Tile (Beige) | 100% | Cellulose Fibers | 5% | 11/07 | SW |
| | | | Calcite / Vinyl Binders | 95% | | |
| | Layer Not Analyzed - Positive Stop | | | | | |

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**PLM Detail Report**
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NVLAP Lab Code 102056-0
TDSHS License No. 300084

Client : Terracon - Birmingham
Project : Trenholm, Executive Park Property
Project # : E1227393

Lab Job No. : 23B-13423
Report Date : 11/08/2023

Page 4 of 7

| Sample Number | Layer | % Of Sample | Components | % of Layer | Analysis Date | Analyst |
|---|---|---|---|---|---|---|
| 27 | Floor Tile (Beige) | 100% | Cellulose Fibers | 5% | 11/07 | SW |
| | | | Calcite / Vinyl Binders | 95% | | |
| | Layer Not Analyzed - Positive Stop | | | | | |
| 28 | Floor Tile (Beige) | 98% | Calcite / Vinyl Binders | 100% | 11/07 | SW |
| | Yellow Mastic (Yellow) | 2% | Glue Binders | 100% | | |
| 29 | Floor Tile (Beige) | 98% | Calcite / Vinyl Binders | 100% | 11/07 | SW |
| | Yellow Mastic (Yellow) | 2% | Glue Binders | 100% | | |
| 30 | Floor Tile (Beige) | 98% | Calcite / Vinyl Binders | 100% | 11/07 | SW |
| | Yellow Mastic (Yellow) | 2% | Glue Binders | 100% | | |
| 31 | Yellow Glue (Yellow) | 100% | Calcite | 40% | 11/07 | SW |
| | | | Glue Binders | 60% | | |
| 32 | Yellow Glue (Yellow) | 100% | Calcite | 40% | 11/07 | SW |
| | | | Glue Binders | 60% | | |
| 33 | Yellow Glue (Yellow) | 100% | Calcite | 40% | 11/07 | SW |
| | | | Glue Binders | 60% | | |
| 34 | Floor Tile (Beige) | 93% | Chrysotile | 5% | 11/07 | SW |
| | | | Calcite / Vinyl Binders | 95% | | |
| | Yellow Mastic (Yellow) | 2% | Glue Binders | 100% | | |
| | Black Mastic (Black) | 5% | Chrysotile | 5% | | |
| | | | Tar Binders | 95% | | |
| 35 | Layer Not Analyzed - Positive Stop | 96% | | | 11/07 | SW |
| | Yellow Mastic (Yellow) | 1% | Glue Binders | 100% | | |
| | Layer Not Analyzed - Positive Stop | 3% | | | | |
| 36 | Layer Not Analyzed - Positive Stop | 96% | | | 11/07 | SW |
| | Yellow Mastic (Yellow) | 1% | Glue Binders | 100% | | |
| | Layer Not Analyzed - Positive Stop | 3% | | | | |
| 37 | Yellow Glue (Yellow) | 100% | Glue Binders | 100% | 11/07 | SW |
| 38 | Yellow Glue (Yellow) | 100% | Glue Binders | 100% | 11/07 | SW |

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**PLM Detail Report**
**Supplement to PLM Summary Report**

NVLAP Lab Code 102056-0
TDSHS License No. 300084

Client : Terracon - Birmingham
Project : Trenholm, Executive Park Property
Project # : E1227393

Lab Job No. : 23B-13423
Report Date : 11/08/2023



| Sample Number | Layer | % Of Sample | Components | % of Layer | Analysis Date | Analyst |
|---|---|---|---|---|---|---|
| 39 | Yellow Glue (Yellow) | 100% | Glue Binders | 100% | 11/07 | SW |
| 40 | Black Mastic (Black) | 5% | Tar Binders | 100% | 11/07 | SW |
| | Paper / Foil Wrap (Tan / Silver) | 94% | Cellulose Fibers | 60% | | |
| | | | Glass Wool Fibers | 20% | | |
| | | | Metal Foil | 20% | | |
| | Paint (Green) | 1% | Pigment / Binders | 100% | | |
| 41 | Black Mastic (Black) | 5% | Tar Binders | 100% | 11/07 | SW |
| | Paper / Foil Wrap (Tan / Silver) | 94% | Cellulose Fibers | 60% | | |
| | | | Glass Wool Fibers | 20% | | |
| | | | Metal Foil | 20% | | |
| | Paint (Green) | 1% | Pigment / Binders | 100% | | |
| 42 | Black Mastic (Black) | 5% | Tar Binders | 100% | 11/07 | SW |
| | Paper / Foil Wrap (Tan / Silver) | 94% | Cellulose Fibers | 60% | | |
| | | | Glass Wool Fibers | 20% | | |
| | | | Metal Foil | 20% | | |
| | Paint (Green) | 1% | Pigment / Binders | 100% | | |
| 43 | Caulking (Brown) | 100% | Calcite | 40% | 11/07 | SW |
| | | | Binders / Fillers | 60% | | |
| 44 | Caulking (Brown) | 100% | Calcite | 40% | 11/07 | SW |
| | | | Binders / Fillers | 60% | | |
| 45 | Caulking (Brown) | 100% | Calcite | 40% | 11/07 | SW |
| | | | Binders / Fillers | 60% | | |
| 46 | Caulking (Black) | 100% | Chrysotile | 2% | 11/07 | HW |
| | | | Binders / Fillers | 98% | | |
| 47 | Not Analyzed - Positive Stop | 100% | | | 11/07 | HW |
| 48 | Not Analyzed - Positive Stop | 100% | | | 11/07 | HW |

*Moody Labs*
2051 Valley View Lane
Farmers Branch, TX 75234 Phone: (972) 241-8460

**PLM Detail Report**
**Supplement to PLM Summary Report**

NVLAP Lab Code 102056-0
TDSHS License No. 300084

Client : Terracon - Birmingham
Project : Trenholm, Executive Park Property
Project # : E1227393

Lab Job No. : 23B-13423
Report Date : 11/08/2023

Page 6 of 7

| Sample Number | Layer | % Of Sample | Components | % of Layer | Analysis Date | Analyst |
|---|---|---|---|---|---|---|
| 49 | Insulation (Yellow) | 3% | Mineral Wool Fibers | 95% | 11/07 | HW |
| | | | Resin Binders | 5% | | |
| | Paper / Foil Wrap (White / Silver) | 92% | Cellulose Fibers | 60% | | |
| | | | Glass Wool Fibers | 20% | | |
| | | | Metal Foil | 20% | | |
| | White Mastic (Off-White) | 5% | Pigment / Binders | 100% | | |
| 50 | No Insulation | | | | 11/08 | AL |
| | Paper / Foil Wrap (White / Silver) | 85% | Cellulose Fibers | 60% | | |
| | | | Glass Wool Fibers | 20% | | |
| | | | Metal Foil | 20% | | |
| | White Mastic (Off-White) | 15% | Pigment / Binders | 100% | | |
| 51 | Insulation (Yellow) | <1% | Mineral Wool Fibers | 95% | 11/08 | AL |
| | | | Resin Binders | 5% | | |
| | Paper / Foil Wrap (White / Silver) | 85% | Cellulose Fibers | 60% | | |
| | | | Glass Wool Fibers | 20% | | |
| | | | Metal Foil | 20% | | |
| | White Mastic (Off-White) | 15% | Pigment / Binders | 100% | | |
| 52 | Glass Foam (Black) | 50% | Glass Foam | 100% | 11/08 | AL |
| | Paper / Foil Wrap (White / Silver) | 45% | Cellulose Fibers | 55% | | |
| | | | Glass Wool Fibers | 20% | | |
| | | | Metal Foil | 20% | | |
| | | | Tar Binders | 5% | | |
| | Green Mastic (Green) | 5% | Calcite | 50% | | |
| | | | Binders / Fillers | 50% | | |

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**PLM Detail Report**
**Supplement to PLM Summary Report**

NVLAP Lab Code 102056-0
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Client : Terracon - Birmingham
Project : Trenholm, Executive Park Property
Project # : E1227393

Lab Job No. : 23B-13423
Report Date : 11/08/2023

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| Sample Number | Layer | % Of Sample | Components | % of Layer | Analysis Date | Analyst |
|---|---|---|---|---|---|---|
| 53 | Glass Foam (Black) | 45% | Glass Foam | 100% | 11/08 | AL |
| | Paper / Foil Wrap (White / Silver) | 50% | Cellulose Fibers | 55% | | |
| | | | Glass Wool Fibers | 20% | | |
| | | | Metal Foil | 20% | | |
| | | | Tar Binders | 5% | | |
| | Green Mastic (Green) | 5% | Calcite | 50% | | |
| | | | Binders / Fillers | 50% | | |
| 54 | Glass Foam (Black) | 40% | Glass Foam | 100% | 11/08 | AL |
| | Paper / Foil Wrap (White / Silver) | 55% | Cellulose Fibers | 60% | | |
| | | | Glass Wool Fibers | 20% | | |
| | | | Metal Foil | 20% | | |
| | Green Mastic (Green) | 5% | Calcite | 50% | | |
| | | | Binders / Fillers | 50% | | |

Moody Labs

## Chain of Custody

Lab Job # 238.11423.PLM.54
Lab Job #
Lab Job #

AFTER HOURS / WEEKEND WORK: ☐ YES ☐ NO
*Please call in advance for after hours / immediate pricing & availability*

Page 1 of 4

**ASBESTOS PLM** (per Stephen H.: NAT)

Bulk ☐ Immediate ☑ 1 day ☐ 2 day ☐ 3 day ☐ 5-7 day
☐ Analyze All ☒ Positive Stop

**PCM Air (7400)**

☐ Immediate ☐ 1 day ☐ 2 day ☐ 3 day ☐ 5 day
Analyze Blanks ☐ Yes ☐ No

**TOTAL DUST(0500/0600)**

☐ 1 day ☐ 2 day

**ASBESTOS TEM**

| | | | | |
|---|---|---|---|---|
| Air AHERA Method | ☐ Late Night* | ☐ 6 hr | ☐ 12 hr | ☐ 24 hr |
| Air 7402 (Modified) | ☐ 1 day | ☐ 2 day | ☐ 3 day | |
| Bulk | ☐ 1 day | ☐ 2 day | ☐ 3 day | ☐ 5 day |
| Water/Wipe/Micro Vac | ☐ 1 day | ☐ 2 day | ☐ 3 day | |
| Analyze Blanks | ☐ Yes | ☐ No | | |

*Late night analysis surcharges apply

**MOLD**

| | | | | |
|---|---|---|---|---|
| Direct Exam | ☐ Immed | ☐ 1 day | ☐ 2 day | ☐ 5 day |
| Standard Air | ☐ Immed | ☐ 1 day | ☐ 2 day | ☐ 5 day |
| Expanded Air | ☐ Immed | ☐ 1 day | ☐ 2 day | ☐ 5 day |
| TPC w/ Yeast & Mold (TYMC)** | | | | ☐ 5 day |
| Culture** | | | ☐ 10-14 days | |

Analyze Blanks ☐ Yes ☐ No

**BACTERIA****

| | |
|---|---|
| Total Plate Count (TAMC) | ☐ 2 day |
| Coliform & E. coli (P/A) | ☐ 1 day |
| Coliform & E. coli (Q) | ☐ 1 day |
| Enterococci (P/A) | ☐ 1 day |

**Please note Bateria / Mold Culture turnarounds are approximate and subject to analytical requirements**

**OTHER:** _____

**Billing Company / City:** Terracon / Birmingham # of Samples: 54 Sample Date: 11/3/23

Project: Trenholm / Executive Park Property Project #: E1227393

**Contact Information:** Name: Stephen Howard Phone #: _____

E-mail Results to: Stephen.howard@terracon.com Mobile #: (205) 903-0581

Invoice Address: _____ P.O. #: _____

*Please review paperwork and samples before submitting to lab. Unsealed / improperly packaged / damaged / expired samples or excessive administrative requests may incur additional fees*

Notes: _____

| Sample # | Sample Description | Vol. / Area (if applicable) | Location / Notes |
|---|---|---|---|
| | See Attached Bulks Sample Summary | | |
| | | | |
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| Released By: | Date / Time: | Received By: | Date / Time: |
|---|---|---|---|
| | 11/6/23 | Via Fed Ex | 11/7/23 9:45a |
| Released By: | Date / Time: | Received By: | Date / Time: |

**Moody Labs, LLC** • 2051 Valley View Ln. • Farmers Branch, TX 75234 • (972) 241-8460 • Customerservice@moodylabs.com
www.moodylabs.com
MLQ-0315-2023

Terracon
2147 Riverchase Office Road
Birmingham, AL 35244
(205) 942-1289

23B-13423

Collection Date: 11/3/23 Inspector: Stephen Howard

Project Name: Trenholm / Executive Park Property Project #: E1227393

## Asbestos Bulk Sampling Log

| HA | Sample No. | Sample Description | Location / Notes |
|---|---|---|---|
| A-1 | 1 | Green Pipe Wrap | Building A, Mech. Room (Main Level) |
| ↓ | 2 | ↓ | ↓ |
| ↓ | 3 | ↓ | ↓ |
| A-2 | 4 | Green Pipe Insulation, End Caps | ↓ |
| ↓ | 5 | ↓ | ↓ |
| ↓ | 6 | ↓ | ↓ |
| A-3 | 7 | Green Pipe Insulation, Elbows | ↓ |
| ↓ | 8 | ↓ | ↓ |
| ↓ | 9 | ↓ | ↓ |
| A-4 | 10 | Black Window Caulk | Buildings A-B Mezzanine |
| ↓ | 11 | ↓ | ↓ |
| ↓ | 12 | ↓ | ↓ |
| A-5 | 13 | Hard Brown Window Frame Caulk | ↓ |
| ↓ | 14 | ↓ | ↓ |
| ↓ | 15 | ↓ | ↓ |
| B-6 | 16 | Hard Brown Window Frame Caulk | Building B |
| ↓ | 17 | ↓ | ↓ |
| ↓ | 18 | ↓ | ↓ |

Page: 2 of 4

## Asbestos Bulk Sampling Log

238.1B423

| HA | Sample No. | Sample Description | Location / Notes |
|---|---|---|---|
| B-7 | 19 | 9x9-Inch Maroon Floor Tile | Building B, 1st Floor |
| ↓ | 20 | ↓ | ↓ |
| ↓ | 21 | ↓ | ↓ |
| B-8 | 22 | 12x12-Inch Beige-Speckled Floor Tile | Building B, 1st Floor |
| ↓ | 23 | ↓ | ↓ |
| ↓ | 24 | ↓ | ↓ |
| B-9 | 25 | 12x12-Inch Beige-Streaked Floor Tile | Building B, West Stairwell |
| ↓ | 26 | ↓ | ↓ |
| ↓ | 27 | ↓ | ↓ |
| B-10 | 28 | 12x12-Inch Floor Tile | Building B Elevator Cabin |
| ↓ | 29 | ↓ | ↓ |
| ↓ | 30 | ↓ | ↓ |
| B-11 | 31 | Carpet Glue | Building B |
| ↓ | 32 | ↓ | ↓ |
| ↓ | 33 | ↓ | ↓ |
| C-12 | 34 | 12x12-Inch Beige w/ Brown Streaks Floor Tile | Building C, 2nd Floor |
| ↓ | 35 | ↓ | ↓ |
| ↓ | 36 | ↓ | ↓ |
| D-13 | 37 | Carpet Glue | Building D |
| ↓ | 38 | ↓ | ↓ |

Page: 3 of 41

## Asbestos Bulk Sampling Log

23B.13423

| HA | Sample No. | Sample Description | | Location / Notes |
|---|---|---|---|---|
| D-13 | 39 | Carpet Glue | | Building D |
| D-14 | 40 | Green Pipe Wrap | | Building D, Mechanical Rooms |
| " | 41 | " | | " |
| " | 42 | " | | " |
| C-15 | 43 | Brown Window Frame Caulk | | Building C, Lobby |
| " | 44 | " | | " |
| " | 45 | " | | " |
| C-16 | 46 | Black Window Caulk | | Building C, Lobby |
| " | 47 | " | | " |
| " | 48 | " | | " |
| D-17 | 49 | White Pipe Wrap | | Building D |
| " | 50 | " | | " |
| " | 51 | " | | " |
| C-18 | 52 | Green Pipe Wrap | | Building C, Basement |
| " | 53 | " | | " |
| " | 54 | " | | " |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

Page: 4 of 4







# Report of Subsurface Exploration and Geotechnical Evaluation
# TSCC Executive Park Building E
# Montgomery, Alabama
# Building & Earth Project No.: MG260083

*Prepared For:*
Seay, Seay, & Litchfield Architects

*October 19, 2026*

BUILDING & EARTH
Geotechnical, Environmental, and Materials Engineers

BUILDING & EARTH
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Montgomery, AL 36110
Ph: (334) 260-9177
www.BuildingAndEarth.com

October 19, 2026

Seay, Seay, & Litchfield Architects
1115 South Court Street
Montgomery, AL 36104

Attention: Ms. Olivia Smith

Subject: Report of Subsurface Exploration and Geotechnical Evaluation
TSCC Executive Park Building E
Montgomery, AL
Building & Earth Project No: MG260083

Dear Ms. Smith:

Building & Earth Sciences LLC (Bldg & Earth) has completed the authorized subsurface exploration and geotechnical engineering evaluation for the TSCC Executive Park Building E located at 2511 Fairlane Drive in Montgomery, Alabama.

The purpose of this exploration and evaluation was to determine general subsurface conditions at the site and to address applicable geotechnical aspects of the proposed construction and site development. The recommendations in this report are based on a physical reconnaissance of the site, conditions observed at the time of the exploration, and observation and classification of samples obtained from 18 hand auger borings and various testing methods, including dynamic cone penetrometer (DCP) and Kessler DCP testing, conducted at the site. Confirmation of the anticipated subsurface conditions during construction is an essential part of geotechnical services.

We appreciate the opportunity to provide consultation services for the proposed project. If you have any questions regarding the information in this report or need any additional information, please call us.

Respectfully Submitted,
**BUILDING & EARTH SCIENCES LLC**

Zach Houde, E.I.
Field Professional II

Jeff Pepper, P.E.
Regional VP – Geotechnical Engineering



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APPENDIX

## 1.0 PROJECT & SITE DESCRIPTION

The subject site is located at 2511 Fairlane Drive in Montgomery, Alabama. The proposed work consists of installing utilities into the existing Building E, erecting pilasters at each entrance, construction of a new sign, and an evaluation of the parking to the southwest of Building E. Based on the conditions of the site at the time of our exploration and the nature of the proposed work, the site appears to be at or near final grade; therefore, we assume that only minimal grading will be required. The following photographs show the site conditions observed during our exploration.



**Figure 1: Near Hand Auger Boring HA-08 Facing Southwest**




**Figure 2: Typical Site Conditions on the Interior of Building E Along Proposed Utility Alignment**



**Figure 3: Rutting and Potholing Observed Southeast of Hand Auger Boring P-02**



**Figure 4: Block and Alligator Cracking Observed near Hand Auger Boring P-01**



**Figure 5: Delamination Observed near Hand Auger Boring P-03**

## 2.0 SCOPE OF SERVICES

The authorized subsurface exploration was performed on September 28 and 29, and October 2 and 3, 2026 in conformance with our proposal MG28104 – Revision II, dated September 18, 2026.

The purpose of the geotechnical exploration was to determine general subsurface conditions at specific boring locations and to gather data on which to base a geotechnical evaluation with respect to the proposed construction. The subsurface exploration for this project consisted of 18 hand auger borings with DCP testing performed at the proposed pilaster and sign locations and Kessler DCP testing performed at the pavement evaluation locations. See the Appendix for further explanation of the procedures.

The hand auger boring locations were determined in the field by a representative of our staff using a handheld GPS using coordinates gathered from Google Earth Pro. As such, the locations shown on the Hand Auger Boring/DCP Location Plan attached to this report should be considered approximate.

The soil samples recovered during our site investigation were visually classified and specific samples were selected by the project engineer for laboratory analysis. The laboratory analysis consisted of:

| Test | ASTM | No. of Tests |
|---|---|---|
| Natural Moisture Content | D2216 | 26 |
| Atterberg Limits | D4318 | 4 |
| Material Finer Than No. 200 Sieve by Washing | D1140 | 6 |

**Table 1: Scope of Laboratory Tests**

The results of the laboratory analysis are presented on the enclosed Boring Logs and in tabular form in the Appendix of this report. Descriptions of the laboratory tests that were performed are also included in the Appendix.

The results of the work are presented within this report that addresses:

- Summary of existing surface conditions.
- A description of the subsurface conditions encountered at the test locations, including any groundwater conditions observed during field exploration.
- Presentation of laboratory test results.
- Site preparation considerations including material types to be expected at the site and treatment of unsuitable soils, if encountered, where applicable.

- Compaction requirements and recommended criteria to establish suitable material for structural backfill, where applicable.
- Recommendations to be used for foundation design, including appropriate foundation types, bearing pressures, and depths, where applicable.
- A summary of the Kessler DCP results and corresponding estimated CBR value at the test locations, where applicable.
- A summary of the subgrade support conditions, including estimated CBR values at the test locations, where applicable.
- Recommendations for pavement remediation, including treatment of unsuitable soils if encountered, and an appropriate pavement section based on the provided traffic loading, where applicable.

## 3.0 GEOTECHNICAL SITE CHARACTERIZATION

The following discussion is intended to create a general understanding of the site from a geotechnical engineering perspective. It is not intended to be a discussion of every potential geotechnical issue that may arise, nor to provide every possible interpretation of the conditions identified. It is important to note that the following conditions and subsequent recommendations are based solely on the subsurface conditions observed at the boring locations, and the assumption that significant changes in subsurface conditions do not occur between boreholes. However, subsurface conditions may vary due to the local geologic conditions and/or the presence of fill; therefore, the assumed conditions should be verified during site grading and foundation installation. The seasonal weather conditions and rainfall amount prior to and during site grading can have a significant impact on the near surface site conditions.

### 3.1 EXISTING SURFACE CONDITIONS

At the time of our exploration, the site consisted of the existing Building E and associated parking lots. The site was relatively flat, with runoff directed to stormwater inlets by slight grades. Groundcover consisted of asphalt and brick in the parking areas, and grass with landscaped areas around the perimeter. The asphalt in the parking lot to the southwest of Building E appeared to be in poor to fair condition, with the majority of the pavement distress, including block, alligator, delamination, rutting, and potholing, observed in areas heavily trafficked by construction equipment. It appeared that the most heavily trafficked area was the pavement wrapping from west to south around the property.

## 3.2 Subsurface Conditions

A generalized stratification summary has been prepared using data from the test borings and is presented in the table below. The stratification depicts the general soil/rock conditions and strata encountered in the test borings.

| Stratum No. | Description | Consistency/Relative Density |
|---|---|---|
| 1 | Topsoil | N/A |
| 1A | Asphalt/Aggregate Base/Concrete/Lime Stabilized Fat Clay (CH) | N/A |
| 2 | Fill Soils: Sandy Lean Clay (CL) and Silty Clayey Sand (SC-SM) | CL – medium stiff to very stiff<br>SC-SM – N/A |
| 3 | Alluvial Soils: Clayey Sand (SC), Sandy Fat Clay (CH), and Fat Clay (CH) | SC – loose to medium dense<br>CH – typically, medium stiff to very stiff |

**Table 2: Stratification Summary**

Subsurface profiles, presented in the Appendix, have also been prepared based on data obtained at specific boring locations. For specific details on the information obtained from individual test borings, refer to the Boring Logs included in the Appendix. The ground surface elevations at the boring locations indicated in this report were estimated based on Google Earth elevation data, and as such should be considered approximate.

### 3.2.1 Topsoil/Asphalt/Aggregate Base/Concrete/Lime Stabilized Fat Clay

The interior hand auger borings, HA-11 and HA-13, initially encountered approximately 4.5 and 5 inches of concrete with approximately 1 to 2 inches of aggregate base, respectively. The parking area hand auger borings encountered between 5 to 6.5 inches of asphalt underlain by approximately 6 to 8.5 inches of lime stabilized fat clay. The remaining hand auger borings initially encountered approximately 3 to 12 inches of topsoil. Topsoil depths reported on the boring logs should only be construed as an estimate and topsoil thickness may vary in unexplored areas. For this report, topsoil is defined as the soil horizon which contains the root mat of the noted vegetation. The summary of the topsoil, asphalt, concrete, lime stabilized fat clay (CH) and base thicknesses are in the following table.

| Boring No. | Topsoil (inches) | *Asphalt /Concrete (inches) | *Lime Stabilized CH/Aggregate Base (inches) |
|---|---|---|---|
| HA-01 | 4 | - | - |
| HA-02 | 3 | - | - |
| HA-03 | 4 | - | - |

| Boring No. | Topsoil (inches) | *Asphalt /Concrete (inches) | *Lime Stabilized CH/Aggregate Base (inches) |
|---|---|---|---|
| HA-04 | 4 | - | - |
| HA-05 | 6 | - | - |
| HA-06 | 12 | - | - |
| HA-07 | 12 | - | - |
| HA-08 | 10 | - | - |
| HA-09 | 6 | - | - |
| HA-10 | 6 | - | - |
| HA-11 | - | 4.5 | 1 |
| HA-12 | 6 | - | - |
| HA-13 | - | 5 | 2 |
| P-01 | - | *6 | *6 |
| P-02 | - | *5.5 | *8.5 |
| P-03 | - | *6 | *7 |
| P-04 | - | *5 | *3 |
| P-05 | - | *6.5 | *3 |

**Table 4: Approximate Topsoil, Asphalt, Concrete, and Base thicknesses**

Phenolphthalein indicator testing was performed on the parking lot subgrade soils to determine whether lime stabilization was used during original construction. If the underlying soils had been chemically treated, the samples would turn purple. The test results indicate that lime stabilization techniques appear to have been applied during original construction or repairs at all test locations within the upper elevations directly beneath the pavement. The photographic image below depicts the indicator testing results.



**Figure 6: Acidity Testing Results of Subgrade Underlying P-02**

### 3.2.2 EXISTING FILL SOILS

Borings HA-02, HA-11, HA-12, and HA-13 initially encountered approximately 1 to 5 feet of fill consisting of sandy lean clays (CL) and silty clayey sands (SC-SM).

Low consistency (N≤8) CL fill soils were encountered in boring HA-02 between approximately 1 to 5 feet in depth. SPT N-values throughout the fill strata ranged from 5 to 11 blows per increment (bpi), with an average of 7 bpf.

Laboratory testing on select samples of fill CL soils indicated soil moisture contents ranging from approximately 17 to 33 percent with approximately 80 percent finer than the No. 200 sieve. Atterberg limits testing indicated a liquid limit (LL) of 32 with a plasticity index (PI) of 15.

3.2.3 Laboratory testing on a select sample of fill SC-SM soil indicated a soil moisture content of approximately 20 percent with approximately 39 percent finer than the No. 200 sieve. Atterberg limits testing indicated a liquid limit (LL) of 21 with a plasticity index (PI) of 7.

### ALLUVIAL SOILS

Beneath the surface material and fill soils, the borings encountered alluvial soils consisting of sandy fat clays (CH), fat clays (CH), and clayey sand (SC).

The alluvial cohesive soils were generally medium stiff to stiff in the upper 5 feet, with a low consistency (N≤8) stratum encountered in the upper 2 feet in hand auger borings HA-04, and HA-05 and the upper 4 feet in hand auger boring HA-06. The alluvial sands were loose to medium dense with a low relative density stratum located at approximately 2 feet in hand auger boring HA-08.

Laboratory testing on select CH samples indicated soil moisture contents ranging from approximately 17 to 38 percent with approximately 84 to 99 percent finer than the No. 200 sieve. Atterberg limits testing indicated liquid limits (LL) of 50 with plasticity indices (PI) of 25 and 26.

Laboratory testing on a select SC sample indicated a soil moisture content of approximately 15 percent.

### 3.3 Groundwater at Boring Locations

For purposes of this report, "groundwater" refers to water encountered at the borehole locations. Designation between perched water and a true groundwater table was not included in our scope of work.

At the time of our exploration, groundwater was not encountered through the depths explored in any of the hand auger borings. Water levels reported are accurate only for the time and date that the borings were drilled. Long term monitoring of the boreholes was not included as part of our subsurface exploration. The borings were backfilled the same day that they were performed so the stabilized water level may be different than shown.

The prevalent weather conditions prior to construction will influence the amount and depth of water at the borehole locations. Identifying the static depth to the groundwater table versus the presence of perched water was not included in our scope of services.

## 4.0 SITE DEVELOPMENT CONSIDERATIONS

Information on existing or final grades was not available at the time of this report and assumptions have been made regarding grades for the purpose of this report. ***Therefore, it will be essential for Bldg & Earth to review the final grading plans when they become available and be contracted to provide supplemental recommendations prior to starting construction.*** Based on the existing topography, we anticipate minimal grading will be required to reach finished grades at each pilaster and sign location.

Our recommendations are based on the subsurface conditions observed during the exploration and do not account for seasonal weather variations that may occur prior to or during construction.

Based on our evaluation of the subsurface information encountered in the test borings, and the anticipated foundation loads, it appears that construction with a conventional shallow foundation system and typical pavement section is feasible.

The primary geotechnical concerns for this project are:

- The presence of moisture sensitive soils encountered throughout the site.
- The likelihood to encounter old foundations, septic tanks, old water wells, and construction debris across the site.
- Highly plastic fat clay (CH) soils with the potential for volume change with changes in moisture content.
- Potential for perched water during wet weather construction.

Recommendations addressing the site conditions are presented in the following sections.

## 4.1 Initial Site Preparation

The interior hand auger borings, HA-11 and HA-13, initially encountered approximately 4.5 and 5 inches of concrete with approximately 1 to 2 inches of aggregate base, respectively. The pavement evaluation hand auger borings P-01 to P-05 encountered between 5 to 6.5 inches of asphalt underlain by approximately 6 to 8.5 inches of lime stabilized fat clay. The remaining hand auger borings initially encountered approximately 3 to 12 inches of topsoil. The surface material thicknesses are accurate only for the specific boring locations and likely will vary in unexplored areas of the site.

Because of past use of the site, buried structures could be encountered such as foundations, basement walls and slabs, utility lines, septic tanks, etc. If encountered, they should be removed and backfilled in accordance with requirements outlined in the *Structural Fill* section of this report.

Materials disturbed during clearing operations should be stabilized in place or, if necessary, undercut to undisturbed materials and backfilled with properly compacted, approved structural fill.

During site preparation activities, the contractor should identify borrow source materials that will be used as structural fill and provide samples to the testing laboratory so that conformance to the *Structural Fill* requirements outlined below and appropriate moisture-density relationship curves can be determined.

## 4.2 Subgrade Evaluation

We recommend the project geotechnical engineer, or their representative, assess the subgrade after site preparation. Unstable or unsuitable areas may exist in unexplored

portions of the site. All locations requiring fill or structural support should be proofrolled using a loaded tandem-axle dump truck (gross vehicle weight: 20–25 tons) or, in areas with limited access, evaluated through shallow test pits and probings at the appropriate stages:

- After an area has been stripped, and undercut if required, prior to the placement of any fill.
- After grading an area to the finished subgrade elevation in a building or pavement area.
- After areas have been exposed to any precipitation, and/or have been exposed for more than 48 hours.

Some instability may exist during construction, depending on climatic and other factors immediately preceding and during construction. If any soft or otherwise unsuitable soils are identified during the proofrolling process, they should be undercut or stabilized prior to fill placement, or construction of floor slab and pavement. All unsuitable material identified during construction should be removed and replaced in accordance with the *Structural Fill* section of this report.

### 4.3 Moisture Sensitive Soils

Moisture sensitive lean clays (CL) and fat clays (CH) are present at the project site. Refer to the appended profiles and boring logs to identify areas in which these soils will be at final grade or used as fill.

The contractor should anticipate some difficulty during the earthwork phase of this project if moisture levels are moderate to high during construction. ***Increased moisture levels will soften the subgrade, and the soils may become unstable under the influence of construction traffic. Accordingly, construction during wet weather conditions should be avoided, as this could result in soft and unstable soil conditions that would require ground modification, such as in place stabilization or undercutting.***

Refer to the *Wet Weather Construction* section of this report for additional considerations.

It is not Bldg & Earth's responsibility to evaluate expected weather patterns for the time of year construction is planned, as these conditions can significantly affect site preparation and earthwork activities. This is particularly important where moisture-sensitive soils are present, since periods of rainfall or freezing conditions may adversely impact soil performance, excavation and compaction.

## 4.4 Evaluation of Low Consistency/Relative Density Soils

Based on our subsurface exploration, the fill material in hand auger boring HA-02 appears to have received some compactive effort applied during fill placement.

Low consistency cohesive soils (CL) and low relative density sands were encountered in the upper 5 feet in hand auger boring HA-02, and the upper 2 feet in hand auger borings HA-04, HA-05, and HA-08.

Following stripping all areas should be thoroughly proofrolled. An attempt should be made to moisture condition and recompact near surface unstable soils identified during the proofroll using heavy compaction equipment. Recompacted soils should meet compaction requirements specified in the Structural Fill Section of this report. Soils which fail to properly compact, or which are determined to be unsuitable by the geotechnical engineer, should be undercut to a stable, suitable subgrade.

Some unsuitable or unstable areas may be present in unexplored areas of the site. Once the known undercut is complete, the areas planned for construction should be proofrolled to identify any additional soft soils requiring further removal.

## 4.5 Structural Fill

Structural fill recommendations for this project are as follows:

| Soil Type | USCS Classification | Property Recommendations | Placement Location |
|---|---|---|---|
| Clay | CL | LL≤50, PI≤25, $\gamma_d \geq 100$ pcf | All locations and depths with proper drainage. |
| Clay | CH | N/A | Not suitable for structural fill. |
| Silt | ML, MH | N/A | Not suitable for structural fill. |
| On-site soils | CH, CL, SC, SC-SM | As listed above | As listed above |

**Table 5: Structural Fill Recommendations**

**Notes:**

1. ***All structural fill should be free of vegetation, topsoil, and any other deleterious materials. The organic content of materials to be used for fill should be less than 4 percent unless approved by the geotechnical engineer.***
2. ***LL indicates the soil Liquid Limit; PI indicates the soil Plasticity Index; $\gamma_d$ indicates the maximum dry density as defined by the density standard outlined in the table below.***
3. ***Laboratory testing of the soils proposed for fill should be performed to verify their conformance with the above recommendations.***
4. ***Any fill to be placed at the site should be reviewed by the geotechnical engineer.***

Recommendations for structural fill placement are as follows:



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| Specification | Recommendation |
|---|---|
| Lift Thickness | Maximum 8-inch loose lifts when compacted with large heavy compaction equipment. Maximum 6-inch loose lifts when compacted with lightweight compaction equipment (thinner lifts may be required in confined locations). |
| Density | Minimum of 98% of maximum dry density as defined by ASTM D698 at all locations and depths. |
| Moisture | Moisture content of the Cohesive soils should be carefully controlled in an effort to mitigate volume change potential. Compaction moisture content 0 to +4 percent optimum is recommended, |
| Density Testing Frequency | One test per 200 feet of trench backfill with minimum of 2 tests per lift. |

**Table 6: Structural Fill Placement Recommendations**

**Notes:**

1. ***All utility trenches should be backfilled and compacted in the manner specified above for structural fill. It may be necessary to reduce the lift thickness to 4 to 6 inches to achieve compaction using hand-operated equipment.***

## 4.6 Excavation Considerations

All excavations performed at the site should follow OSHA guidelines for temporary excavations. Excavated soils should be stockpiled according to OSHA regulations to limit the potential cave-in of soils.

### 4.6.1 Groundwater Effect on Grading

Groundwater was not encountered in the boreholes during our exploration. Groundwater is not expected to be encountered during construction, particularly during undercutting operations, foundation installation, and in utility trenches. It should be noted that fluctuations in the water level could occur due to seasonal variations in rainfall, and prevalent weather conditions during site grading. The contractor should be prepared to remove water seepage from excavations if encountered during construction. Excavations extending below water levels will require dewatering systems (such as well points, sump pumps or trench drains). The contractor should evaluate the most economical and practical dewatering method based on the conditions encountered during construction, as the design of permanent or temporary dewatering systems was not included in our scope of services.

## 4.7 Utility Trench Backfill

Following completion of building pad and pavement subgrade preparation, trench excavations typically will occur for the installation of under-slab and under-pavement utility lines. The performance of a slab-on-grade and pavement is dependent on the subgrade conditions; therefore, it is important that backfill of utility trench excavations be monitored by a representative of Bldg & Earth. The field monitoring of backfill placement

should include verification of material type, lift thickness, compaction, and moisture content for each lift, and follow the recommendations outlined in the *Structural Fill* section of this report.

At the perimeter wall crossings, we recommend that clay soils or a flowable fill be used to backfill the utility trench. The clay or flowable fill will act as a relatively impermeable plug reducing the risk of water migration from the outside into the interior of the building. The plug should be at least 36 inches wide and should extend below the perimeter walls to provide for a proper seal.

## 4.8 Landscaping and Drainage Consideration

The potential for soil moisture fluctuations within building areas and pavement subgrades should be reduced to lessen the potential of subgrade movement. Site grading should include positive drainage away from buildings and pavements. Excessive irrigation of landscaping poses a risk of saturating and softening soils below shallow footings and pavements, which could result in settlement of footings and premature failure of pavements. In addition, ponding water and excessive irrigation can result in swelling of high plasticity clay soils.

## 4.9 Wet Weather Construction

Excessive movement of construction equipment across the site during wet weather may result in ruts, which will collect rainwater, prolonging the time required to dry the subgrade soils. Therefore, the grading contractor should maintain positive drainage to avoid surface water ponding and provide temporary dewatering methods as required to help avoid degradation and softening of the soils.

During rainy periods, additional effort will be required to properly prepare the site and establish/maintain an acceptable subgrade. The difficulty will increase in areas where moisture sensitive soils are exposed at the subgrade elevation.

***Likewise, rainwater may become perched on the higher plasticity clay soils encountered across the site, which could require additional dewatering efforts not needed during dry conditions.***

A perched-water condition occurs when water seeping downward is slowed by a low permeability soil layer, such as the onsite fat clay clays. The perched-water level can be any number of feet above the true groundwater level. Due to the prevalence of fat clay soils encountered across the project site, the successful contractor should expect to encounter perched water during wet weather construction.

Grading contractors typically postpone grading operations during wet weather to wait for conditions that are more favorable. Contractors can typically disk or aerate the upper soils

to promote drying during intermittent periods of favorable weather. When deadlines restrict postponement of grading operations, additional measures such as undercutting and replacing saturated soils or stabilization can be utilized to facilitate placement of additional fill material.

### 4.10 SUBGRADE REHABILITATION

The subgrade soils often become disturbed during the period between initial site grading and construction of surface improvements. The amount and depth of disturbance will vary with soil type, weather conditions, construction traffic, and drainage.

The engineer should evaluate the subgrade soil during final grading to verify that the subgrade is suitable to receive pavement and/or concrete slab base materials. The final evaluation may include proofrolling or density tests.

Subgrade rehabilitation can become a point of controversy when different contractors are responsible for site grading and building construction. The construction documents should specifically state which contractor will be responsible for maintaining and rehabilitating the subgrade. Rehabilitation may include moisture conditioning and re-compacting soils. When deadlines or weather restrict grading operations, additional measures such as undercutting and replacing saturated soils or chemical stabilization can often be utilized.

## 5.0 FOUNDATION RECOMMENDATIONS

Specific structural loading conditions were not known at the time of this report; however, based on our experience with similar projects, we anticipate that the individual loads will be less than 10 kips. ***If these assumptions concerning structural loading are incorrect, our office should be contacted, such that our recommendations can be reviewed.***

### 5.1 SHALLOW FOUNDATIONS

Based on the conditions encountered during our field investigation and after our site preparation and grading recommendations are implemented, the proposed pilaster and sign structures can be supported on conventional shallow foundations that bear in existing soils.

Column footings should be at least 24 inches wide and strip footings should be at least 18 inches wide. These dimensions facilitate hand cleaning of footing subgrades disturbed by the excavation process and the placement of reinforcing steel. They also reduce the potential for localized punching shear failure. ***All footings should bear at least 36 inches below the adjacent exterior grade.***

Shallow foundations designed and constructed as recommended above can be designed using a maximum net allowable bearing capacity of 2,000 psf.

Total settlement of footings designed and constructed as recommended above is estimated at 1 inch or less. Differential settlement between any two points along a continuous footing or between isolated spread footings spaced 40 feet is estimated at ½-inch.

The following items should be considered during the preparation of construction documents and foundation installation:

- The geotechnical engineer of record should observe the exposed foundation bearing surfaces prior to concrete placement to verify that the conditions anticipated during the subsurface exploration are encountered.
- Wherever possible, the foundation concrete should be placed "neat", using the sides of the excavations as forms. Where this is not possible, the excavations created by forming the foundations must be backfilled with suitable structural fill and properly compacted.
- Concrete should be placed the same day as the excavations are completed and the bearing materials verified by the engineer. If the excavations are left open for an extended period, or if the bearing surfaces are disturbed after the initial observation, then the bearing surfaces should be re-evaluated prior to concrete placement.
- Water should not be allowed to pond in foundation excavations prior to concrete placement or above the concrete after the foundation is completed.
- Grades around the structure should be sloped to drain away from the foundations.

## 6.0 PAVEMENT REMEDIATION DISCUSSION/RECOMMENDATIONS

Overall, for its age, most of the asphalt pavement at the site appeared to be in fair condition, with primary pavement distresses in the form of longitudinal and transverse cracking, isolated areas of alligator cracking, spalling of the wearing surface, and potholing. Given the age of the pavement, it has likely met its design life.

In general, we recommend milling and overlay of the asphalt pavement. Joints and cracks present after milling is performed should be routed and crack sealed prior to placement of the wearing surface. We anticipate the majority of the construction joint cracks will remain after milling. Areas with extensive fatigue cracking should be sawcut and removed, then replaced with full-depth asphalt. We recommend a minimum milling depth of 1.5

inches for the asphalt pavement overlay. Areas where asphalt pavement is less than 1.5 inches thick will need to be completely removed.

In areas of full-depth asphalt replacement, we recommend that the subgrade be evaluated prior to repair. After the pavement is removed, the subgrade should be evaluated by a geotechnical engineer by performing proofroll observations with a heavy, minimum 40,000-pound rubber-tired vehicle. If unstable conditions are observed during the proofroll, remediation such as undercutting and/or stabilization may be required, as determined by the on-site engineer. Any areas that are not stable should be removed, moisture conditioned and recompacted. Additional subgrade remediation may be recommended depending on the results of the evaluation. Table 7 provides a summary of the recommended full-depth asphalt replacement thicknesses.

| Pavement Component | Minimum Recommended Thickness (in) |
|---|---|
| Bituminous Concrete Wearing Course | 1.0 |
| Bituminous Concrete Binder Course | 2.0 |
| Crushed Aggregate Base | 6.0 |

**Table 7: Asphalt Pavement Section**

## 7.0 CONSTRUCTION MONITORING

Field verification of site conditions is an essential part of the services provided by the geotechnical consultant. In order to confirm our recommendations, it will be necessary for Bldg & Earth personnel to make periodic visits to the site during site grading. Typical construction monitoring services are listed below.

- Periodic observations and consultations by a member of our engineering staff during site grading
- Field density tests during structural fill placement
- Observation and verification of the bearing surfaces exposed after foundation excavation.
- Molding and testing of concrete cylinders.
- Structural steel and welding inspections.
- Masonry observations and field grout testing

## 8.0 CLOSING AND LIMITATIONS

This report was prepared for Seay, Seay, & Litchfield Architects, for specific application to the TSCC Executive Park Building E located in Montgomery, Alabama. The information in this report is not transferable. This report should not be used for a different development on the same property without first being evaluated by the engineer.

The recommendations in this report were based on the information obtained from our field exploration and laboratory analysis. The data collected and presented in this report is representative of the subsurface conditions encountered at the specific boring locations at the time of the exploration. Variations in soil and groundwater conditions may occur between boring locations and throughout other areas of the site. Engineering judgment was applied in regard to conditions between borings. In addition, seasonal or short-term changes in weather patterns, such as rainfall or drought, can further influence subsurface conditions. Evaluation of these potential variations and changes falls outside the scope of this report and should be addressed by the client and contractor during construction.

This report has been prepared in accordance with generally accepted standards of geotechnical engineering practice. No other warranty is expressed or implied. In the event that changes are made, or anticipated to be made, to the nature, design, or location of the project as outlined in this report, Bldg & Earth must be informed of the changes and given the opportunity to either verify or modify the conclusions of this report in writing, or the recommendations of this report will no longer be valid.

The scope of services for this project did not include any environmental assessment of the site or identification of pollutants or hazardous materials or conditions. If the owner is concerned about environmental issues, Bldg & Earth would be happy to provide an additional scope of services to address those concerns.

This report is intended for use during design and preparation of specifications and may not address all conditions at the site during construction. Contractors reviewing this information should acknowledge that this document is for design information only and is not a substitute for means, methods, or construction practices, which remain the sole responsibility of the contractor.

An article published by the Geoprofessional Business Association (GBA), titled *Important Information About Your Geotechnical Report*, has been included in the Appendix. We encourage all individuals to become familiar with the article to help manage risk.

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# GEOTECHNICAL INVESTIGATION METHODOLOGIES

## *HAND AUGER BORINGS AND DYNAMIC CONE PENETRATION TESTING*

Hand auger borings were drilled with a 3-inch diameter auger to advance the hole below the existing grade. A Building & Earth representative collected samples of the subsurface soils at regular depth intervals and at depths where a change in lithology occurred.

Dynamic Cone Penetration (DCP) testing was performed in the hand auger borings to evaluate the consistency of the subgrade soils. The DCP apparatus consists of a steel, cylindrical shaft with a conical tip at the end. The conical tip measures 1.5-inches in diameter, with a 45° tip angle. A 15-pound sliding ring weight is mounted to the shaft. When dropped from a height of 20 inches, the ring weight strikes a steel anvil, driving the point into the soil. After seating the point into the soil 2 inches, the weight is dropped until the shaft travels an interval of 1.75 inches. The number of blows necessary to drive the tip each 1.75-inch increment is recorded. Given the material type and certain soil properties, this number can then be correlated to the Standard Penetration Test (ASTM D1586) N-values. The DCP test results are shown under the "Remarks" column on the boring logs.

## *DUAL MASS DYNAMIC CONE PENETRATION TESTING (KESSLER DCP)*

Dynamic Cone Penetration (DCP) tests were performed to estimate the in-place soil consistency and in-place California Bearing Ratio (CBR) of the subsurface soils by in-situ methods.

The DCP tests were performed starting at the top of existing subgrade to the desired depth of investigation. The DCP test was performed using the Kessler DCP with Dual Mass Hammer. A cone tip with base diameter of 0.79 inches and tip angle of 60 degrees was driven into the subsurface soils by a 17.6 pound (dual mass) sliding hammer from a height of 22.6 inches. The depth of cone penetration was measured at selected hammer drop intervals and the soil shear strength was reported in terms of DCP index. The DCP index is based on the average penetration depth resulting from one blow of the 17.6-pound hammer. The Kessler DCP can be used to estimate the strength characteristics of clay soils. The in-place CBR values of the subsurface soils at the test locations were estimated using empirical correlations between DCP index and California Bearing Ratio (CBR). The DCP test results are included in a subsequent section of the Appendix.

## BORING LOG DESCRIPTION

Building & Earth Sciences used the gINT software program to prepare the attached boring logs. The gINT program provides the flexibility to custom design the boring logs to include the pertinent information from the subsurface exploration and results of our laboratory analysis. The soil and laboratory information included on our logs is summarized below:

### *DEPTH AND ELEVATION*

The depth below the ground surface and the corresponding elevation are shown in the first two columns.

### *SAMPLE TYPE*

The method used to collect the sample is shown. The typical sampling methods include Split Spoon Sampling, Shelby Tube Sampling, Grab Samples, and Rock Core. A key is provided at the bottom of the log showing the graphic symbol for each sample type.

### *SAMPLE NUMBER*

Each sample collected is numbered sequentially.

### *SOIL DATA*

Column 6 is a graphic representation of four different soil parameters. Each of the parameters use the same graph, however, the values of the graph subdivisions vary with each parameter. Each parameter presented on column 6 is summarized below:

- N-value - The DCP Test N-value, obtained by averaging the number of blows required to drive the sampler the last two increments, is recorded . The graph labels range from 0 to 50.
- Qu – Unconfined Compressive Strength estimate from the Pocket Penetrometer test in tons per square foot (tsf). The graph labels range from 0 to 5 tsf.
- Atterberg Limits – The Atterberg Limits are plotted with the plastic limit to the left, and liquid limit to the right, connected by a horizontal line. The difference in the plastic and liquid limits is referred to as the Plasticity Index. The Atterberg Limits test results are also included in the Remarks column on the far right of the boring log. The Atterberg Limits graph labels range from 0 to 100%.
- Moisture – The Natural Moisture Content of the soil sample as determined in our laboratory.

### *SOIL DESCRIPTION*

The soil description were prepared in accordance with ASTM D2488, Visual Description of Soil Samples. Strata changes are indicated by a solid line, with the depth of the change indicated on the left side of the line and the elevation of the change indicated on the right side of the line. If subtle changes within a soil type occur, a broken line is used. The Boring Termination or Auger Refusal depth is shown as a solid line at the bottom of the boring.

### *GRAPHIC*

The graphic representation of the soil type is shown. The graphic used for each soil type is related to the Unified Soil Classification chart. A chart showing the graphic associated with each soil classification is included.

### *REMARKS*

Remarks regarding borehole observations, and additional information regarding the laboratory results and groundwater observations.

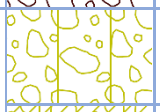
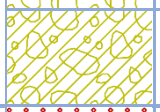
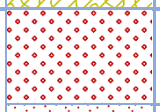
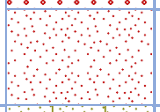
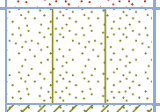
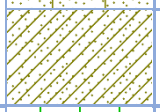
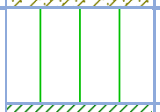
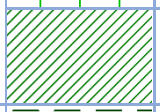
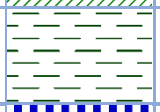
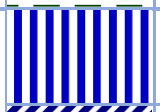
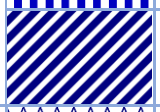
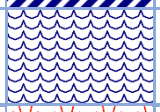
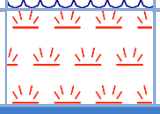
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| **Coarse Grained Soils**<br>*More than 50% of material is larger than No. 200 sieve size* | **Gravel and Gravelly Soils**<br>*More than 50% of coarse fraction is larger than No. 4 sieve* | **Clean Gravels**<br>*(Less than 5% fines)* |  | **GW** | *Well-graded gravels, gravel – sand mixtures, little or no fines* |
| | | |  | **GP** | *Poorly-graded gravels, gravel – sand mixtures, little or no fines* |
| | | **Gravels with Fines**<br>*(More than 12% fines)* |  | **GM** | *Silty gravels, gravel – sand – silt mixtures* |
| | | |  | **GC** | *Clayey gravels, gravel – sand – clay mixtures* |
| | **Sand and Sandy Soils**<br>*More than 50% of coarse fraction is smaller than No. 4 sieve* | **Clean Sands**<br>*(Less than 5% fines)* |  | **SW** | *Well-graded sands, gravelly sands, little or no fines* |
| | | |  | **SP** | *Poorly-graded sands, gravelly sands, little or no fines* |
| | | **Sands with Fines**<br>*(More than 12% fines)* |  | **SM** | *Silty sands, sand – silt mixtures* |
| | | |  | **SC** | *Clayey sands, sand – clay mixtures* |
| **Fine Grained Soils**<br>*More than 50% of material is smaller than No. 200 sieve size* | **Silts and Clays**<br>*Liquid Limit less than 50* | **Inorganic** |  | **ML** | *Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silt with slight plasticity* |
| | | |  | **CL** | *Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays* |
| | | **Organic** |  | **OL** | *Organic silts and organic silty clays of low plasticity* |
| | **Silts and Clays**<br>*Liquid Limit greater than 50* | **Inorganic** |  | **MH** | *Inorganic silts, micaceous or diatomaceous fine sand, or silty soils* |
| | | |  | **CH** | *Inorganic clays of high plasticity* |
| | | **Organic** |  | **OH** | *Organic clays of medium to high plasticity, organic silts* |
| **Highly Organic Soils** | | |  | **PT** | *Peat, humus, swamp soils with high organic contents* |

**Table 1: Soil Classification Chart (based on ASTM D2487)**

Building & Earth Sciences classifies soil in general accordance with the Unified Soil Classification System (USCS) presented in ASTM D2487. Table 1 and Figure 1 exemplify the general guidance of the USCS. Soil consistencies and relative densities are presented in general accordance with Terzaghi, Peck, & Mesri's (1996) method, as shown on Table 2, when quantitative field and/or laboratory data is available. Table 2 includes Consistency and Relative Density correlations with N-values obtained using either a manual hammer (60 percent efficiency) or automatic hammer (90 percent efficiency). The *Blows Per Increment* and *SPT N-values* displayed on the boring logs are the unaltered values measured in the field. When field and/or laboratory data is not available, we may classify soil in general accordance with the Visual Manual Procedure presented in ASTM D2488.

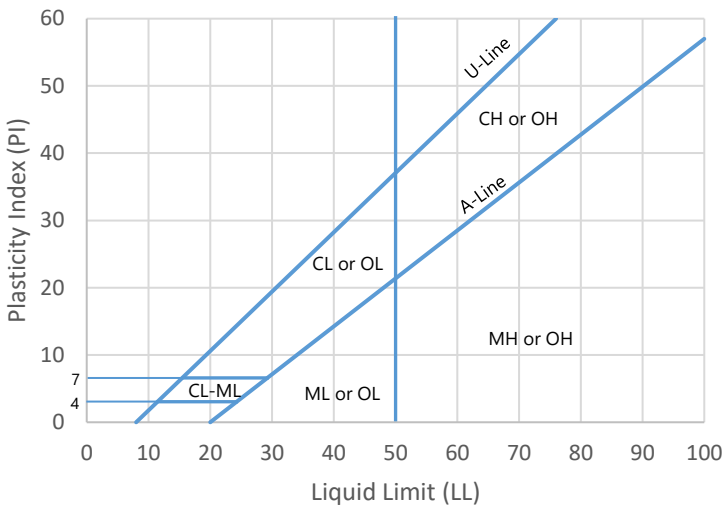



**Figure 1: Plasticity Chart (based on ASTM D2487)**

| **Non-cohesive: Coarse-Grained Soil** | | | **Cohesive: Fine-Grained Soil** | | | |
|---|---|---|---|---|---|---|
| **SPT Penetration (blows/foot)** | | **Relative Density** | **SPT Penetration (blows/foot)** | | **Consistency** | **Estimated Range of Unconfined Compressive Strength (tsf)** |
| | | | Automatic Hammer* | Manual Hammer | | |
| Automatic Hammer* | Manual Hammer | | < 2 | < 2 | Very Soft | < 0.25 |
| 0 - 3 | 0 - 4 | Very Loose | 2 - 3 | 2 - 4 | Soft | 0.25 – 0.50 |
| 3 - 7 | 4 - 10 | Loose | 3 - 5 | 4 - 8 | Medium Stiff | 0.50 – 1.00 |
| 7 - 20 | 10 - 30 | Medium Dense | 5 - 10 | 8 - 15 | Stiff | 1.00 – 2.00 |
| 20 - 33 | 30 - 50 | Dense | 10 - 20 | 15 - 30 | Very Stiff | 2.00 – 4.00 |
| > 33 | > 50 | Very Dense | > 20 | > 30 | Hard | > 4.00 |

**Table 2: Soil Consistency and Relative Density (based on Terzaghi, Peck & Mesri, 1996)**

* - Modified based on 90% hammer efficiency

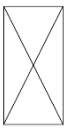
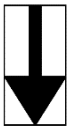
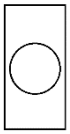
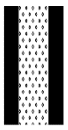
| | | | |
|---|---|---|---|
|  | Standard Penetration Test ASTM D1586 or AASHTO T-206 |  | Dynamic Cone Penetrometer (Sower DCP) ASTM STP-399 |
|  | Shelby Tube Sampler ASTM D1587 |  | No Sample Recovery |
|  | Rock Core Sample ASTM D2113 |  | Groundwater at Time of Drilling |
|  | Auger Cuttings |  | Groundwater as Indicated |

**Table 3: Symbol Legend**

| Soil | Particle Size | U.S. Standard |
|---|---|---|
| **Boulders** | Larger than 300 mm | N.A. |
| **Cobbles** | 300 mm to 75 mm | N.A. |
| **Gravel** | 75 mm to 4.75 mm | 3-inch to #4 sieve |
| Coarse | 75 mm to 19 mm | 3-inch to ¾-inch sieve |
| Fine | 19 mm to 4.75 mm | ¾-inch to #4 sieve |
| **Sand** | 4.75 mm to 0.075 mm | #4 to #200 Sieve |
| Coarse | 4.75 mm to 2 mm | #4 to #10 Sieve |
| Medium | 2 mm to 0.425 mm | #10 to #40 Sieve |
| Fine | 0.425 mm to 0.075 mm | #40 to #200 Sieve |
| **Fines** | Less than 0.075 mm | Passing #200 Sieve |
| Silt | 0.075 mm to 2 µm | N.A. |
| Clay | Less than 2 µm | N.A. |

**Table 4: Standard Sieve Sizes**

| | | | |
|---|---|---|---|
| N-Value  | Standard Penetration Test Resistance calculated using ASTM D1586 or AASHTO T-206. Calculated as sum of original, field recorded values. | Atterberg Limits  PL LL | A measure of a soil's plasticity characteristics in general accordance with ASTM D4318. The soil Plasticity Index (PI) is representative of this characteristic and is bracketed by the Liquid Limit (LL) and the Plastic Limit (PL). |
| Qu  | Unconfined compressive strength, typically estimated from a pocket penetrometer. Results are presented in tons per square foot (tsf). | % Moisture  | Percent natural moisture content in general accordance with ASTM D2216. |

**Table 5: Soil Data**

| | |
|---|---|
| Hollow Stem Auger | Flights on the outside of the shaft advance soil cuttings to the surface. The hollow stem allows sampling through the middle of the auger flights. |
| Mud Rotary / Wash Bore | A cutting head advances the boring and discharges a drilling fluid to support the borehole and circulate cuttings to the surface. |
| Solid Flight Auger | Flights on the outside bring soil cuttings to the surface. Solid stem requires removal from borehole during sampling. |
| Hand Auger | Cylindrical bucket (typically 3-inch diameter and 8 inches long) attached to a metal rod and turned by human force. |

**Table 6: Soil Drilling Methods**

| Descriptor | Meaning |
|---|---|
| Trace | Likely less than 5% |
| Few | 5 to 10% |
| Little | 15 to 25% |
| Some | 30 to 45% |
| Mostly | 50 to 100% |

**Table 7: Descriptors**

| | |
|---|---|
| **Manual Hammer** | The operator tightens and loosens the rope around a rotating drum assembly to lift and drop a sliding, 140-pound hammer falling 30 inches. |
| **Automatic Trip Hammer** | An automatic mechanism is used to lift and drop a sliding, 140-pound hammer falling 30 inches. |
| **Dynamic Cone Penetrometer (Sower DCP) ASTM STP-399** | Uses a 15-pound steel mass falling 20 inches to strike an anvil and cause penetration of a 1.5-inch diameter cone seated in the bottom of a hand augered borehole. The blows required to drive the embedded cone a depth of 1-3/4 inches have been correlated by others to N-values derived from the Standard Penetration Test (SPT). |

**Table 8: Sampling Methods**

| | |
|---|---|
| **Non-plastic** | A 1/8-inch thread cannot be rolled at any water content. |
| **Low** | The thread can barely be rolled and the lump cannot be formed when drier than the plastic limit. |
| **Medium** | The thread is easy to roll and not much time is required to reach the plastic limit. The thread cannot be re-rolled after reaching the plastic limit. The lump crumbles when drier than the plastic limit. |
| **High** | It takes considerable time rolling and kneading to reach the plastic limit. The thread can be re-rolled several times after reaching the plastic limit. The lump can be formed without crumbling when drier than the plastic limit. |

**Table 9: Plasticity**

| | |
|---|---|
| **Dry** | Absence of moisture, dusty, dry to the touch. |
| **Moist** | Damp but no visible water. |
| **Wet** | Visible free water, usually soil is below water table. |

**Table 10: Moisture Condition**

| | |
|---|---|
| **Stratified** | Alternating layers of varying material or color with layers at least ½ inch thick. |
| **Laminated** | Alternating layers of varying material or color with layers less than ¼ inch thick. |
| **Fissured** | Breaks along definite planes of fracture with little resistance to fracturing. |
| **Slickensides** | Fracture planes appear polished or glossy, sometimes striated. |
| **Blocky** | Cohesive soil that can be broken down into small angular lumps which resist further breakdown. |
| **Lensed** | Inclusion of small pockets of different soils, such as small lenses of sand scattered through a mass of clay. |
| **Homogeneous** | Same color and appearance throughout. |

**Table 11: Structure**

# KEY TO HATCHES

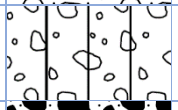
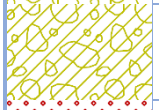
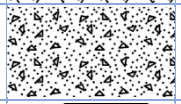
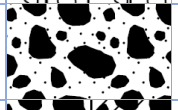
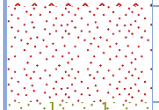
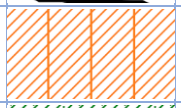
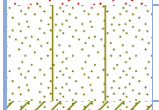
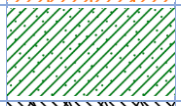
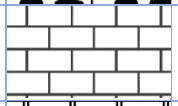
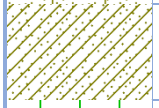
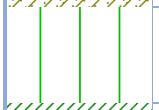
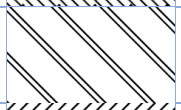
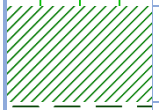
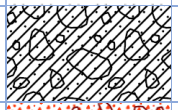
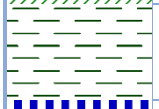
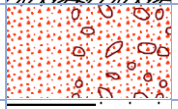
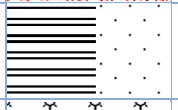
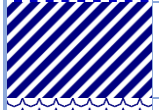
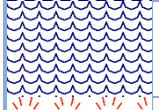
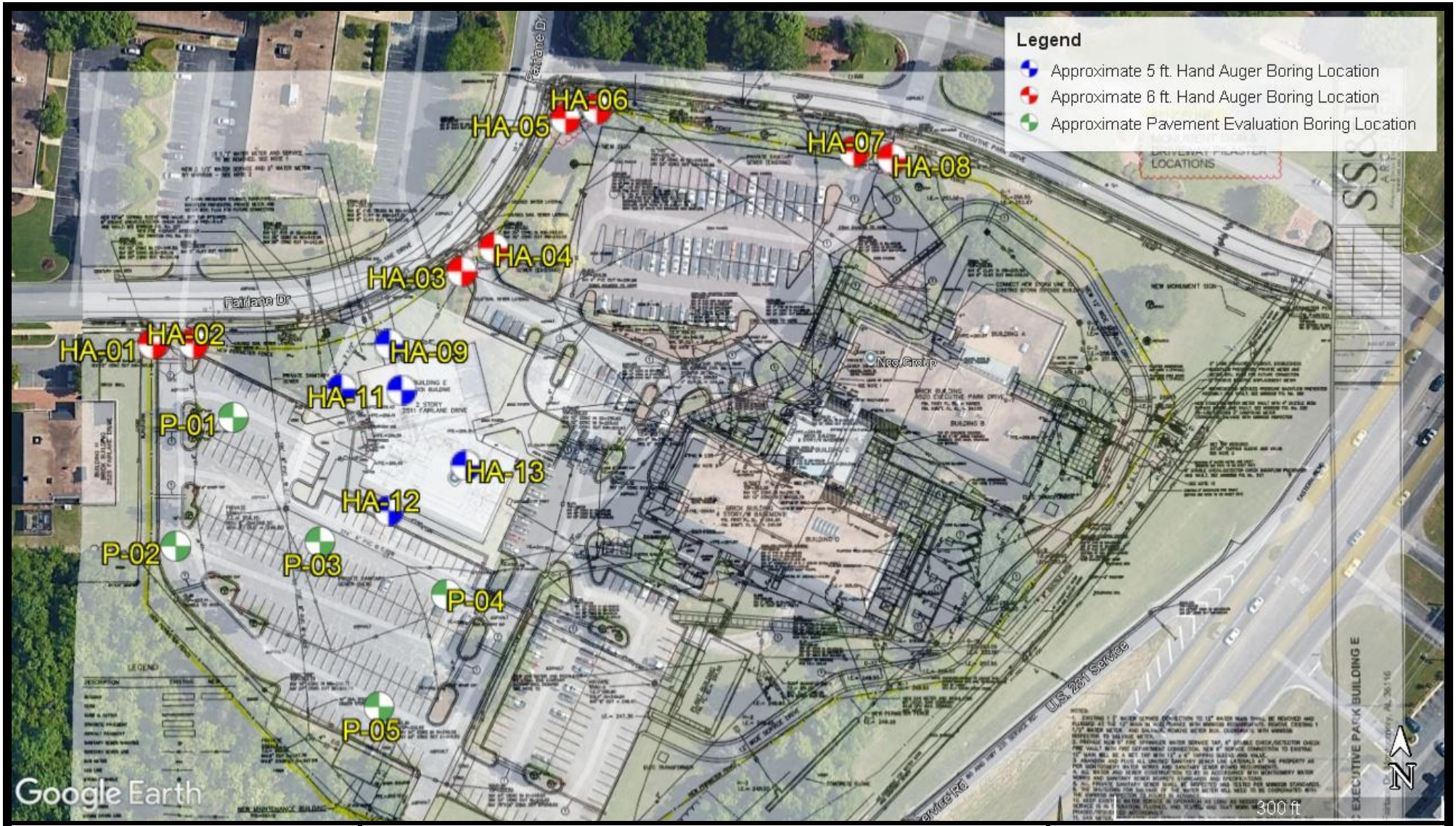
| Hatch | Description | Hatch | Description | Hatch | Description |
|---|---|---|---|---|---|
|  | **GW** - *Well-graded gravels, gravel – sand mixtures, little or no fines* |  | *Asphalt* |  | *Clay with Gravel* |
|  | **GP** - *Poorly-graded gravels, gravel – sand mixtures, little or no fines* |  | *Aggregate Base* |  | *Sand with Gravel* |
|  | **GM** - *Silty gravels, gravel – sand – silt mixtures* |  | *Topsoil* |  | *Silt with Gravel* |
|  | **GC** - *Clayey gravels, gravel – sand – clay mixtures* |  | *Concrete* |  | *Gravel with Sand* |
|  | **SW** - *Well-graded sands, gravelly sands, little or no fines* |  | *Coal* |  | *Gravel with Clay* |
|  | **SP** - *Poorly-graded sands, gravelly sands, little or no fines* |  | ***CL-ML*** - *Silty Clay* |  | *Gravel with Silt* |
|  | **SM** - *Silty sands, sand – silt mixtures* |  | *Sandy Clay* |  | *Limestone* |
|  | **SC** - *Clayey sands, sand – clay mixtures* |  | *Clayey Chert* |  | *Chalk* |
|  | **ML** - *Inorganic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silt with slight plasticity* |  | *Low and High Plasticity Clay* |  | *Siltstone* |
|  | **CL** - *Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays* |  | *Low Plasticity Silt and Clay* |  | *Till* |
|  | **OL** - *Organic silts and organic silty clays of low plasticity* |  | *High Plasticity Silt and Clay* |  | *Sandy Clay with Cobbles and Boulders* |
|  | **MH** - *Inorganic silts, micaceous or diatomaceous fine sand, or silty soils* |  | *Fill* |  | *Sandstone with Shale* |
|  | **CH** - *Inorganic clays of high plasticity* |  | *Weathered Rock* |  | *Coral* |
|  | **OH** - *Organic clays of medium to high plasticity, organic silts* |  | *Sandstone* |  | *Boulders and Cobbles* |
|  | **PT** - *Peat, humus, swamp soils with high organic contents* |  | *Shale* |  | *Soil and Weathered Rock* |

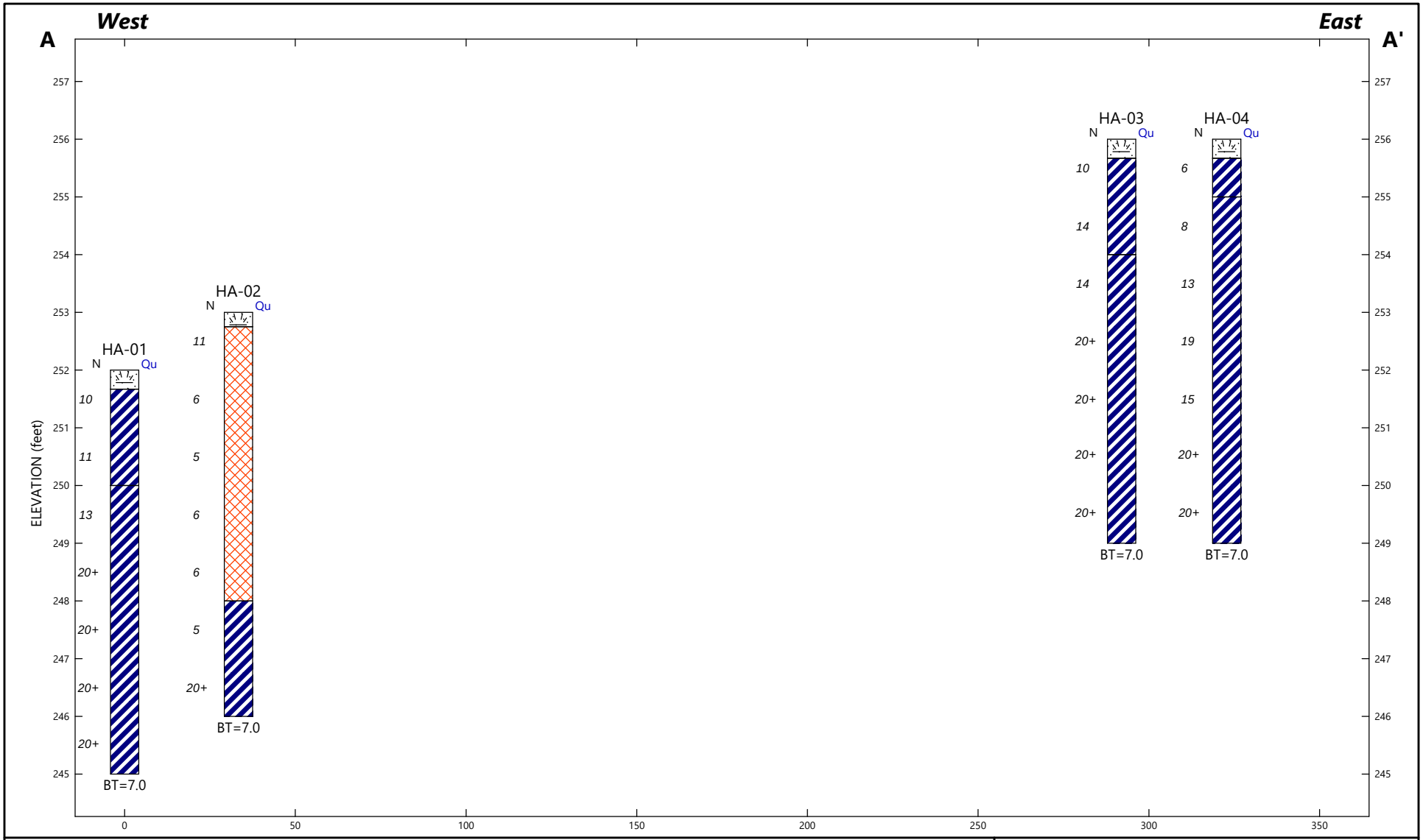
**Table 12: Key to Hatches Used for Boring Logs and Soil Profiles**

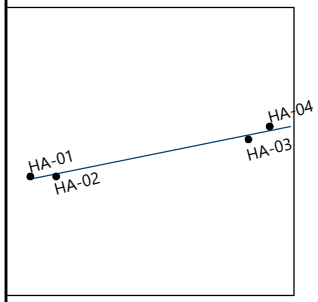
## BORING LOCATION PLAN




| Reference used to produce this drawing: | HAND AUGER BORING/DCP LOCATION PLAN | | BUILDING & EARTH<br>Geotechnical, Environmental, and Materials Engineers | |
|---|---|---|---|---|
| *Site Utilities Plan, Sheet C4.1, undated* and *First Floor New Work Plan- Sanitary and Vent, Sheet P03.01, undated* | **PROJECT NO.:** | **PROJECT NAME / LOCATION:** | **SCALE:** | **DATE:** |
| | MG260083 | TSCC Executive Park Building E<br>Montgomery, AL | As shown | 10/16/2026 |

## SUBSURFACE SOIL PROFILES




Site Map Scale 1 inch equals 255 feet

## Key to Hatches

Topsoil

USCS High Plasticity Clay

Fill

## Legend

BT=Boring Termination, TPT=Test Pit Terminated
AR=Auger Refusal, ER=Excavation Refusal
N=Standard Penetration Test N-Value
Qu=Unconfined compressive strength estimate from pocket penetrometer test (tsf)
Water Level Reading at time of drilling.
Water Level Reading after drilling.

0 41

Horizontal Scale (feet)
Vertical Exaggeration: 17x

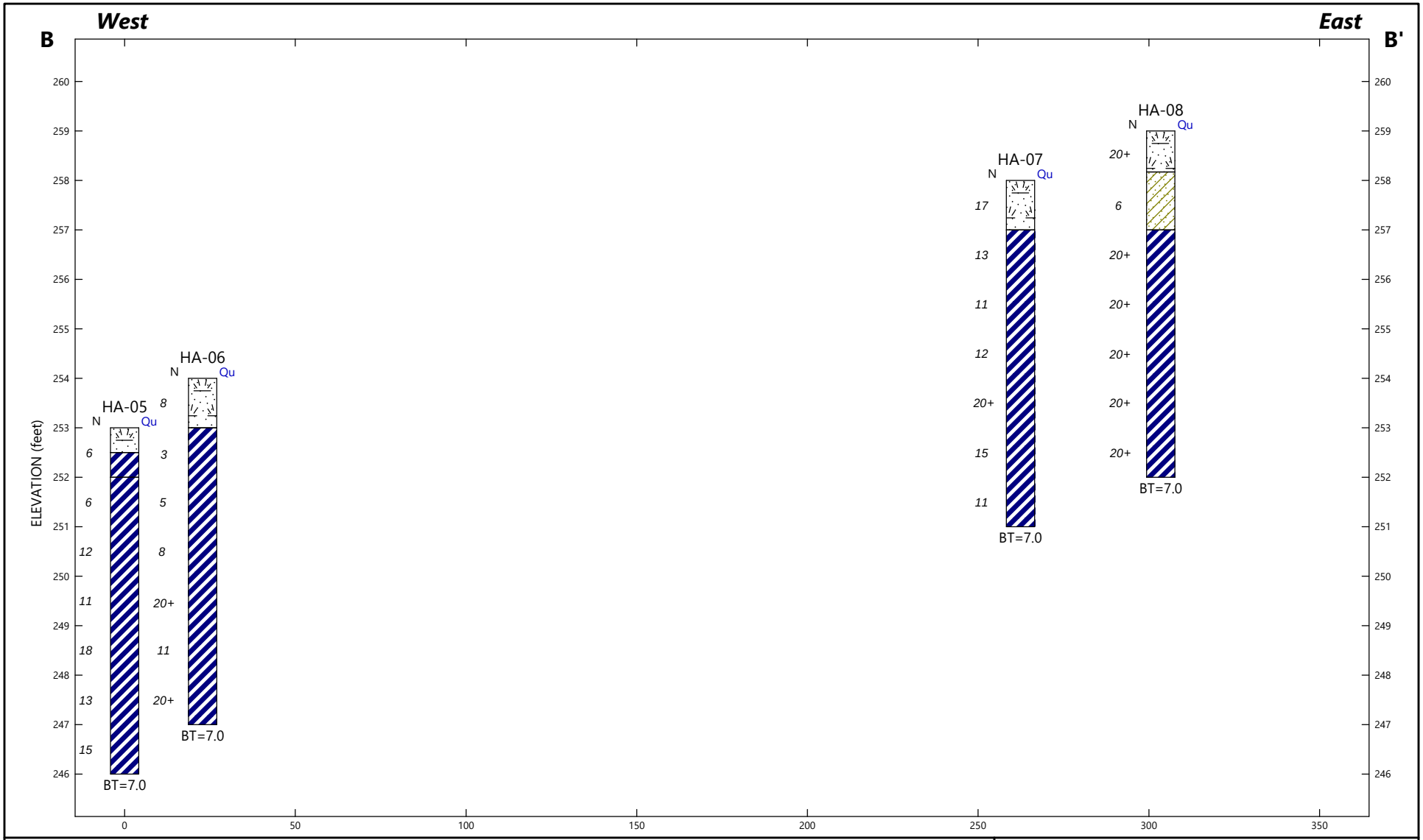
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1211 Newell Parkway, Montgomery, AL 36110

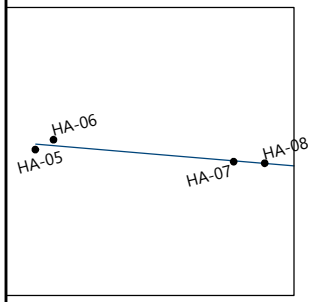
TSCC Executive Park Building E
Montgomery, AL

**TSCC Executive Park Building E A-A': Subsurface Profile**

| PROJECT NO: MG260083 | PLATE NO: A-1 | DATE: 10/17/26 |
|---|---|---|

BUILDING & EARTH
Geotechnical, Environmental, and Materials Engineers




Site Map Scale 1 inch equals 255 feet

## Key to Hatches

Topsoil

USCS High Plasticity Clay

USCS Clayey Sand

## Legend

BT=Boring Termination, TPT=Test Pit Terminated
AR=Auger Refusal, ER=Excavation Refusal
N=Standard Penetration Test N-Value
Qu=Unconfined compressive strength estimate from pocket penetrometer test (tsf)
Water Level Reading at time of drilling.
Water Level Reading after drilling.

0 41

Horizontal Scale (feet)
Vertical Exaggeration: 14.5x

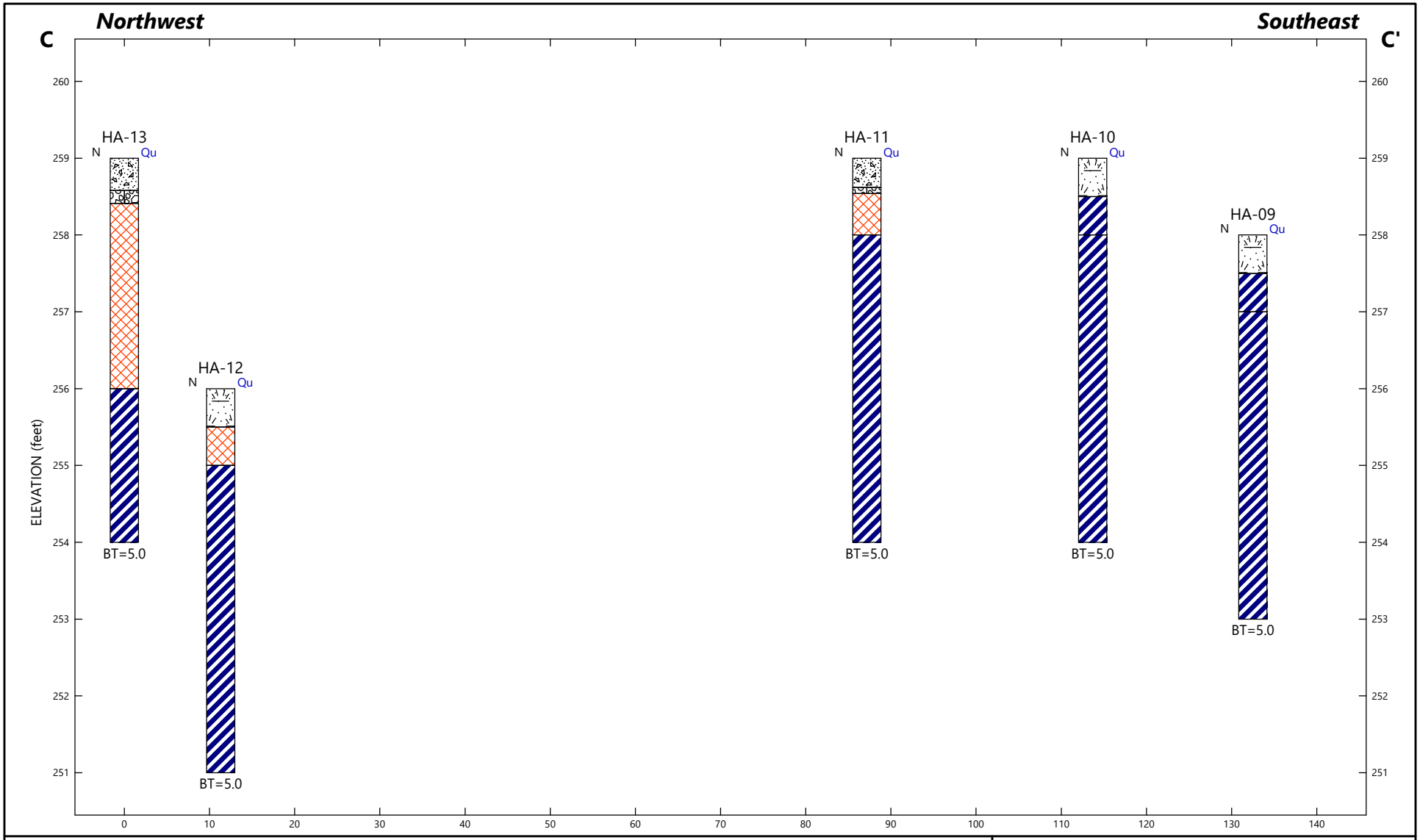
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1211 Newell Parkway, Montgomery, AL 36110

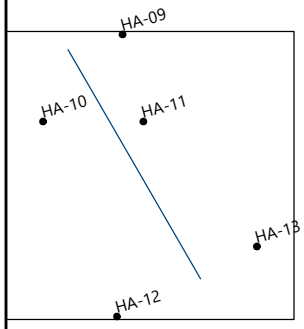
TSCC Executive Park Building E
Montgomery, AL

**TSCC Executive Park Building E B-B': Subsurface Profile**

| PROJECT NO: MG260083 | PLATE NO: A-1 | DATE: 10/17/26 |
|---|---|---|

BUILDING & EARTH
Geotechnical, Environmental, and Materials Engineers




Site Map Scale 1 inch equals 100 feet

## Key to Hatches

- Topsoil
- USCS High Plasticity Clay
- Concrete
- Aggregate Base Material
- Fill

## Legend

BT=Boring Termination, TPT=Test Pit Terminated
AR=Auger Refusal, ER=Excavation Refusal
N=Standard Penetration Test N-Value
Qu=Unconfined compressive strength estimate from pocket penetrometer test (tsf)
▽ Water Level Reading at time of drilling.
▼ Water Level Reading after drilling.

0 — 17
Horizontal Scale (feet)
Vertical Exaggeration: 9x

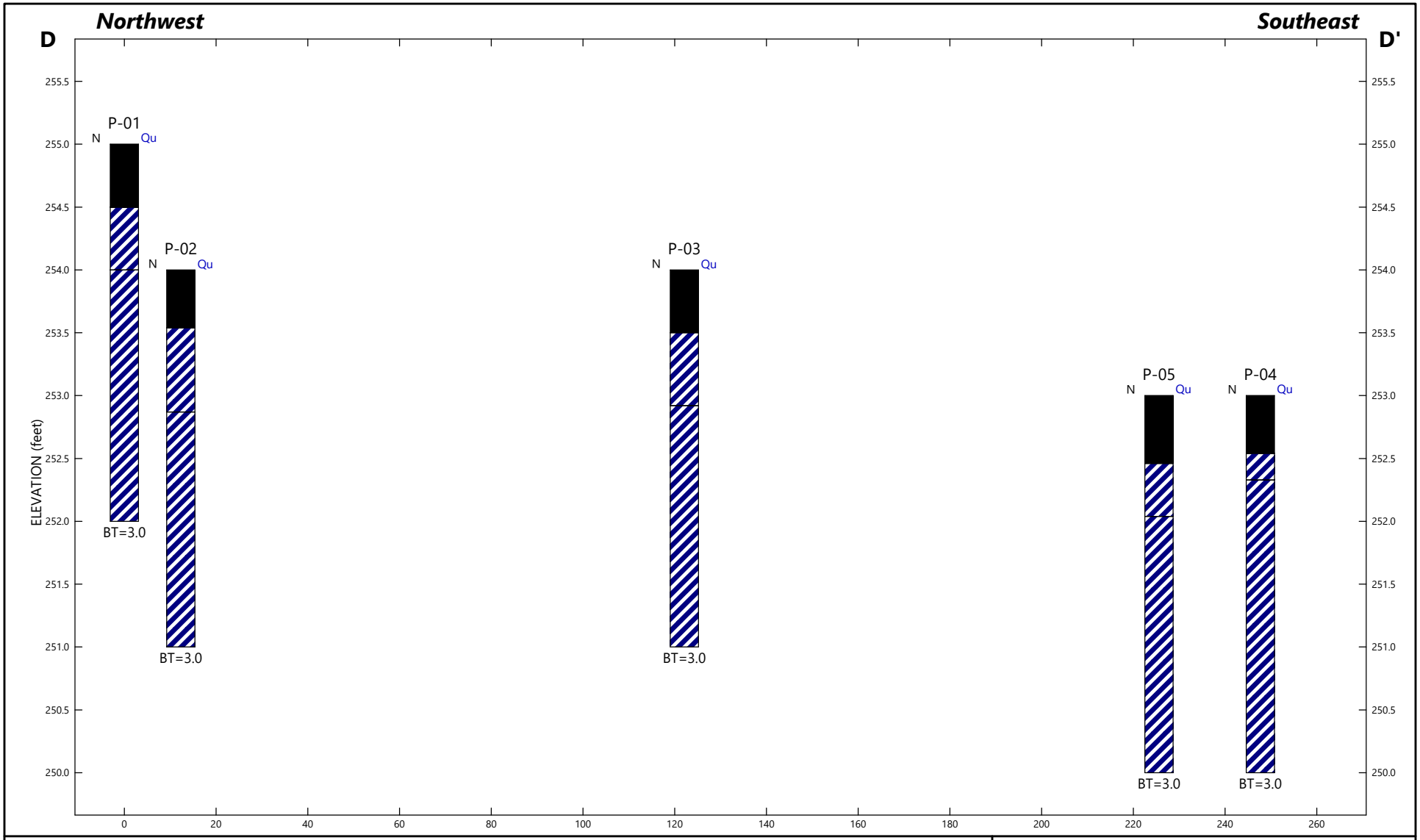
**Building & Earth Sciences, Inc.**
1211 Newell Parkway, Montgomery, AL 36110

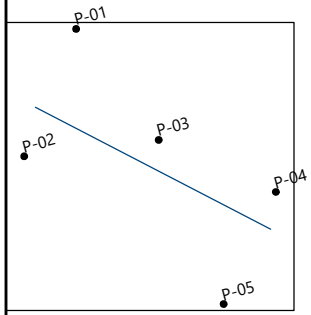
TSCC Executive Park Building E
Montgomery, AL

**TSCC Executive Park Building E C-C': Subsurface Profile**

| PROJECT NO: MG260083 | PLATE NO: A-1 | DATE: 10/17/26 |
|---|---|---|

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Site Map Scale 1 inch equals 190 feet

## Key to Hatches

Asphalt

USCS High Plasticity Clay

## Legend

BT=Boring Termination, TPT=Test Pit Terminated
AR=Auger Refusal, ER=Excavation Refusal
N=Standard Penetration Test N-Value
Qu=Unconfined compressive strength estimate from pocket penetrometer test (tsf)
Water Level Reading at time of drilling.
Water Level Reading after drilling.

0 31

Horizontal Scale (feet)
Vertical Exaggeration: 27.5x

**Building & Earth Sciences, Inc.**
1211 Newell Parkway, Montgomery, AL 36110

TSCC Executive Park Building E
Montgomery, AL

**TSCC Executive Park Building E D-D': Subsurface Profile**

| PROJECT NO: MG260083 | PLATE NO: A-1 | DATE: 10/17/26 |
|---|---|---|

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# BOREHOLE LOGS

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# LOG OF HAND AUGER BORING

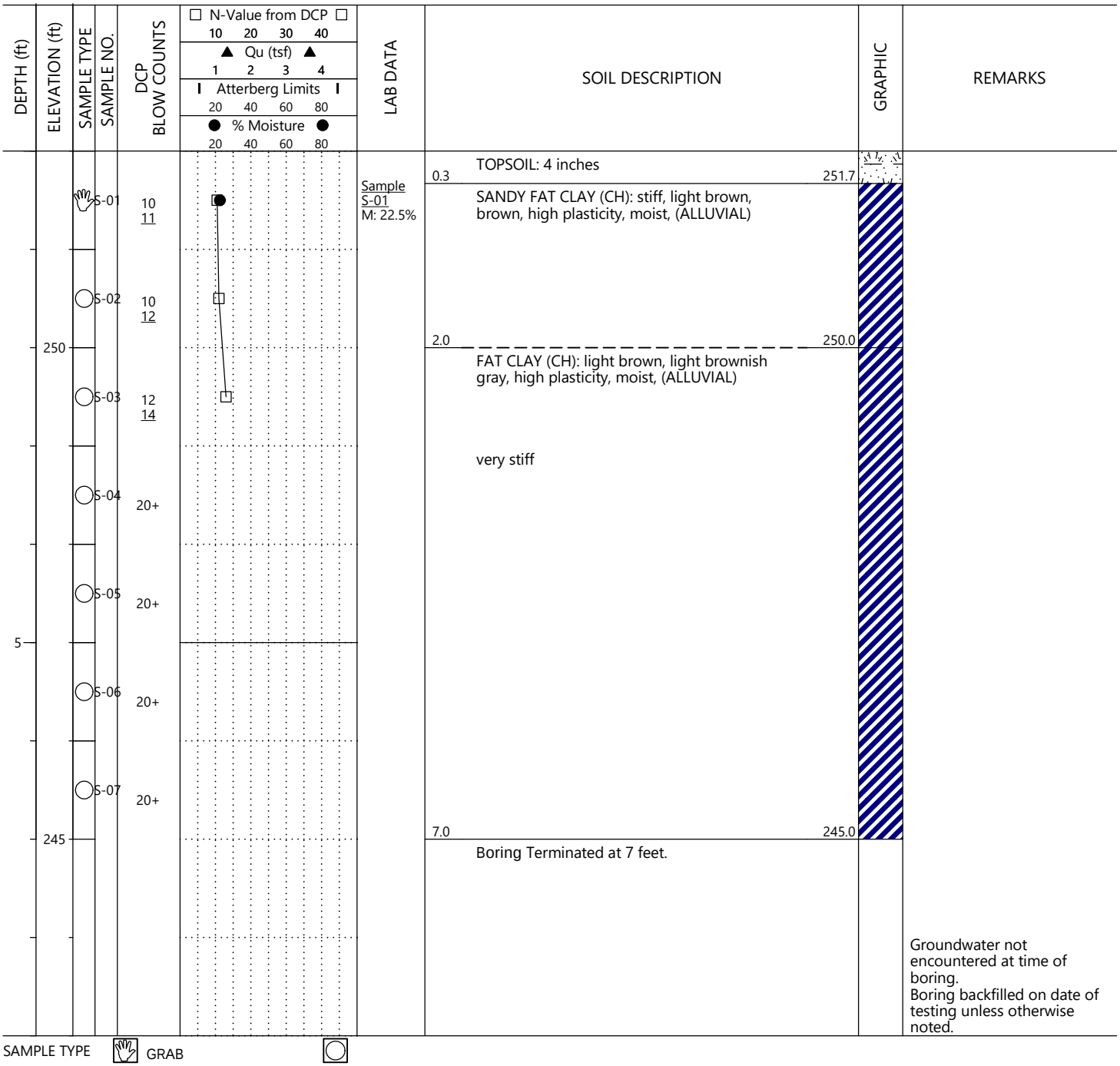
Designation: HA-01

Sheet 1 of 1

1211 Newell Parkway
Montgomery, AL 36110
Office: (334) 260-9174
BuildingAndEarth.com

PROJECT NAME: TSCC Executive Park Building E
PROJECT NUMBER: MG260083
EQUIPMENT USED: Hand Auger/DCP
APPX. ELEVATION: 252
BORING LOCATION: SW Gate: W Pilaster: 32.331287°,-86.235141°

LOCATION: Montgomery, AL
DATE: 9/28/26
WEATHER: Sunny, 85°
LOGGED BY: Z. Houde




SAMPLE TYPE GRAB

**DCP-VALUE** CORRELATION TO STANDARD PENETRATION TEST PER ASTM D1586
**% MOISTURE** PERCENT NATURAL MOISTURE CONTENT
▽ GROUNDWATER LEVEL IN THE BORING AT TIME OF DRILLING
▼ STABILIZED GROUNDWATER LEVEL

**LL:** LIQUID LIMIT
**PL:** PLASTIC LIMIT
**PI:** PLASTICITY INDEX
**Qu** POCKET PENETROMETER UNCONFINED COMPRESSIVE STRENGTH

**M:** NATURAL MOISTURE CONTENT
**F:** PERCENT PASSING NO. 200 SIEVE

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# LOG OF HAND AUGER BORING

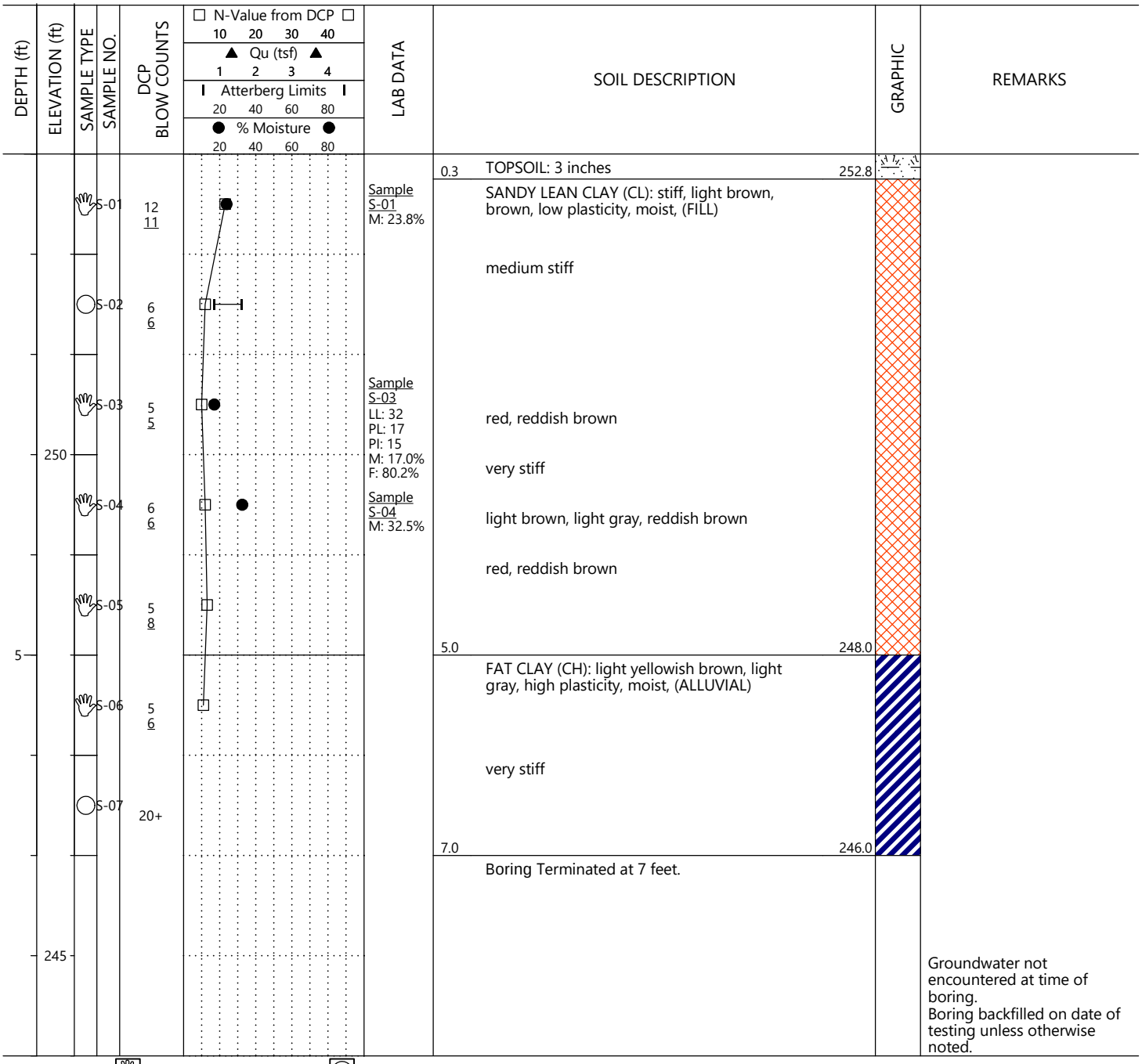
Designation: HA-02

Sheet 1 of 1

1211 Newell Parkway
Montgomery, AL 36110
Office: (334) 260-9174
BuildingAndEarth.com

PROJECT NAME: TSCC Executive Park Building E
PROJECT NUMBER: MG260083
EQUIPMENT USED: Hand Auger/DCP
APPX. ELEVATION: 253
BORING LOCATION: SW Gate: E Pilaster: 32.331288°,-86.235018°

LOCATION: Montgomery, AL
DATE: 9/28/26
WEATHER: Sunny, 85°
LOGGED BY: Z. Houde




SAMPLE TYPE GRAB

**DCP-VALUE** CORRELATION TO STANDARD PENETRATION TEST PER ASTM D1586
**% MOISTURE** PERCENT NATURAL MOISTURE CONTENT
▽ GROUNDWATER LEVEL IN THE BORING AT TIME OF DRILLING
▼ STABILIZED GROUNDWATER LEVEL

**LL:** LIQUID LIMIT
**PL:** PLASTIC LIMIT
**PI:** PLASTICITY INDEX
**Qu** POCKET PENETROMETER UNCONFINED COMPRESSIVE STRENGTH
**M:** NATURAL MOISTURE CONTENT
**F:** PERCENT PASSING NO. 200 SIEVE

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# LOG OF HAND AUGER BORING

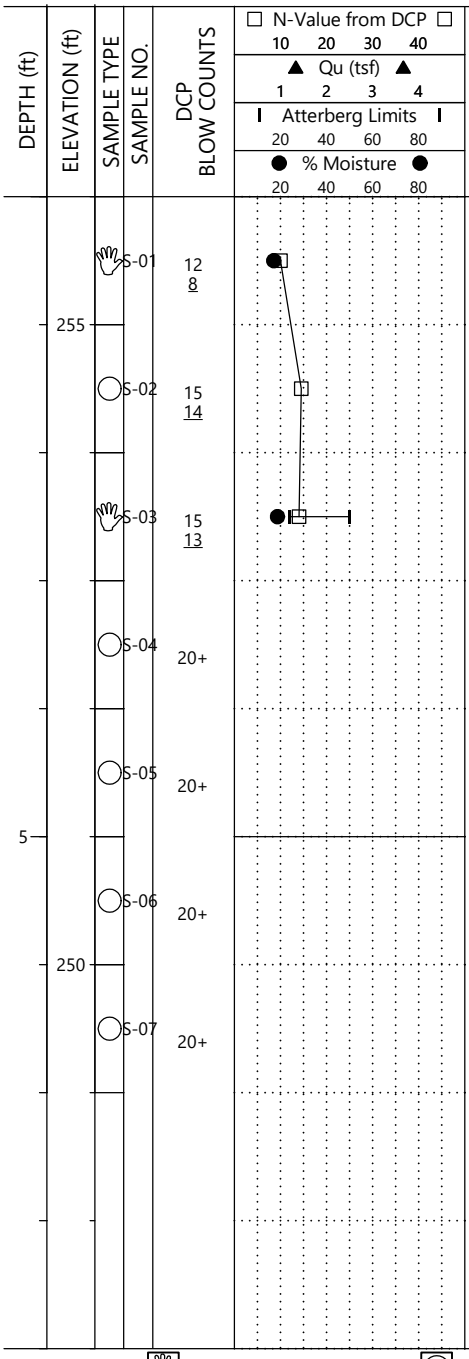
Designation: HA-03

Sheet 1 of 1

1211 Newell Parkway
Montgomery, AL 36110
Office: (334) 260-9174
BuildingAndEarth.com

PROJECT NAME: TSCC Executive Park Building E
PROJECT NUMBER: MG260083
EQUIPMENT USED: Hand Auger/DCP
APPX. ELEVATION: 256
BORING LOCATION: W Gate: SW Pilaster: 32.331468°,-86.234212°

LOCATION: Montgomery, AL
DATE: 9/28/26
WEATHER: Sunny, 85°
LOGGED BY: Z. Houde




| DEPTH (ft) | ELEVATION (ft) | SAMPLE TYPE | SAMPLE NO. | DCP BLOW COUNTS | LAB DATA | SOIL DESCRIPTION | GRAPHIC | REMARKS |
|---|---|---|---|---|---|---|---|---|
| 0.3 | 255.7 | | | | | TOPSOIL: 4 inches | | |
| | | | S-01 | 12<br>8 | Sample S-01<br>M: 17.1% | SANDY FAT CLAY (CH): stiff, brown, light brown, white, high plasticity, moist, (ALLUVIAL) | | |
| | 255 | | S-02 | 15<br>14 | | | | |
| 2.0 | 254.0 | | | | | | | |
| | | | S-03 | 15<br>13 | Sample S-03<br>LL: 50<br>PL: 24<br>PI: 26<br>M: 18.7%<br>F: 98.9% | FAT CLAY (CH): very stiff, light brown, light brownish gray, white, high plasticity, moist, (ALLUVIAL) | | |
| | | | S-04 | 20+ | | | | |
| | | | S-05 | 20+ | | | | |
| | 5 | | | | | | | |
| | | | S-06 | 20+ | | | | |
| | 250 | | | | | | | |
| | | | S-07 | 20+ | | | | |
| 7.0 | 249.0 | | | | | | | |
| | | | | | | Boring Terminated at 7 feet. | | |
| | | | | | | | | Groundwater not encountered at time of boring.<br>Boring backfilled on date of testing unless otherwise noted. |

SAMPLE TYPE GRAB

**DCP-VALUE** CORRELATION TO STANDARD PENETRATION TEST PER ASTM D1586
**% MOISTURE** PERCENT NATURAL MOISTURE CONTENT
▽ GROUNDWATER LEVEL IN THE BORING AT TIME OF DRILLING
▼ STABILIZED GROUNDWATER LEVEL

**LL:** LIQUID LIMIT
**PL:** PLASTIC LIMIT
**PI:** PLASTICITY INDEX
**Qu** POCKET PENETROMETER UNCONFINED COMPRESSIVE STRENGTH

**M:** NATURAL MOISTURE CONTENT
**F:** PERCENT PASSING NO. 200 SIEVE

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# LOG OF HAND AUGER BORING

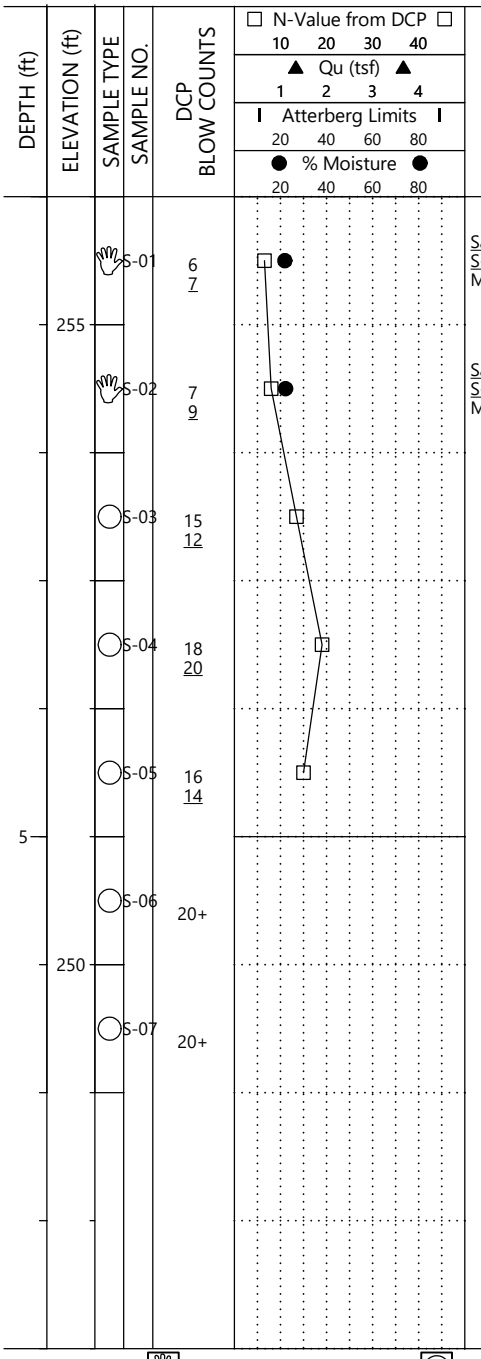
Designation: HA-04

Sheet 1 of 1

1211 Newell Parkway
Montgomery, AL 36110
Office: (334) 260-9174
BuildingAndEarth.com

PROJECT NAME: TSCC Executive Park Building E
PROJECT NUMBER: MG260083
EQUIPMENT USED: Hand Auger/DCP
APPX. ELEVATION: 256
BORING LOCATION: W Gate: NE Pilaster: 32.331526°,-86.234116°

LOCATION: Montgomery, AL
DATE: 9/28/26
WEATHER: Sunny, 85°
LOGGED BY: Z. Houde




| LAB DATA | SOIL DESCRIPTION | GRAPHIC | REMARKS |
|---|---|---|---|
| | TOPSOIL: 4 inches (0.3 / 255.7) | | |
| Sample S-01 M: 21.9% | SANDY FAT CLAY (CH): medium stiff, light brown, brown, high plasticity, moist, (ALLUVIAL) (1.0 / 255.0) | | |
| Sample S-02 M: 22.2% | FAT CLAY (CH): light brown, light brown gray, white, high plasticity, moist, (ALLUVIAL) | | |
| | stiff | | |
| | very stiff | | |
| | stiff | | |
| | very stiff | | |
| | (7.0 / 249.0) Boring Terminated at 7 feet. | | Groundwater not encountered at time of boring. Boring backfilled on date of testing unless otherwise noted. |

SAMPLE TYPE GRAB

**DCP-VALUE** CORRELATION TO STANDARD PENETRATION TEST PER ASTM D1586
**% MOISTURE** PERCENT NATURAL MOISTURE CONTENT
▽ GROUNDWATER LEVEL IN THE BORING AT TIME OF DRILLING
▼ STABILIZED GROUNDWATER LEVEL

**LL:** LIQUID LIMIT
**PL:** PLASTIC LIMIT
**PI:** PLASTICITY INDEX
**Qu** POCKET PENETROMETER UNCONFINED COMPRESSIVE STRENGTH
**M:** NATURAL MOISTURE CONTENT
**F:** PERCENT PASSING NO. 200 SIEVE

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# LOG OF HAND AUGER BORING

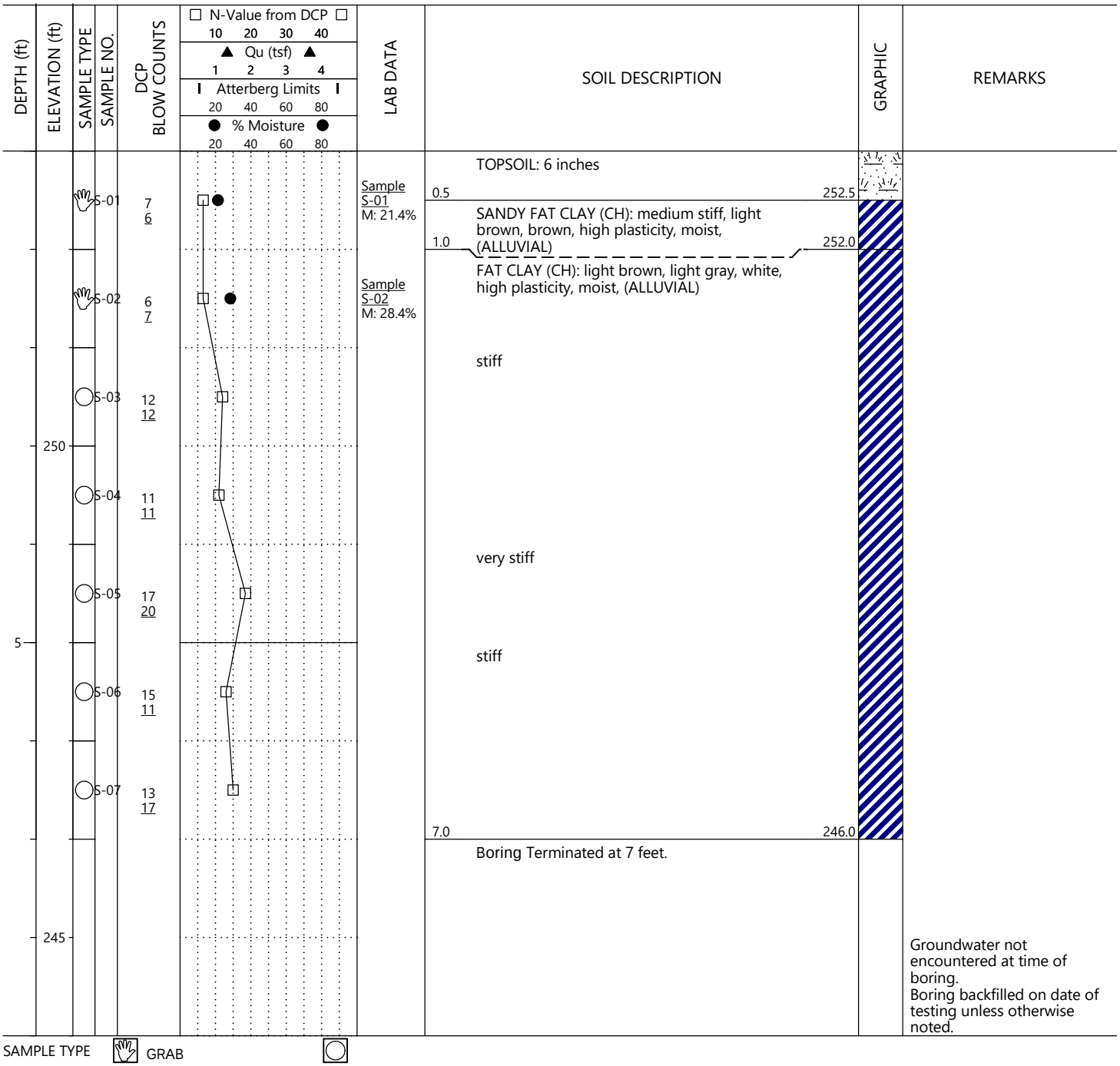
Designation: HA-05

Sheet 1 of 1

1211 Newell Parkway
Montgomery, AL 36110
Office: (334) 260-9174
BuildingAndEarth.com

PROJECT NAME: TSCC Executive Park Building E
PROJECT NUMBER: MG260083
EQUIPMENT USED: Hand Auger/DCP
APPX. ELEVATION: 253
BORING LOCATION: Sign: SW Side: 32.331852°,-86.233901°

LOCATION: Montgomery, AL
DATE: 9/28/26
WEATHER: Sunny, 85°
LOGGED BY: Z. Houde




SAMPLE TYPE GRAB

**DCP-VALUE** CORRELATION TO STANDARD PENETRATION TEST PER ASTM D1586
**% MOISTURE** PERCENT NATURAL MOISTURE CONTENT
▽ GROUNDWATER LEVEL IN THE BORING AT TIME OF DRILLING
▼ STABILIZED GROUNDWATER LEVEL

**LL:** LIQUID LIMIT
**PL:** PLASTIC LIMIT
**PI:** PLASTICITY INDEX
**Qu** POCKET PENETROMETER UNCONFINED COMPRESSIVE STRENGTH

**M:** NATURAL MOISTURE CONTENT
**F:** PERCENT PASSING NO. 200 SIEVE

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# LOG OF HAND AUGER BORING

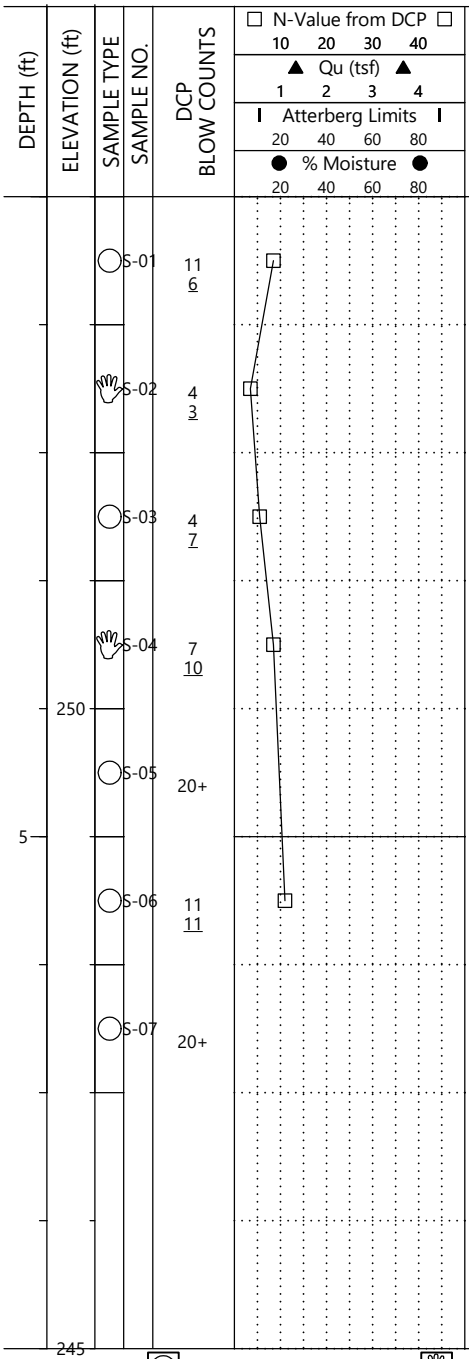
Designation: HA-06

Sheet 1 of 1

1211 Newell Parkway
Montgomery, AL 36110
Office: (334) 260-9174
BuildingAndEarth.com

PROJECT NAME: TSCC Executive Park Building E
PROJECT NUMBER: MG260083
EQUIPMENT USED: Hand Auger/DCP
APPX. ELEVATION: 254
LOCATION: Sign: NE Side: 32.331876°,-86.233809°

LOCATION: Montgomery, AL
DATE: 10/2/26
WEATHER: Sunny, 85°
LOGGED BY: Z. Houde




LAB DATA

| SOIL DESCRIPTION | GRAPHIC | REMARKS |
|---|---|---|
| TOPSOIL: medium stiff, 12 inches | | |
| 1.0 — 253.0 | | |
| FAT CLAY (CH): soft, reddish brown, brown, high plasticity, moist, (ALLUVIAL) | | |
| medium stiff | | |
| light brown, white, light gray | | |
| very stiff | | |
| medium stiff | | |
| very stiff | | |
| 7.0 — 247.0 | | |
| Boring Terminated at 7 feet. | | Groundwater not encountered at time of boring. Boring backfilled on date of testing unless otherwise noted. |

SAMPLE TYPE ◯ GRAB

**DCP-VALUE** CORRELATION TO STANDARD PENETRATION TEST PER ASTM D1586
**% MOISTURE** PERCENT NATURAL MOISTURE CONTENT
▽ GROUNDWATER LEVEL IN THE BORING AT TIME OF DRILLING
▼ STABILIZED GROUNDWATER LEVEL

**LL:** LIQUID LIMIT
**PL:** PLASTIC LIMIT
**PI:** PLASTICITY INDEX
**Qu** POCKET PENETROMETER UNCONFINED COMPRESSIVE STRENGTH
**M:** NATURAL MOISTURE CONTENT
**F:** PERCENT PASSING NO. 200 SIEVE

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Geotechnical, Environmental, and Materials Engineers

# LOG OF HAND AUGER BORING

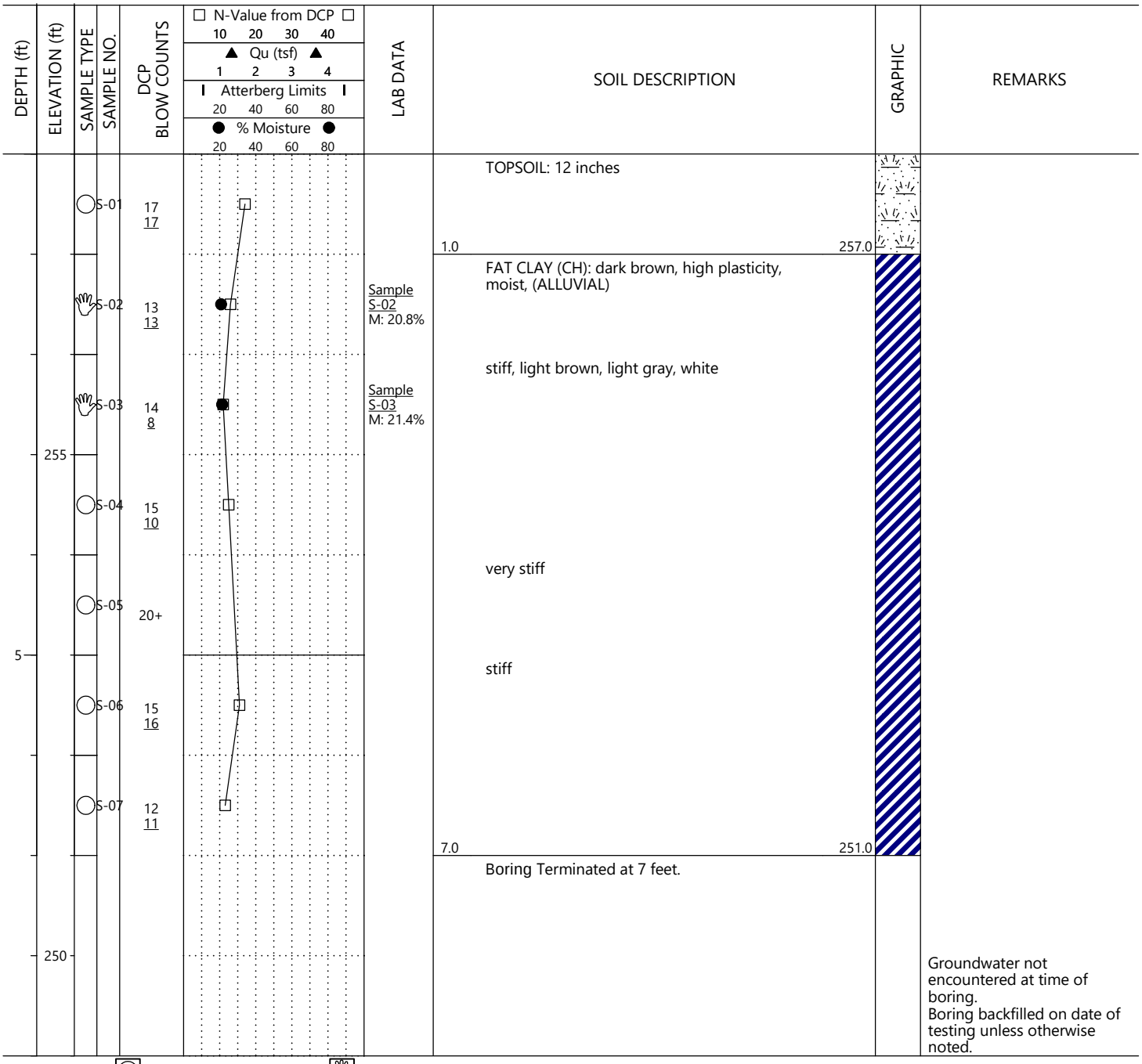
Designation: HA-07

Sheet 1 of 1

1211 Newell Parkway
Montgomery, AL 36110
Office: (334) 260-9174
BuildingAndEarth.com

PROJECT NAME: TSCC Executive Park Building E
PROJECT NUMBER: MG260083
EQUIPMENT USED: Hand Auger/DCP
APPX. ELEVATION: 258
BORING LOCATION: NE Gate: W Pilaster: 32.331767°,-86.233041°

LOCATION: Montgomery, AL
DATE: 10/2/26
WEATHER: Sunny, 85°
LOGGED BY: Z. Houde




SAMPLE TYPE ◯ GRAB

**DCP-VALUE** CORRELATION TO STANDARD PENETRATION TEST PER ASTM D1586
**% MOISTURE** PERCENT NATURAL MOISTURE CONTENT
▽ GROUNDWATER LEVEL IN THE BORING AT TIME OF DRILLING
▼ STABILIZED GROUNDWATER LEVEL

**LL:** LIQUID LIMIT
**PL:** PLASTIC LIMIT
**PI:** PLASTICITY INDEX
**Qu** POCKET PENETROMETER UNCONFINED COMPRESSIVE STRENGTH

**M:** NATURAL MOISTURE CONTENT
**F:** PERCENT PASSING NO. 200 SIEVE

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Geotechnical, Environmental, and Materials Engineers

# LOG OF HAND AUGER BORING

Designation: HA-08

Sheet 1 of 1

1211 Newell Parkway
Montgomery, AL 36110
Office: (334) 260-9174
BuildingAndEarth.com

PROJECT NAME: TSCC Executive Park Building E
PROJECT NUMBER: MG260083
EQUIPMENT USED: Hand Auger/DCP
APPX. ELEVATION: 259
LOCATION: NE Gate: E Pilaster: 32.331749°,-86.232927°

LOCATION: Montgomery, AL
DATE: 10/2/26
WEATHER: Sunny, 85°
LOGGED BY: Z. Houde

| DEPTH (ft) | ELEVATION (ft) | SAMPLE TYPE | SAMPLE NO. | DCP BLOW COUNTS | N-Value from DCP / Qu (tsf) / Atterberg Limits / % Moisture | LAB DATA | SOIL DESCRIPTION | GRAPHIC | REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | TOPSOIL: 10 inches | | |
| | | | S-01 | 20+ | | | 0.8 / 258.2 | | |
| | | | S-02 | 7<br>6 | | Sample S-02<br>M: 15.3% | CLAYEY SAND (SC): medium dense, dark brown, fine to medium grained, moist, (ALLUVIAL)<br>loose | | |
| | | | S-03 | 20+ | | Sample S-03<br>M: 20.9% | 2.0 / 257.0 | | |
| | | | S-04 | 20+ | | | FAT CLAY (CH): very stiff, light brown, light gray, high plasticity, moist, (ALLUVIAL) | | |
| | 255 | | S-05 | 20+ | | | | | |
| 5 | | | S-06 | 20+ | | | | | |
| | | | S-07 | 20+ | | | 7.0 / 252.0 | | |
| | 250 | | | | | | Boring Terminated at 7 feet. | | Groundwater not encountered at time of boring.<br>Boring backfilled on date of testing unless otherwise noted. |

SAMPLE TYPE ◯ GRAB

**DCP-VALUE** CORRELATION TO STANDARD PENETRATION TEST PER ASTM D1586
**% MOISTURE** PERCENT NATURAL MOISTURE CONTENT
▽ GROUNDWATER LEVEL IN THE BORING AT TIME OF DRILLING
▼ STABILIZED GROUNDWATER LEVEL

**LL:** LIQUID LIMIT
**PL:** PLASTIC LIMIT
**PI:** PLASTICITY INDEX
**Qu** POCKET PENETROMETER UNCONFINED COMPRESSIVE STRENGTH

**M:** NATURAL MOISTURE CONTENT
**F:** PERCENT PASSING NO. 200 SIEVE

BUILDING & EARTH
Geotechnical, Environmental, and Materials Engineers

# LOG OF HAND AUGER BORING

Designation: HA-09

Sheet 1 of 1

1211 Newell Parkway
Montgomery, AL 36110
Office: (334) 260-9174
BuildingAndEarth.com

PROJECT NAME: TSCC Executive Park Building E
PROJECT NUMBER: MG260083
EQUIPMENT USED: Hand Auger
APPX. ELEVATION: 258
BORING LOCATION: N of Building E: 32.331286°,-86.234427°

LOCATION: Montgomery, AL
DATE: 10/3/26
WEATHER: Sunny, 80°
LOGGED BY: Z. Houde

| DEPTH (ft) | ELEVATION (ft) | SAMPLE TYPE | SAMPLE NO. | DCP BLOW COUNTS | N-Value from DCP (10 20 30 40) / Qu (tsf) (1 2 3 4) / Atterberg Limits (20 40 60 80) / % Moisture (20 40 60 80) | LAB DATA | SOIL DESCRIPTION | GRAPHIC | REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | TOPSOIL: 6 inches | | |
| 0.5 | 257.5 | | | | | | | | |
| | | | S-01 | | | | SANDY FAT CLAY (CH): light brown, light gray, high plasticity, moist, (ALLUVIAL) | | |
| 1.0 | 257.0 | | | | | | | | |
| | | | S-02 | | | | FAT CLAY (CH): light brown, light gray, (ALLUVIAL) | | |
| | 255 | | | | | | | | |
| 5.0 | 253.0 | | | | | | | | |
| 5 | | | | | | | Boring Terminated at 5 feet. | | |
| | 250 | | | | | | | | Groundwater not encountered at time of boring. Boring backfilled on date of testing unless otherwise noted. |

SAMPLE TYPE GRAB

**DCP-VALUE** CORRELATION TO STANDARD PENETRATION TEST PER ASTM D1586
**% MOISTURE** PERCENT NATURAL MOISTURE CONTENT
▽ GROUNDWATER LEVEL IN THE TEST PIT AT TIME OF DRILLING
▼ STABILIZED GROUNDWATER LEVEL

**LL:** LIQUID LIMIT
**PL:** PLASTIC LIMIT
**PI:** PLASTICITY INDEX
**Qu** POCKET PENETROMETER UNCONFINED COMPRESSIVE STRENGTH

**M:** NATURAL MOISTURE CONTENT
**F:** PERCENT PASSING NO. 200 SIEVE

BUILDING & EARTH
Geotechnical, Environmental, and Materials Engineers

# LOG OF HAND AUGER BORING

Designation: HA-10

Sheet 1 of 1

1211 Newell Parkway
Montgomery, AL 36110
Office: (334) 260-9174
BuildingAndEarth.com

PROJECT NAME: TSCC Executive Park Building E
PROJECT NUMBER: MG260083
EQUIPMENT USED: Hand Auger
APPX. ELEVATION: 259
BORING LOCATION: NW of Building E: 32.331174°,-86.234569°

LOCATION: Montgomery, AL
DATE: 10/3/26
WEATHER: Sunny, 80°
LOGGED BY: Z. Houde

| DEPTH (ft) | ELEVATION (ft) | SAMPLE TYPE | SAMPLE NO. | DCP BLOW COUNTS | N-Value from DCP (10 20 30 40) / Qu (tsf) (1 2 3 4) / Atterberg Limits (20 40 60 80) / % Moisture (20 40 60 80) | LAB DATA | SOIL DESCRIPTION | GRAPHIC | REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Sample S-01 M: 17.4% | TOPSOIL: 6 inches | | |
| 0.5 | 258.5 | | | | | | | | |
| | | S | S-01 | | | | SANDY FAT CLAY (CH): light brown, light gray, high plasticity, moist, (ALLUVIAL) | | |
| 1.0 | 258.0 | | | | | | | | |
| | | S | S-02 | | | Sample S-02 M: 21.0% | FAT CLAY (CH): light brown, light gray, (ALLUVIAL) | | |
| | | S | S-03 | | | Sample S-03 M: 19.1% | | | |
| 5 | 255 | | | | | | | | |
| 5.0 | 254.0 | | | | | | Boring Terminated at 5 feet. | | |
| | 250 | | | | | | | | Groundwater not encountered at time of boring. Boring backfilled on date of testing unless otherwise noted. |

SAMPLE TYPE GRAB

**DCP-VALUE** CORRELATION TO STANDARD PENETRATION TEST PER ASTM D1586
**% MOISTURE** PERCENT NATURAL MOISTURE CONTENT
▽ GROUNDWATER LEVEL IN THE TEST PIT AT TIME OF DRILLING
▼ STABILIZED GROUNDWATER LEVEL

**LL:** LIQUID LIMIT
**PL:** PLASTIC LIMIT
**PI:** PLASTICITY INDEX
**Qu** POCKET PENETROMETER UNCONFINED COMPRESSIVE STRENGTH

**M:** NATURAL MOISTURE CONTENT
**F:** PERCENT PASSING NO. 200 SIEVE

BUILDING & EARTH
Geotechnical, Environmental, and Materials Engineers

# LOG OF HAND AUGER BORING

Designation: HA-11

Sheet 1 of 1

1211 Newell Parkway
Montgomery, AL 36110
Office: (334) 260-9174
BuildingAndEarth.com

PROJECT NAME: TSCC Executive Park Building E
PROJECT NUMBER: MG260083
EQUIPMENT USED: Hand Auger
APPX. ELEVATION: 259
LOCATION: Building E Interior: N: 32.331171°,-86.234390°

LOCATION: Montgomery, AL
DATE: 9/29/26
WEATHER: Sunny, 80°
LOGGED BY: Z. Houde

| DEPTH (ft) | ELEVATION (ft) | SAMPLE TYPE | SAMPLE NO. | DCP BLOW COUNTS | N-Value from DCP (10 20 30 40) / Qu (tsf) (1 2 3 4) / Atterberg Limits (20 40 60 80) / % Moisture (20 40 60 80) | LAB DATA | SOIL DESCRIPTION | GRAPHIC | REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Sample S-01 LL: 21 PL: 14 PI: 7 M: 19.8% F: 38.9% | CONCRETE: 4.5 inches (0.4 / 258.6) | | |
| | | S-01 | | | | | AGGREGATE BASE: 1 inch (0.5 / 258.5) | | |
| | | | | | | | SILTY CLAYEY SAND (SC-SM): light red, fine to medium grained, moist, (FILL) (1.0 / 258.0) | | |
| | | S-02 | | | | Sample S-02 LL: 50 PL: 25 PI: 25 M: 17.2% F: 97.8% | FAT CLAY (CH): light brown, high plasticity, moist, (ALLUVIAL) | | |
| | 255 | S-03 | | | | Sample S-03 M: 17.4% | | | |
| 5 | | | | | | | (5.0 / 254.0) Boring Terminated at 5 feet. | | Groundwater not encountered at time of boring. Boring backfilled on date of testing unless otherwise noted. |
| | 250 | | | | | | | | |

SAMPLE TYPE GRAB

**DCP-VALUE** CORRELATION TO STANDARD PENETRATION TEST PER ASTM D1586
**% MOISTURE** PERCENT NATURAL MOISTURE CONTENT
GROUNDWATER LEVEL IN THE BORING AT TIME OF DRILLING
STABILIZED GROUNDWATER LEVEL

**LL:** LIQUID LIMIT
**PL:** PLASTIC LIMIT
**PI:** PLASTICITY INDEX
**Qu** POCKET PENETROMETER UNCONFINED COMPRESSIVE STRENGTH

**M:** NATURAL MOISTURE CONTENT
**F:** PERCENT PASSING NO. 200 SIEVE

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Geotechnical, Environmental, and Materials Engineers

# LOG OF HAND AUGER BORING

Designation: HA-12

Sheet 1 of 1

1211 Newell Parkway
Montgomery, AL 36110
Office: (334) 260-9174
BuildingAndEarth.com

PROJECT NAME: TSCC Executive Park Building E
PROJECT NUMBER: MG260083
EQUIPMENT USED: Hand Auger
APPX. ELEVATION: 256
BORING LOCATION: S of Building E: 32.330869°,-86.234431°

LOCATION: Montgomery, AL
DATE: 9/29/26
WEATHER: Sunny, 80°
LOGGED BY: Z. Houde

| DEPTH (ft) | ELEVATION (ft) | SAMPLE TYPE | SAMPLE NO. | DCP BLOW COUNTS | N-Value from DCP (10 20 30 40) / Qu (tsf) (1 2 3 4) / Atterberg Limits (20 40 60 80) / % Moisture (20 40 60 80) | LAB DATA | SOIL DESCRIPTION | GRAPHIC | REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | | | | | TOPSOIL: 6 inches | | |
| 0.5 | 255.5 | | | | | | | | |
| | | | S-01 | | | | SILTY CLAYEY SAND (SC-SM): light red, fine to medium grained, moist, (FILL) | | |
| 1.0 | 255.0 | | | | | | | | |
| | 255 | | | | | | FAT CLAY (CH): light brown, light reddish brown, high plasticity, moist, (ALLUVIAL) | | |
| | | | | | | | light brown | | |
| 5.0 | 251.0 | | | | | | | | |
| 5 | | | | | | | Boring Terminated at 5 feet. | | |
| | 250 | | | | | | | | Groundwater not encountered at time of boring. Boring backfilled on date of testing unless otherwise noted. |

SAMPLE TYPE GRAB

**DCP-VALUE** CORRELATION TO STANDARD PENETRATION TEST PER ASTM D1586
**% MOISTURE** PERCENT NATURAL MOISTURE CONTENT
▽ GROUNDWATER LEVEL IN THE BORING AT TIME OF DRILLING
▼ STABILIZED GROUNDWATER LEVEL

**LL:** LIQUID LIMIT
**PL:** PLASTIC LIMIT
**PI:** PLASTICITY INDEX
**Qu** POCKET PENETROMETER UNCONFINED COMPRESSIVE STRENGTH

**M:** NATURAL MOISTURE CONTENT
**F:** PERCENT PASSING NO. 200 SIEVE

BUILDING & EARTH
Geotechnical, Environmental, and Materials Engineers

# LOG OF HAND AUGER BORING

Designation: HA-13

Sheet 1 of 1

1211 Newell Parkway
Montgomery, AL 36110
Office: (334) 260-9174
BuildingAndEarth.com

PROJECT NAME: TSCC Executive Park Building E
PROJECT NUMBER: MG260083
EQUIPMENT USED: Hand Auger
APPX. ELEVATION: 259
BORING LOCATION: Bui

LOCATION: Montgomery, AL
DATE: 9/29/26
WEATHER: Sunny, 80°
LOGGED BY: Z. Houde

| DEPTH (ft) | ELEVATION (ft) | SAMPLE TYPE | SAMPLE NO. | DCP BLOW COUNTS | N-Value from DCP (10 20 30 40) / Qu (tsf) (1 2 3 4) / Atterberg Limits (20 40 60 80) / % Moisture (20 40 60 80) | LAB DATA | SOIL DESCRIPTION | GRAPHIC | REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | CONCRETE: 5 inches | | |
| 0.4 | 258.6 | | | | | | | | |
| 0.6 | 258.4 | | | | | | AGGREGATE BASE: 2 inches | | |
| | | | S-02 | | | | SANDY LEAN CLAY (CL): dark red, low plasticity, moist, (FILL) | | |
| 3.0 | 256.0 | | | | | | | | |
| | | | S-03 | | | | FAT CLAY (CH): dark gray, high plasticity, moist, (ALLUVIAL) | | |
| 255 | | | | | | | | | |
| 5 | | | | | | | | | |
| 5.0 | 254.0 | | | | | | Boring Terminated at 5 feet. | | |
| | | | | | | | | | Groundwater not encountered at time of boring. Boring backfilled on date of testing unless otherwise noted. |
| | 250 | | | | | | | | |

SAMPLE TYPE GRAB

**DCP-VALUE** CORRELATION TO STANDARD PENETRATION TEST PER ASTM D1586
**% MOISTURE** PERCENT NATURAL MOISTURE CONTENT
GROUNDWATER LEVEL IN THE BORING AT TIME OF DRILLING
STABILIZED GROUNDWATER LEVEL

**LL:** LIQUID LIMIT
**PL:** PLASTIC LIMIT
**PI:** PLASTICITY INDEX
**Qu** POCKET PENETROMETER UNCONFINED COMPRESSIVE STRENGTH

**M:** NATURAL MOISTURE CONTENT
**F:** PERCENT PASSING NO. 200 SIEVE

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Geotechnical, Environmental, and Materials Engineers

# LOG OF HAND AUGER BORING

Designation: P-01

Sheet 1 of 1

1211 Newell Parkway
Montgomery, AL 36110
Office: (334) 260-9174
BuildingAndEarth.com

PROJECT NAME: TSCC Executive Park Building E
PROJECT NUMBER: MG260083
EQUIPMENT USED: Hand Auger/ Kessler DCP
APPX. ELEVATION: 255
LOCATION: Parking Lot: NW: 32.331103°,-86.234897°

LOCATION: Montgomery, AL
DATE: 9/29/26
WEATHER: Sunny, 80°
LOGGED BY: Z. Houde

| DEPTH (ft) | ELEVATION (ft) | SAMPLE TYPE | SAMPLE NO. | DCP BLOW COUNTS | N-Value from DCP (10 20 30 40) / Qu (tsf) (1 2 3 4) / Atterberg Limits (20 40 60 80) / % Moisture (20 40 60 80) | LAB DATA | SOIL DESCRIPTION | GRAPHIC | REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| | 255 | | | | | | ASPHALT: 6 inches | | |
| | | | S-01 | | | Sample S-01 M: 39.4% F: 83.7% | 0.5 / 254.5 | | |
| | | | | | | | FAT CLAY (CH): Lime Stabilized: 6 inches | | |
| | | | | | | | 1.0 / 254.0 | | |
| | | | S-02 | | | Sample S-02 M: 32.6% | FAT CLAY (CH): light brown, light reddish brown, grayish brown, high plasticity, moist, (ALLUVIAL) | | |
| | | | | | | | 3.0 / 252.0 | | |
| | | | | | | | Boring Terminated at 3 feet. | | |
| 5 | 250 | | | | | | | | Groundwater not encountered at time of boring. Boring backfilled on date of testing unless otherwise noted. |

SAMPLE TYPE GRAB

**DCP-VALUE** CORRELATION TO STANDARD PENETRATION TEST PER ASTM D1586
**% MOISTURE** PERCENT NATURAL MOISTURE CONTENT
▽ GROUNDWATER LEVEL IN THE BORING AT TIME OF DRILLING
▼ STABILIZED GROUNDWATER LEVEL

**LL:** LIQUID LIMIT
**PL:** PLASTIC LIMIT
**PI:** PLASTICITY INDEX
**Qu** POCKET PENETROMETER UNCONFINED COMPRESSIVE STRENGTH

**M:** NATURAL MOISTURE CONTENT
**F:** PERCENT PASSING NO. 200 SIEVE

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Geotechnical, Environmental, and Materials Engineers

# LOG OF HAND AUGER BORING

Designation: P-02

Sheet 1 of 1

1211 Newell Parkway
Montgomery, AL 36110
Office: (334) 260-9174
BuildingAndEarth.com

PROJECT NAME: TSCC Executive Park Building E
PROJECT NUMBER: MG260083
EQUIPMENT USED: Hand Auger/ Kessler DCP
APPX. ELEVATION: 254
LOCATION: Parking Lot: W: 32.330780°,-86.235068°

LOCATION: Montgomery, AL
DATE: 9/29/26
WEATHER: Sunny, 80°
LOGGED BY: Z. Houde

| DEPTH (ft) | ELEVATION (ft) | SAMPLE TYPE | SAMPLE NO. | DCP BLOW COUNTS | N-Value from DCP / Qu (tsf) / Atterberg Limits / % Moisture | LAB DATA | SOIL DESCRIPTION | GRAPHIC | REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | ASPHALT: 5.5 inches | | |
| 0.5 | 253.5 | | | | | | | | |
| | | | S-01 | | | | FAT CLAY (CH): Lime Stabilized: 8.5 inches | | |
| 1.1 | 252.9 | | | | | | | | |
| | | | S-02 | | | | FAT CLAY (CH): light brown, light reddish brown, grayish brown, high plasticity, moist, (ALLUVIAL) | | |
| 3.0 | 251.0 | | | | | | | | |
| | | | | | | | Boring Terminated at 3 feet. | | |
| | 250 | | | | | | | | |
| 5 | | | | | | | | | |
| | 245 | | | | | | | | Groundwater not encountered at time of boring. Boring backfilled on date of testing unless otherwise noted. |

SAMPLE TYPE GRAB

**DCP-VALUE** CORRELATION TO STANDARD PENETRATION TEST PER ASTM D1586
**% MOISTURE** PERCENT NATURAL MOISTURE CONTENT
▽ GROUNDWATER LEVEL IN THE BORING AT TIME OF DRILLING
▼ STABILIZED GROUNDWATER LEVEL

**LL:** LIQUID LIMIT
**PL:** PLASTIC LIMIT
**PI:** PLASTICITY INDEX
**Qu** POCKET PENETROMETER UNCONFINED COMPRESSIVE STRENGTH

**M:** NATURAL MOISTURE CONTENT
**F:** PERCENT PASSING NO. 200 SIEVE

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Geotechnical, Environmental, and Materials Engineers

# LOG OF HAND AUGER BORING

Designation: P-03

Sheet 1 of 1

1211 Newell Parkway
Montgomery, AL 36110
Office: (334) 260-9174
BuildingAndEarth.com

PROJECT NAME: TSCC Executive Park Building E
PROJECT NUMBER: MG260083
EQUIPMENT USED: Hand Auger/ Kessler DCP
APPX. ELEVATION: 254
LOCATION: Parking Lot: Central: 32.330791°,-86.234637°

LOCATION: Montgomery, AL
DATE: 9/29/26
WEATHER: Sunny, 80°
LOGGED BY: Z. Houde

| DEPTH (ft) | ELEVATION (ft) | SAMPLE TYPE | SAMPLE NO. | DCP BLOW COUNTS | N-Value from DCP (10 20 30 40) / Qu (tsf) (1 2 3 4) / Atterberg Limits (20 40 60 80) / % Moisture (20 40 60 80) | LAB DATA | SOIL DESCRIPTION | GRAPHIC | REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | 254 | | | | | | ASPHALT: 6 inches | | |
| 0.5 | 253.5 | S | S-01 | | ● | Sample S-01 M: 37.6% | FAT CLAY (CH): Lime Stabilized: 7 inches | | |
| 1.1 | 252.9 | | | | | | FAT CLAY (CH): gray, light brown, weak red, high plasticity, moist, (ALLUVIAL) | | |
| | | S | S-02 | | ● | Sample S-02 M: 30.8% F: 96.2% | | | |
| 3.0 | 251.0 | | | | | | Boring Terminated at 3 feet. | | Groundwater not encountered at time of boring. Boring backfilled on date of testing unless otherwise noted. |
| 5 | 250 | | | | | | | | |
| | 245 | | | | | | | | |

SAMPLE TYPE GRAB

**DCP-VALUE** CORRELATION TO STANDARD PENETRATION TEST PER ASTM D1586
**% MOISTURE** PERCENT NATURAL MOISTURE CONTENT
▽ GROUNDWATER LEVEL IN THE BORING AT TIME OF DRILLING
▼ STABILIZED GROUNDWATER LEVEL

**LL:** LIQUID LIMIT
**PL:** PLASTIC LIMIT
**PI:** PLASTICITY INDEX
**Qu** POCKET PENETROMETER UNCONFINED COMPRESSIVE STRENGTH

**M:** NATURAL MOISTURE CONTENT
**F:** PERCENT PASSING NO. 200 SIEVE

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# LOG OF HAND AUGER BORING

Designation: P-04

Sheet 1 of 1

1211 Newell Parkway
Montgomery, AL 36110
Office: (334) 260-9174
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PROJECT NAME: TSCC Executive Park Building E
PROJECT NUMBER: MG260083
EQUIPMENT USED: Hand Auger/ Kessler DCP
APPX. ELEVATION: 253
BORING LOCATION: Parking Lot: E: 32.330658°,-86.234260°

LOCATION: Montgomery, AL
DATE: 9/29/26
WEATHER: Sunny, 80°
LOGGED BY: Z. Houde

| DEPTH (ft) | ELEVATION (ft) | SAMPLE TYPE | SAMPLE NO. | DCP BLOW COUNTS | N-Value from DCP (10 20 30 40) / Qu (tsf) (1 2 3 4) / Atterberg Limits (20 40 60 80) / % Moisture (20 40 60 80) | LAB DATA | SOIL DESCRIPTION | GRAPHIC | REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| 0 | | | S-01 | | | | ASPHALT: 5 inches | | |
| 0.5 | 252.5 | | | | | | | | |
| 0.7 | 252.3 | | | | | | FAT CLAY (CH): Lime Stabilized: 3 inches | | |
| | | | S-02 | | | | FAT CLAY (CH): dark grayish brown, dark reddish brown, light brown, high plasticity, moist, (ALLUVIAL) | | |
| 3.0 | 250.0 | | | | | | Boring Terminated at 3 feet. | | |
| 5 | 245 | | | | | | | | Groundwater not encountered at time of boring. Boring backfilled on date of testing unless otherwise noted. |

SAMPLE TYPE GRAB

**DCP-VALUE** CORRELATION TO STANDARD PENETRATION TEST PER ASTM D1586
**% MOISTURE** PERCENT NATURAL MOISTURE CONTENT
▽ GROUNDWATER LEVEL IN THE BORING AT TIME OF DRILLING
▼ STABILIZED GROUNDWATER LEVEL

**LL:** LIQUID LIMIT
**PL:** PLASTIC LIMIT
**PI:** PLASTICITY INDEX
**Qu** POCKET PENETROMETER UNCONFINED COMPRESSIVE STRENGTH

**M:** NATURAL MOISTURE CONTENT
**F:** PERCENT PASSING NO. 200 SIEVE

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# LOG OF HAND AUGER BORING

Designation: P-05

Sheet 1 of 1

1211 Newell Parkway
Montgomery, AL 36110
Office: (334) 260-9174
BuildingAndEarth.com

PROJECT NAME: TSCC Executive Park Building E
PROJECT NUMBER: MG260083
EQUIPMENT USED: Hand Auger/ Kessler DCP
APPX. ELEVATION: 253
BORING LOCATION: Parking Lot: SE: 32.330376°,-86.234462°

LOCATION: Montgomery, AL
DATE: 9/29/26
WEATHER: Sunny, 80°
LOGGED BY: Z. Houde

| DEPTH (ft) | ELEVATION (ft) | SAMPLE TYPE | SAMPLE NO. | DCP BLOW COUNTS | N-Value from DCP / Qu (tsf) / Atterberg Limits / % Moisture | LAB DATA | SOIL DESCRIPTION | GRAPHIC | REMARKS |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | ASPHALT: 6.5 inches | | |
| | | S | S-01 | | | Sample S-01 M: 34.2% | 0.5 / 252.5 | | |
| | | | | | | | FAT CLAY (CH): Lime Stabilized: 3 inches | | |
| | | | | | | | 1.0 / 252.0 | | |
| | | S | S-02 | | | Sample S-02 M: 30.2% | FAT CLAY (CH): dark grayish brown, dark reddish brown, light brown, high plasticity, moist, (ALLUVIAL) | | |
| | 250 | | | | | | 3.0 / 250.0 | | |
| | | | | | | | Boring Terminated at 3 feet. | | |
| 5 | | | | | | | | | |
| | 245 | | | | | | | | Groundwater not encountered at time of boring. Boring backfilled on date of testing unless otherwise noted. |

SAMPLE TYPE GRAB

**DCP-VALUE** CORRELATION TO STANDARD PENETRATION TEST PER ASTM D1586
**% MOISTURE** PERCENT NATURAL MOISTURE CONTENT
▽ GROUNDWATER LEVEL IN THE BORING AT TIME OF DRILLING
▼ STABILIZED GROUNDWATER LEVEL

**LL:** LIQUID LIMIT
**PL:** PLASTIC LIMIT
**PI:** PLASTICITY INDEX
**Qu** POCKET PENETROMETER UNCONFINED COMPRESSIVE STRENGTH

**M:** NATURAL MOISTURE CONTENT
**F:** PERCENT PASSING NO. 200 SIEVE

## ASPHALT CORE PHOTOGRAPHS

MG260083
TSCC Executive Park Building E
Montgomery, AL
P-01
Diameter: 4.0”
Length: 6.0”
Subgrade: Lime Stabilized
Fat Clay (CH)



MG260083
TSCC Executive Park Building E
Montgomery, AL
P-02
Diameter: 4.0”
Length: 5.5”
Subgrade: Lime Stabilized
Fat Clay (CH)



# Core Photographs

BUILDING & EARTH
Geotechnical, Environmental, and Materials Engineers

| Project Name / Location: | Date | Project No.: | Sheet |
|---|---|---|---|
| TSCC Executive Park Building E<br>Montgomery, AL | 10/16/2026 | MG260086 | 1 |

MG260083
TSCC Executive Park Building E
Montgomery, AL
P-03
Diameter: 4.0”
Length: 6.0”
Subgrade: Lime Stabilized
Fat Clay (CH)



MG260083
TSCC Executive Park Building E
Montgomery, AL
P-04
Diameter: 4.0”
Length: 5.5”
Subgrade: Lime Stabilized
Fat Clay (CH)



# Core Photographs

BUILDING & EARTH
Geotechnical, Environmental, and Materials Engineers

| Project Name / Location: | Date | Project No.: | Sheet |
|---|---|---|---|
| TSCC Executive Park Building E<br>Montgomery, AL | 10/16/2026 | MG260086 | 2 |

MG260083
TSCC Executive Park Building E
Montgomery, AL
P-05
Diameter: 4.0”
Length: 6.5”
Subgrade: Lime Stabilized
Fat Clay (CH)



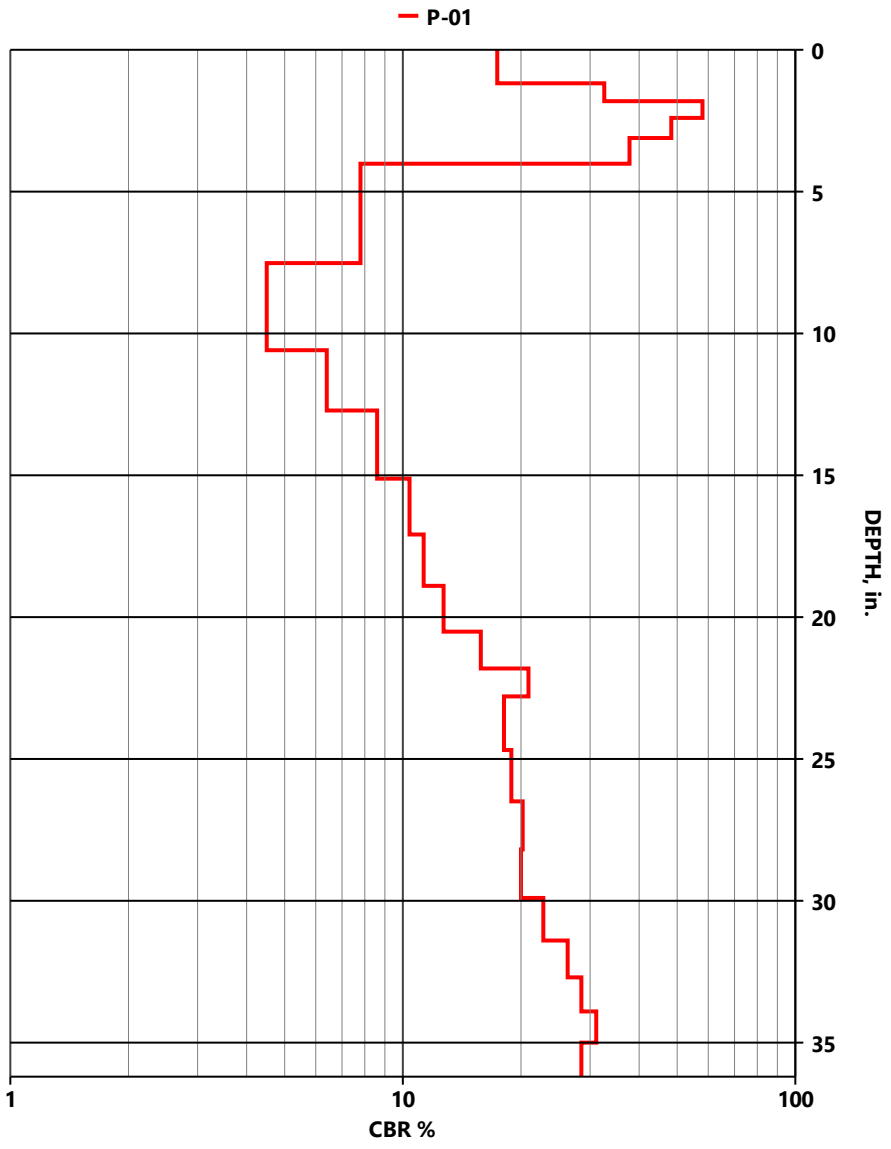
# Core Photographs

BUILDING & EARTH
Geotechnical, Environmental, and Materials Engineers

| Project Name / Location: | Date | Project No.: | Sheet |
|---|---|---|---|
| TSCC Executive Park Building E<br>Montgomery, AL | 10/16/2026 | MG260086 | 3 |

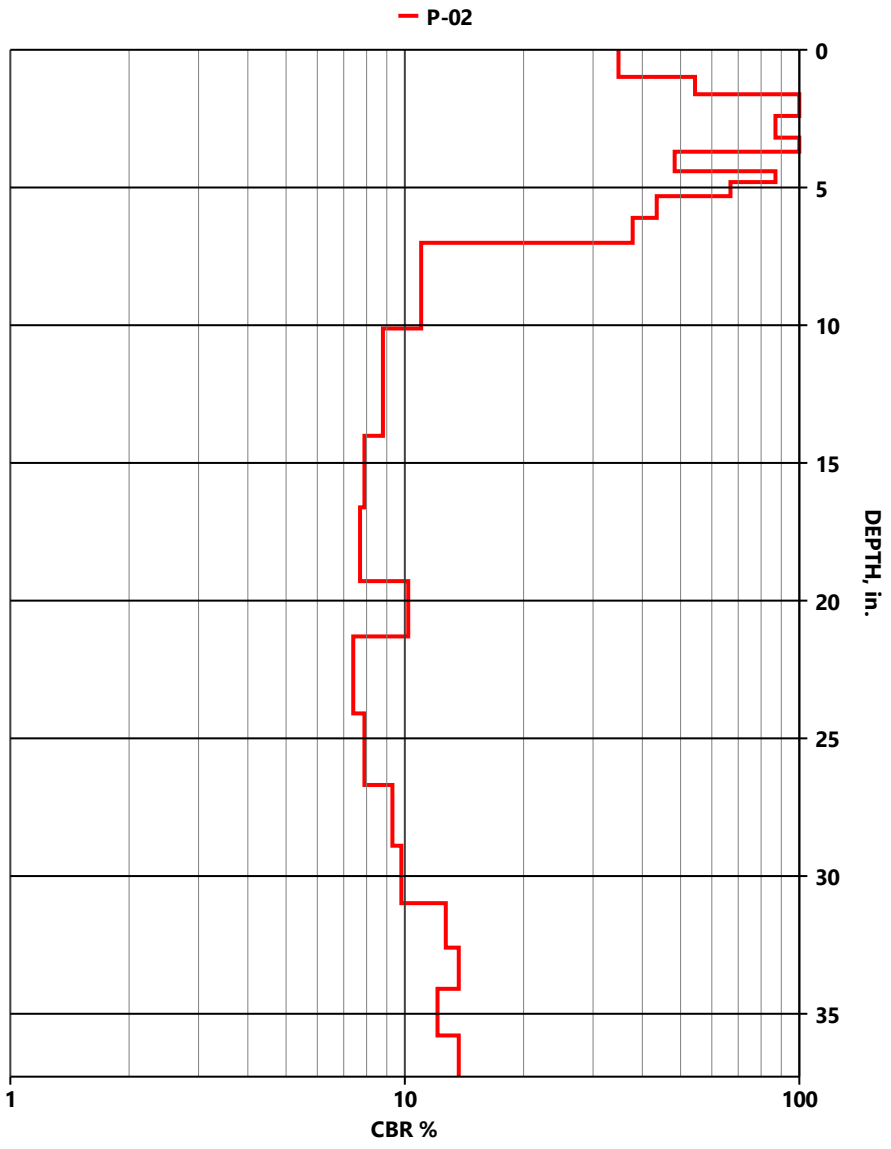
| Location: Unassigned | File name: P-01 |
|---|---|
| Starting Depth: 0.0 in. | Test Date: 10/16/2026 |
| Hammer Type: 17.6 lbs. | Soil Correlation: Heavy Clays |

| No. of Blows | Accumulative Depth (in.) | Type of Hammer |
|---|---|---|
| 0 | 0.0 | 2 |
| 3 | 1.2 | 2 |
| 3 | 1.8 | 2 |
| 5 | 2.4 | 2 |
| 5 | 3.1 | 2 |
| 5 | 4.0 | 2 |
| 4 | 7.5 | 2 |
| 2 | 10.6 | 2 |
| 2 | 12.7 | 2 |
| 3 | 15.1 | 2 |
| 3 | 17.1 | 2 |
| 3 | 18.9 | 2 |
| 3 | 20.5 | 2 |
| 3 | 21.8 | 2 |
| 3 | 22.8 | 2 |
| 5 | 24.7 | 2 |
| 5 | 26.5 | 2 |
| 5 | 28.2 | 2 |
| 5 | 29.9 | 2 |
| 5 | 31.4 | 2 |
| 5 | 32.7 | 2 |
| 5 | 33.9 | 2 |
| 5 | 35.0 | 2 |
| 5 | 36.2 | 2 |



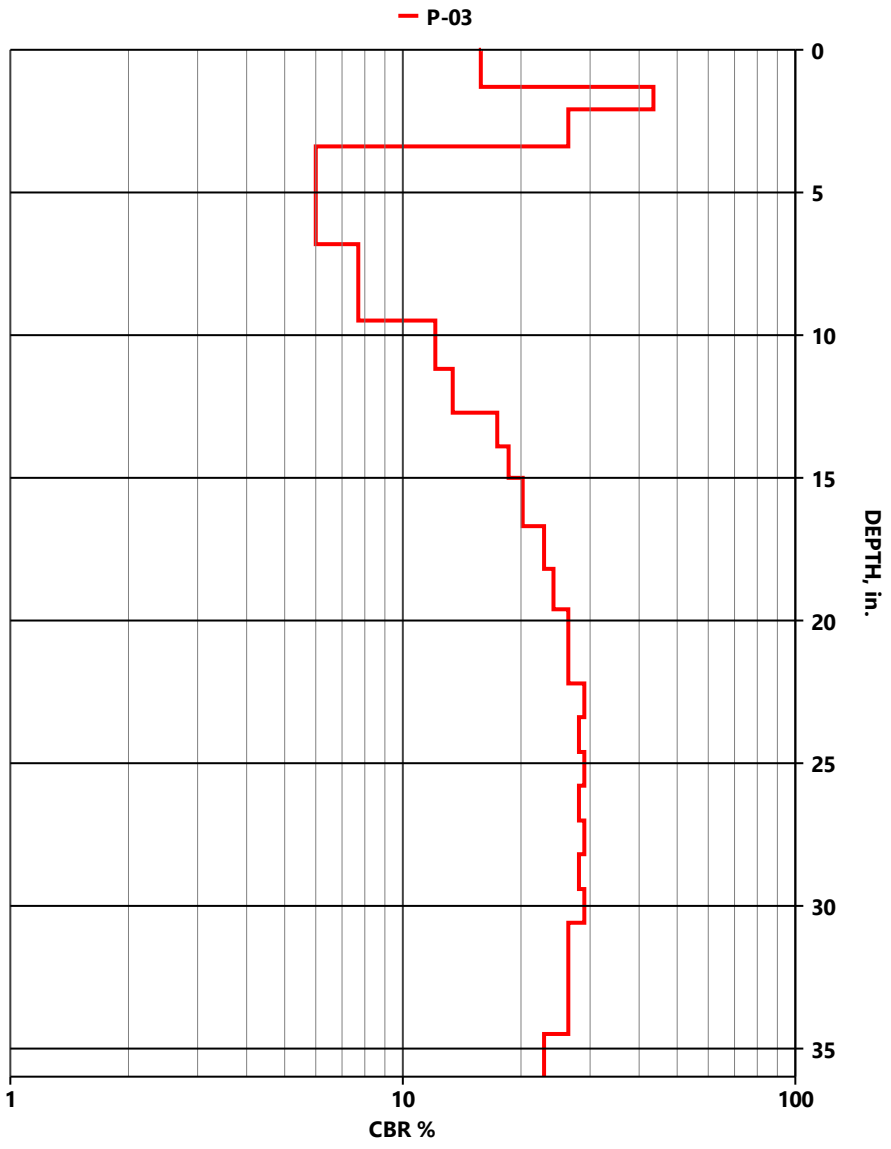
| Location: Unassigned | File name: P-02 |
|---|---|
| Starting Depth: 0.0 in. | Test Date: 10/16/2026 |
| Hammer Type: 17.6 lbs. | Soil Correlation: Heavy Clays |

| No. of Blows | Accumulative Depth (in.) | Type of Hammer |
|---|---|---|
| 0 | 0.0 | 2 |
| 5 | 1.0 | 2 |
| 5 | 1.6 | 2 |
| 5 | 1.9 | 2 |
| 5 | 2.2 | 2 |
| 5 | 2.4 | 2 |
| 5 | 2.8 | 2 |
| 5 | 3.2 | 2 |
| 5 | 3.4 | 2 |
| 5 | 3.7 | 2 |
| 5 | 4.4 | 2 |
| 5 | 4.8 | 2 |
| 5 | 5.3 | 2 |
| 5 | 6.1 | 2 |
| 5 | 7.0 | 2 |
| 5 | 10.1 | 2 |
| 5 | 14.0 | 2 |
| 3 | 16.6 | 2 |
| 3 | 19.3 | 2 |
| 3 | 21.3 | 2 |
| 3 | 24.1 | 2 |
| 3 | 26.7 | 2 |
| 3 | 28.9 | 2 |
| 3 | 31.0 | 2 |
| 3 | 32.6 | 2 |
| 3 | 34.1 | 2 |
| 3 | 35.8 | 2 |
| 3 | 37.3 | 2 |



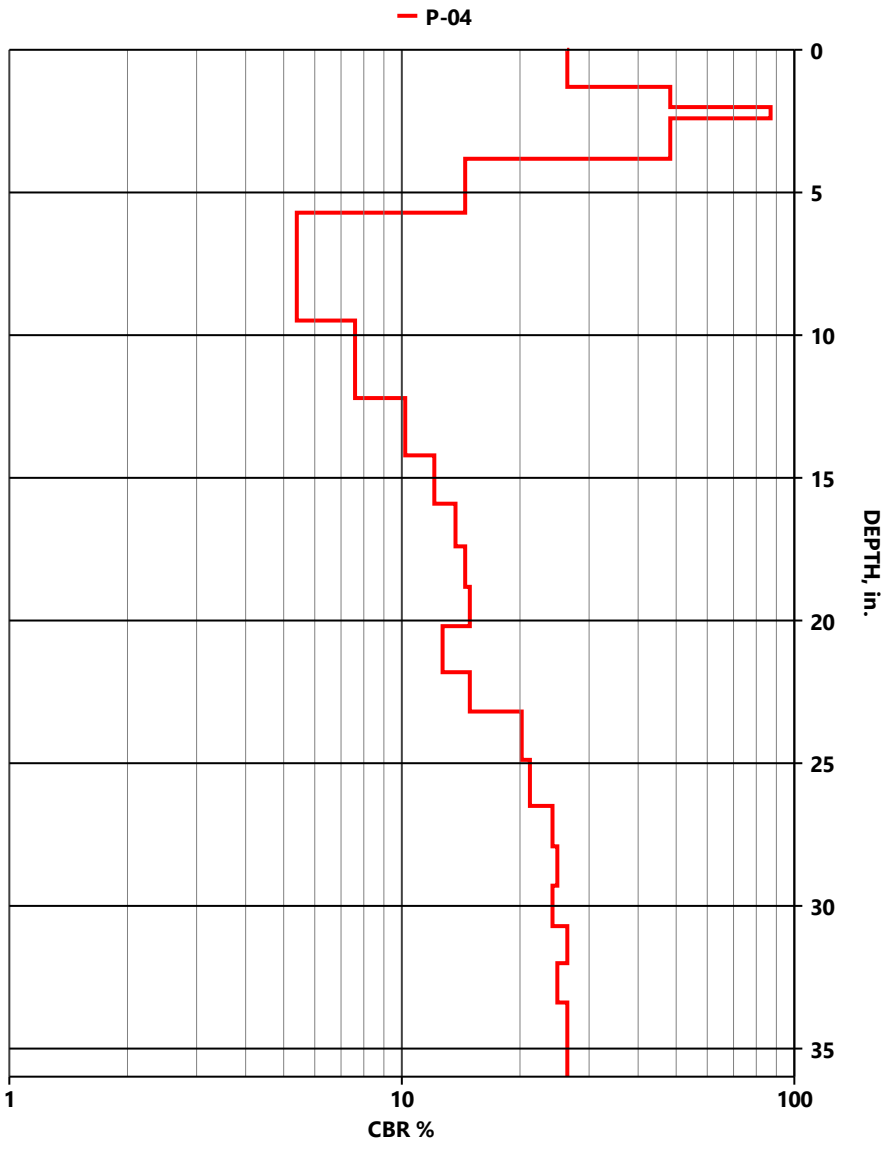
| Location: Unassigned | File name: P-03 |
|---|---|
| Starting Depth: 0.0 in. | Test Date: 10/16/2026 |
| Hammer Type: 17.6 lbs. | Soil Correlation: Heavy Clays |

| No. of Blows | Accumulative Depth (in.) | Type of Hammer |
|---|---|---|
| 0 | 0.0 | 2 |
| 3 | 1.3 | 2 |
| 5 | 2.1 | 2 |
| 5 | 3.4 | 2 |
| 3 | 6.8 | 2 |
| 3 | 9.5 | 2 |
| 3 | 11.2 | 2 |
| 3 | 12.7 | 2 |
| 3 | 13.9 | 2 |
| 3 | 15.0 | 2 |
| 5 | 16.7 | 2 |
| 5 | 18.2 | 2 |
| 5 | 19.6 | 2 |
| 5 | 20.9 | 2 |
| 5 | 22.2 | 2 |
| 5 | 23.4 | 2 |
| 5 | 24.6 | 2 |
| 5 | 25.8 | 2 |
| 5 | 27.0 | 2 |
| 5 | 28.2 | 2 |
| 5 | 29.4 | 2 |
| 5 | 30.6 | 2 |
| 5 | 31.9 | 2 |
| 5 | 33.2 | 2 |
| 5 | 34.5 | 2 |
| 5 | 36.0 | 2 |



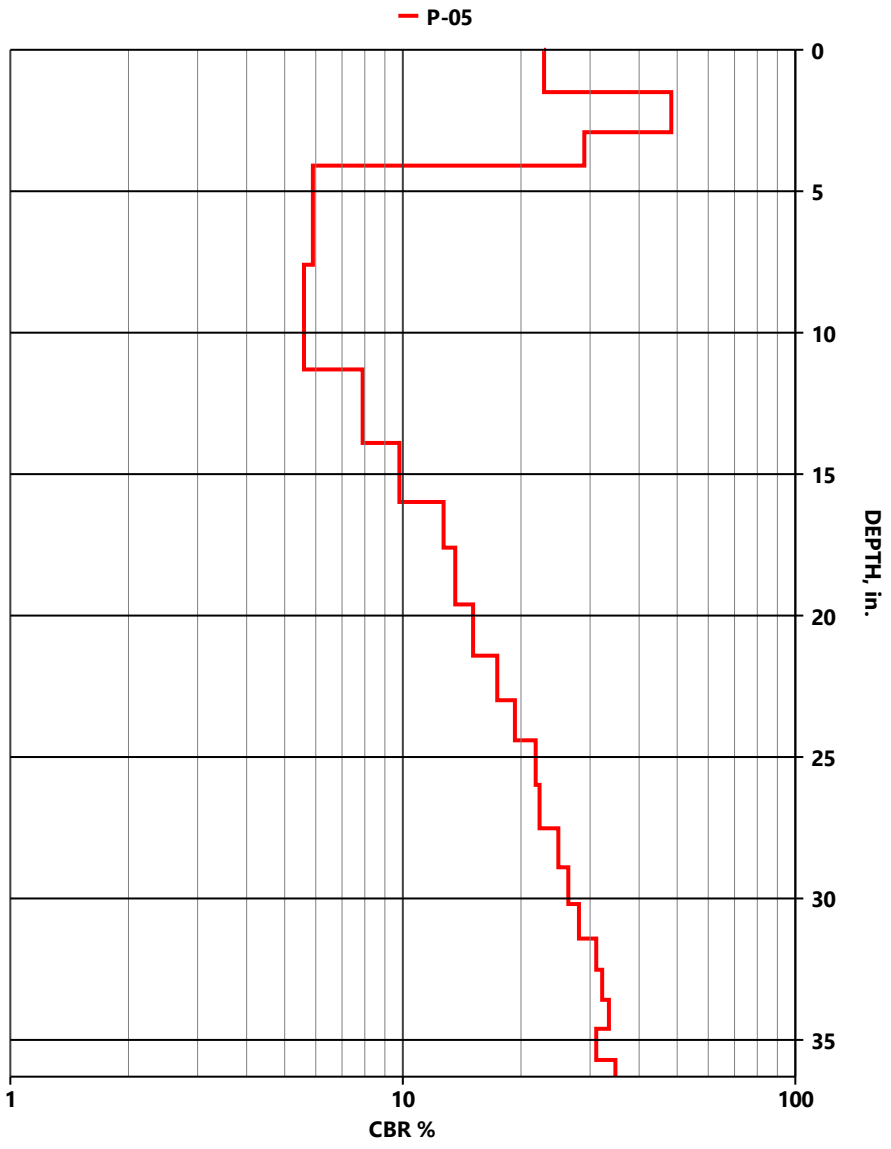
| Location: Unassigned | File name: P-04 |
|---|---|
| Starting Depth: 0.0 in. | Test Date: 10/16/2026 |
| Hammer Type: 17.6 lbs. | Soil Correlation: Heavy Clays |

| No. of Blows | Accumulative Depth (in.) | Type of Hammer |
|---|---|---|
| 0 | 0.0 | 2 |
| 5 | 1.3 | 2 |
| 5 | 2.0 | 2 |
| 5 | 2.4 | 2 |
| 5 | 3.1 | 2 |
| 5 | 3.8 | 2 |
| 4 | 5.7 | 2 |
| 3 | 9.5 | 2 |
| 3 | 12.2 | 2 |
| 3 | 14.2 | 2 |
| 3 | 15.9 | 2 |
| 3 | 17.4 | 2 |
| 3 | 18.8 | 2 |
| 3 | 20.2 | 2 |
| 3 | 21.8 | 2 |
| 3 | 23.2 | 2 |
| 5 | 24.9 | 2 |
| 5 | 26.5 | 2 |
| 5 | 27.9 | 2 |
| 5 | 29.3 | 2 |
| 5 | 30.7 | 2 |
| 5 | 32.0 | 2 |
| 5 | 33.4 | 2 |
| 5 | 34.7 | 2 |
| 5 | 36.0 | 2 |



| Location: Unassigned | File name: P-05 |
|---|---|
| Starting Depth: 0.0 in. | Test Date: 10/16/2026 |
| Hammer Type: 17.6 lbs. | Soil Correlation: Heavy Clays |

| No. of Blows | Accumulative Depth (in.) | Type of Hammer |
|---|---|---|
| 0 | 0.0 | 2 |
| 5 | 1.5 | 2 |
| 5 | 2.2 | 2 |
| 5 | 2.9 | 2 |
| 5 | 4.1 | 2 |
| 3 | 7.6 | 2 |
| 3 | 11.3 | 2 |
| 3 | 13.9 | 2 |
| 3 | 16.0 | 2 |
| 3 | 17.6 | 2 |
| 4 | 19.6 | 2 |
| 4 | 21.4 | 2 |
| 4 | 23.0 | 2 |
| 4 | 24.4 | 2 |
| 5 | 26.0 | 2 |
| 5 | 27.5 | 2 |
| 5 | 28.9 | 2 |
| 5 | 30.2 | 2 |
| 5 | 31.4 | 2 |
| 5 | 32.5 | 2 |
| 5 | 33.6 | 2 |
| 5 | 34.6 | 2 |
| 5 | 35.7 | 2 |
| 3 | 36.3 | 2 |



## LABORATORY TEST PROCEDURES

A brief description of the laboratory tests performed is provided in the following sections.

### *DESCRIPTION OF SOILS (VISUAL-MANUAL PROCEDURE) (ASTM D2488)*

The soil samples were visually examined by our engineer and soil descriptions were provided. Representative samples were then selected and tested in accordance with the aforementioned laboratory-testing program to determine soil classifications and engineering properties. This data was used to correlate our visual descriptions with the Unified Soil Classification System (USCS).

### *NATURAL MOISTURE CONTENT (ASTM D2216)*

Natural moisture contents (M%) were determined on selected samples. The natural moisture content is the ratio, expressed as a percentage, of the weight of water in a given amount of soil to the weight of solid particles.

### *ATTERBERG LIMITS (ASTM D4318)*

The Atterberg Limits test was performed to evaluate the soil's plasticity characteristics. The soil Plasticity Index (PI) is representative of this characteristic and is bracketed by the Liquid Limit (LL) and the Plastic Limit (PL). The Liquid Limit is the moisture content at which the soil will flow as a heavy viscous fluid. The Plastic Limit is the moisture content at which the soil is between "plastic" and the semi-solid stage. The Plasticity Index (PI = LL - PL) is a frequently used indicator for a soil's potential for volume change. Typically, a soil's potential for volume change increases with higher plasticity indices.

### *MATERIAL FINER THAN NO. 200 SIEVE BY WASHING (ASTM D1140)*

Grain-size tests were performed to determine the partial soil particle size distribution. The amount of material finer than the openings on the No. 200 sieve (0.075 mm) was determined by washing soil over the No. 200 sieve. The results of wash #200 tests are presented on the boring logs included in this report and in the table of laboratory test results.

## *LABORATORY TEST RESULTS*

The results of the laboratory testing are presented in the following tables.

| BORING NO. | DEPTH | MOISTURE CONTENT (%) | LIQUID LIMIT | PLASTIC LIMIT | PLASTICITY INDEX | % PASSING #200 SIEVE | CLASSIFICATION |
|---|---|---|---|---|---|---|---|
| HA-01 | 0.0 - 1.0 | 22.5 | | | | | |
| HA-02 | 0.0 - 1.0 | 23.8 | | | | | |
| HA-02 | 2.0 - 3.0 | 17.0 | 32 | 17 | 15 | 80 | CL |
| HA-02 | 3.0 - 4.0 | 32.5 | | | | | |
| HA-03 | 0.0 - 1.0 | 17.1 | | | | | |
| HA-03 | 2.0 - 3.0 | 18.7 | 50 | 24 | 26 | 99 | CH |
| HA-04 | 0.0 - 1.0 | 21.9 | | | | | |
| HA-04 | 1.0 - 2.0 | 22.2 | | | | | |
| HA-05 | 0.0 - 1.0 | 21.4 | | | | | |
| HA-05 | 1.0 - 2.0 | 28.4 | | | | | |
| HA-07 | 1.0 - 2.0 | 20.8 | | | | | |
| HA-07 | 2.0 - 3.0 | 21.4 | | | | | |
| HA-08 | 1.0 - 2.0 | 15.3 | | | | | |
| HA-08 | 2.0 - 3.0 | 20.9 | | | | | |
| HA-10 | 0.0 - 1.0 | 17.4 | | | | | |
| HA-10 | 1.0 - 2.0 | 21.0 | | | | | |
| HA-10 | 3.0 - 4.0 | 19.1 | | | | | |
| HA-11 | 0.0 - 1.0 | 19.8 | 21 | 14 | 7 | 39 | SC-SM |
| HA-11 | 1.0 - 2.0 | 17.2 | 50 | 25 | 25 | 98 | CH |
| HA-11 | 4.0 - 5.0 | 17.4 | | | | | |
| P-01 | 0.0 - 1.0 | 39.4 | | | | 84 | |
| P-01 | 1.0 - 2.0 | 32.6 | | | | | |
| P-03 | 0.0 - 1.0 | 37.6 | | | | | |
| P-03 | 1.0 - 2.0 | 30.8 | | | | 96 | |
| P-05 | 0.0 - 1.0 | 34.2 | | | | | |
| P-05 | 1.0 - 2.0 | 30.2 | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

**TABLE L-1: General Soil Classification Test Results**

*Soils with a Liquid Limit (LL) greater than 50 and Plasticity Index (PI) greater than 25 usually exhibit significant volume change with varying moisture content and are considered to be highly plastic*

# Important Information about This

# Geotechnical-Engineering Report

**Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.**

**While you cannot eliminate all such risks, you can manage them. The following information is provided to help.**

## Geotechnical Services Are Performed for Specific Purposes, Persons, and Projects

Geotechnical engineers structure their services to meet the specific needs of their clients. A geotechnical-engineering study conducted for a civil engineer may not fulfill the needs of a constructor — a construction contractor — or even another civil engineer. Because each geotechnical- engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client. No one except you should rely on this geotechnical-engineering report without first conferring with the geotechnical engineer who prepared it. *And no one — not even you* — should apply this report for any purpose or project except the one originally contemplated.

## Read the Full Report

Serious problems have occurred because those relying on a geotechnical-engineering report did not read it all. Do not rely on an executive summary. Do not read selected elements only.

## Geotechnical Engineers Base Each Report on a Unique Set of Project-Specific Factors

Geotechnical engineers consider many unique, project-specific factors when establishing the scope of a study. Typical factors include: the client's goals, objectives, and risk-management preferences; the general nature of the structure involved, its size, and configuration; the location of the structure on the site; and other planned or existing site improvements, such as access roads, parking lots, and underground utilities. Unless the geotechnical engineer who conducted the study specifically indicates otherwise, do not rely on a geotechnical-engineering report that was:

- not prepared for you;
- not prepared for your project;
- not prepared for the specific site explored; or
- completed before important project changes were made.

Typical changes that can erode the reliability of an existing geotechnical-engineering report include those that affect:

- the function of the proposed structure, as when it's changed from a parking garage to an office building, or from a light-industrial plant to a refrigerated warehouse;
- the elevation, configuration, location, orientation, or weight of the proposed structure;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project changes—even minor ones—and request an assessment of their impact. *Geotechnical engineers cannot accept responsibility or liability for problems that occur because their reports do not consider developments of which they were not informed.*

## Subsurface Conditions Can Change

A geotechnical-engineering report is based on conditions that existed at the time the geotechnical engineer performed the study. *Do not rely on a geotechnical-engineering report whose adequacy may have been affected by:* the passage of time; man-made events, such as construction on or adjacent to the site; or natural events, such as floods, droughts, earthquakes, or groundwater fluctuations. *Contact the geotechnical engineer before applying this report to determine if it is still reliable.* A minor amount of additional testing or analysis could prevent major problems.

## Most Geotechnical Findings Are Professional Opinions

Site exploration identifies subsurface conditions only at those points where subsurface tests are conducted or samples are taken. Geotechnical engineers review field and laboratory data and then apply their professional judgment to render an opinion about subsurface conditions throughout the site. Actual subsurface conditions may differ — sometimes significantly — from those indicated in your report. Retaining the geotechnical engineer who developed your report to provide geotechnical-construction observation is the most effective method of managing the risks associated with unanticipated conditions.

## A Report's Recommendations Are Not Final

Do not overrely on the confirmation-dependent recommendations included in your report. *Confirmation-dependent recommendations are not final,* because geotechnical engineers develop them principally from judgment and opinion. Geotechnical engineers can finalize their recommendations *only* by observing actual subsurface conditions revealed during construction. *The geotechnical engineer who developed your report cannot assume responsibility or liability for the report's confirmation-dependent recommendations if that engineer does not perform the geotechnical-construction observation required to confirm the recommendations' applicability.*

## A Geotechnical-Engineering Report Is Subject to Misinterpretation

Other design-team members' misinterpretation of geotechnical-engineering reports has resulted in costly

problems. Confront that risk by having your geotechnical engineer confer with appropriate members of the design team after submitting the report. Also retain your geotechnical engineer to review pertinent elements of the design team's plans and specifications. Constructors can also misinterpret a geotechnical-engineering report. Confront that risk by having your geotechnical engineer participate in prebid and preconstruction conferences, and by providing geotechnical construction observation.

## Do Not Redraw the Engineer's Logs

Geotechnical engineers prepare final boring and testing logs based upon their interpretation of field logs and laboratory data. To prevent errors or omissions, the logs included in a geotechnical-engineering report should *never* be redrawn for inclusion in architectural or other design drawings. Only photographic or electronic reproduction is acceptable, *but recognize that separating logs from the report can elevate risk.*

## Give Constructors a Complete Report and Guidance

Some owners and design professionals mistakenly believe they can make constructors liable for unanticipated subsurface conditions by limiting what they provide for bid preparation. To help prevent costly problems, give constructors the complete geotechnical-engineering report, *but* preface it with a clearly written letter of transmittal. In that letter, advise constructors that the report was not prepared for purposes of bid development and that the report's accuracy is limited; encourage them to confer with the geotechnical engineer who prepared the report (a modest fee may be required) and/or to conduct additional study to obtain the specific types of information they need or prefer. A prebid conference can also be valuable. *Be sure constructors have sufficient time* to perform additional study. Only then might you be in a position to give constructors the best information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions.

## Read Responsibility Provisions Closely

Some clients, design professionals, and constructors fail to recognize that geotechnical engineering is far less exact than other engineering disciplines. This lack of understanding has created unrealistic expectations that have led to disappointments, claims, and disputes. To help reduce the risk of such outcomes, geotechnical engineers commonly include a variety of explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

## Environmental Concerns Are Not Covered

The equipment, techniques, and personnel used to perform an *environmental* study differ significantly from those used to perform a *geotechnical* study. For that reason, a geotechnical-engineering report does not usually relate any environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated environmental problems have led to numerous project failures.* If you have not yet obtained your own environmental information, ask your geotechnical consultant for risk-management guidance. *Do not rely on an environmental report prepared for someone else.*

## Obtain Professional Assistance To Deal with Mold

Diverse strategies can be applied during building design, construction, operation, and maintenance to prevent significant amounts of mold from growing on indoor surfaces. To be effective, all such strategies should be devised for the *express purpose* of mold prevention, integrated into a comprehensive plan, and executed with diligent oversight by a professional mold-prevention consultant. Because just a small amount of water or moisture can lead to the development of severe mold infestations, many mold- prevention strategies focus on keeping building surfaces dry. While groundwater, water infiltration, and similar issues may have been addressed as part of the geotechnical- engineering study whose findings are conveyed in this report, the geotechnical engineer in charge of this project is not a mold prevention consultant; *none of the services performed in connection with the geotechnical engineer's study were designed or conducted for the purpose of mold prevention. Proper implementation of the recommendations conveyed in this report will not of itself be sufficient to prevent mold from growing in or on the structure involved.*

## Rely, on Your GBC-Member Geotechnical Engineer for Additional Assistance

Membership in the Geotechnical Business Council of the Geoprofessional Business Association exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project. Confer with you GBC-Member geotechnical engineer for more information.

GEOTECHNICAL BUSINESS COUNCIL
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# SECTION 03 2000
# CONCRETE REINFORCING

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Reinforcing steel for cast-in-place concrete.

B. Supports and accessories for steel reinforcement.

C. Refer to structural for additional requirements. Where conflicts occur provide what structural specifies.

### 1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete.

B. Section 04 2000 - Unit Masonry: Reinforcement for masonry.

### 1.03 REFERENCE STANDARDS

A. ACI 301 - Specifications for Concrete Construction; 2020.

B. ACI 318 - Building Code Requirements for Structural Concrete; 2019, with Errata (2021).

C. ACI SP-66 - ACI Detailing Manual; 2004.

D. ASTM A184/A184M - Standard Specification for Welded Deformed Steel Bar Mats for Concrete Reinforcement; 2006 (Reapproved 2011).

E. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2020.

F. ASTM A641/A641M - Standard Specification for Zinc-Coated (Galvanized) Carbon Steel Wire; 2019 (Reapproved 2025).

G. ASTM A704/A704M - Standard Specification for Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement; 2006 (Reapproved 2011).

H. ASTM A706/A706M - Standard Specification for Deformed and Plain Low-Alloy Steel Bars for Concrete Reinforcement; 2016.

I. ASTM A767/A767M - Standard Specification for Zinc-Coated (Galvanized) Steel Bars for Concrete Reinforcement; 2019.

J. ASTM A775/A775M - Standard Specification for Epoxy-Coated Steel Reinforcing Bars; 2019.

K. ASTM A996/A996M - Standard Specification for Rail-Steel and Axle-Steel Deformed Bars for Concrete Reinforcement; 2016.

L. ASTM A1064/A1064M - Standard Specification for Carbon-Steel Wire and Welded Wire Reinforcement, Plain and Deformed, for Concrete; 2024.

M. ASTM A1094/A1094M - Standard Specification for Continuous Hot-Dip Galvanized Steel Bars for Concrete Reinforcement; 2016.

N. ASTM D3963/D3963M - Standard Specification for Fabrication and Jobsite Handling of Epoxy-Coated Steel Reinforcing Bars; 2021.

O. AWS D1.4/D1.4M - Structural Welding Code - Reinforcing Steel; 2011.

P. CRSI (DA4) - Manual of Standard Practice; 2009.

Q. CRSI (P1) - Placing Reinforcing Bars; 2011.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Comply with requirements of ACI SP-66. Include bar schedules, shapes of bent bars, spacing of bars, and location of splices.
   1. Prepare shop drawings under seal of a Professional Structural Engineer experienced in design of work of this type and licensed in the State in which the Project is located.

C. Manufacturer's Certificate: Certify that reinforcing steel and accessories supplied for this project meet or exceed specified requirements.

D. Reports: Submit certified copies of mill test report of reinforcement materials analysis.

### 1.05 QUALITY ASSURANCE

A. Perform work of this section in accordance with ACI 301.

B. Provide Architect with access to fabrication plant to facilitate inspection of reinforcement. Provide notification of commencement and duration of shop fabrication in sufficient time to allow inspection.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. Continuously Galvanized Reinforcing Steel:
   1. Substitutions: See Section 01 6000 - Product Requirements.

### 2.02 REINFORCEMENT

A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) (420 MPa).
   1. Plain billet-steel bars.
   2. Unfinished.

B. Reinforcing Steel: ASTM A706/A706M, deformed low-alloy steel bars.
   1. Unfinished.

C. Reinforcing Steel: Deformed bars, ASTM A996/A996M Grade 40 (280), Type A.

D. Reinforcing Steel Mat: ASTM A704/A704M, using ASTM A615/A615M, Grade 40 (40,000 psi) (280 MPa) steel bars or rods, unfinished.

E. Stirrup Steel: ASTM A1064/A1064M steel wire, unfinished.

F. Reinforcement Accessories:
   1. Tie Wire: Annealed, minimum 16 gage, 0.0508 inch (1.29 mm).
   2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.

### 2.03 RE-BAR SPLICING:

A. Coupler Systems: Mechanical devices for splicing reinforcing bars; capable of developing full steel reinforcing design strength in tension and compression.
   1. Products:
      a. Dayton Superior Corporation; _____: www.daytonsuperior.com/#sle.
      b. Substitutions: See Section 01 6000 - Product Requirements.

B. Dowel Bar Splicer with Dowel-Ins: Mechanical devices for connecting dowels; capable of developing full steel reinforcing design strength in tension and compression.
   1. Products:
      a. Dayton Superior Corporation; _____: www.daytonsuperior.com/#sle.

b. _____.
c. Substitutions: See Section 01 6000 - Product Requirements.

C. Taper Tie Hole Plug: Mechanical device for plugging tie holes; anchors optional flush or recessed grout.
1. Products:
a. Substitutions: See Section 01 6000 - Product Requirements.

D. Grout: Cementitious, non-metallic, non-shrink grout for use with manufacturer's grout sleeve reinforcing bar coupler system.
1. Products:
a. Dayton Superior Corporation; _____: www.daytonsuperior.com/#sle.
b. _____.
c. Substitutions: See Section 01 6000 - Product Requirements.

**2.04 FABRICATION**

A. Fabricate concrete reinforcing in accordance with CRSI (DA4) - Manual of Standard Practice.

B. Welding of reinforcement is not permitted.

C. Welding of reinforcement is permitted only with the specific approval of Architect. Perform welding in accordance with AWS D1.4/D1.4M.
1. Galvanized Reinforcement: Clean surfaces, weld and re-protect welded joint in accordance with CRSI (DA4).

**PART 3 EXECUTION**

**3.01 PLACEMENT**

A. Place, support and secure reinforcement against displacement. Do not deviate from required position.

B. Do not displace or damage vapor barrier.

C. Accommodate placement of formed openings.

D. Maintain concrete cover around reinforcing as follows: See structural notes
1. Beams:____ inch (____ mm)
2. Supported Slabs and Joists: ____ inch (____ mm).
3. Column Ties: ____ inch (____ mm).
4. Walls (exposed to weather or backfill): ____ inch (____ mm).
5. Footings and Concrete Formed Against Earth: ____ inch (____ mm).
6. Slabs on Fill: ____ inch (____ mm).

E. Comply with applicable code for concrete cover over reinforcement.

**3.02 FIELD QUALITY CONTROL**

A. An independent testing agency, as specified in Section 01 4000 - Quality Requirements, will inspect installed reinforcement for compliance with contract documents before concrete placement.

**END OF SECTION**

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# SECTION 03 3000
# CAST-IN-PLACE CONCRETE

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Concrete formwork.

B. Concrete building frame members.

C. Concrete for composite floor construction.

D. Floors and slabs on grade.

E. Concrete reinforcement.

F. Joint devices associated with concrete work.

G. Concrete curing.

H.

### 1.02 RELATED REQUIREMENTS

A. Section 03 2000 - Concrete Reinforcing.

B.

C. Section 07 2650 - Itergarally Bonded Underslab Vapor Protection

D. Section 31 3116 - Termite Control: Field-applied termiticide and mildewcide for concrete surfaces.

E. Section 07 9005 - Joint Sealers: Sealants for saw cut joints and isolation joints in slabs.

### 1.03 REFERENCE STANDARDS

A. ACI 117 - Specification for Tolerances for Concrete Construction and Materials; 2010 (Reapproved 2015).

B. ACI 211.1 - Standard Practice for Selecting Proportions for Normal, Heavyweight, and Mass Concrete; 1991 (Reapproved 2009).

C. ACI 301 - Specifications for Concrete Construction; 2020.

D. ACI 302.1R - Guide to Concrete Floor and Slab Construction; 2015.

E. ACI 304R - Guide for Measuring, Mixing, Transporting, and Placing Concrete; 2000 (Reapproved 2009).

F. ACI 305R - Guide to Hot Weather Concreting; 2020.

G. ACI 306R - Guide to Cold Weather Concreting; 2016.

H. ACI 308R - Guide to External Curing of Concrete; 2016.

I. ACI 318 - Building Code Requirements for Structural Concrete; 2019, with Errata (2021).

J. ACI 347R - Guide to Formwork for Concrete; 2014, with Errata (2017).

K. ASTM A185/A185M - Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete; 2007.

L. ASTM A497/A497M - Standard Specification for Steel Welded Wire Reinforcement, Deformed, for Concrete; 2007.

M. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2020.

N. ASTM C33/C33M - Standard Specification for Concrete Aggregates; 2018.

O. ASTM C39/C39M - Standard Test Method for Compressive Strength of Cylindrical Concrete Specimens; 2026.

P. ASTM C94/C94M - Standard Specification for Ready-Mixed Concrete; 2021b.

Q. ASTM C109/C109M - Standard Test Method for Compressive Strength of Hydraulic Cement Mortars (Using 50 mm [2 in.] Cube Specimens); 2026a.

R. ASTM C150/C150M - Standard Specification for Portland Cement; 2021.

S. ASTM C260/C260M - Standard Specification for Air-Entraining Admixtures for Concrete; 2010a (Reapproved 2016).

T. ASTM C309 - Standard Specification for Liquid Membrane-Forming Compounds for Curing Concrete; 2019.

U. ASTM C494/C494M - Standard Specification for Chemical Admixtures for Concrete; 2024.

V. ASTM C618 - Standard Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use in Concrete; 2019.

W. ASTM C881/C881M - Standard Specification for Epoxy-Resin-Base Bonding Systems for Concrete; 2020a.

X. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete; 2024.

Y. ASTM C1059/C1059M - Standard Specification for Latex Agents for Bonding Fresh to Hardened Concrete; 2021.

Z. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2020.

AA. ASTM C1240 - Standard Specification for Silica Fume Used in Cementitious Mixtures; 2020.

BB. ASTM D994/D994M - Standard Specification for Preformed Expansion Joint Filler for Concrete (Bituminous Type); 2011 (Reapproved 2022).

CC. COE CRD-C 513 - Handbook for Concrete and Cement Corps of Engineers Specifications for Rubber Waterstops; 1974.

DD. COE CRD-C 572 - Handbook for Concrete and Cement Corps of Engineers Specifications for Polyvinylchloride Waterstop; 1974.

EE. NSF 61 - Drinking Water System Components - Health Effects; 2025, with Addendum

**1.04 SUBMITTALS**

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit manufacturers' data on manufactured products showing compliance with specified requirements and installation instructions.

C. Samples for Pigment Color Selection: Submit manufacturer's complete sample chip set, including pigment number and required dosage rate for each color.

D. Verification Samples: Submit sample chips of specified colors indicating pigment numbers and required dosage rates, for subsequent comparison to installed concrete.

E. Samples: Submit samples of underslab vapor retarder to be used.

F. Manufacturer's Installation Instructions: For concrete accessories, indicate installation procedures and interface required with adjacent construction.

G. Sustainable Design Submittal: If any fly ash, ground granulated blast furnace slag, silica fume, rice hull ash, or other waste material is used in mix designs to replace Portland cement, submit the total volume of concrete cast in place, mix design(s) used showing the quantity of portland cement replaced, reports showing successful cylinder testing, and temperature on day of pour if cold weather mix is used; use LEED New Product Content Form.

H. Project Record Documents: Accurately record actual locations of embedded utilities and components that will be concealed from view upon completion of concrete work.

I. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing of current materials:

J. Material Certificates: Signed by manufacturers certifying that each of the following items complies with requirements:
   1. Retain list below with either paragraph above. Edit to suit Project.
   2. Cementitious materials and aggregates.
   3. Form materials and form-release agents.
   4. Steel reinforcement and reinforcement accessories.
   5. Admixtures.
   6. Waterstops.
   7. Curing materials.
   8. Floor and slab treatments.
   9. Bonding agents.
   10. Adhesives.
   11. Vapor retarders.
   12. Epoxy joint filler.
   13. Joint-filler strips.
   14. Repair materials.

K. Formwork Shop Drawings: Design and engineering of formwork are Contractor's responsibility.

L. Steel Reinforcement Shop Drawings: Details of fabrication, bending, and placement, prepared according to ACI 315, "Details and Detailing of Concrete Reinforcement." Include material, grade, bar schedules, stirrup spacing, bent bar diagrams, arrangement, and supports of concrete reinforcement. Include special reinforcement required for openings through concrete structures.

M. Design Mixes: For each concrete mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.
   1. Indicate amounts of mix water to be withheld for later addition at Project site.

**1.05 QUALITY ASSURANCE**

A. Perform work of this section in accordance with ACI 301 and ACI 318.
   1. Maintain one copy of each document on site.

B. Follow recommendations of ACI 305R when concreting during hot weather.

C. Follow recommendations of ACI 306R when concreting during cold weather.

D. Installer Qualifications: An experienced installer who has completed concrete Work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

E. Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.
   1. Manufacturer must be certified according to the National Ready Mixed Concrete Association's Certification of Ready Mixed Concrete Production Facilities.

F. Testing Agency Qualifications: **An independent testing agency as provided by owner,** acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548. Retesting if failed test to be provided and paid for by the General Contractor.
   1. Retain subparagraph below, required by ACI 301 and ASTM C 31/C 31M, if emphasis is needed. ASTM C 1077 notes relevant field or laboratory technician certification by ACI, NRMCA, PCA, or National Institute for Certification in Engineering Technologies may demonstrate evidence of competence.
   2. Personnel conducting field tests shall be qualified as ACI Concrete Field Testing Technician, Grade 1, according to ACI CP-1 or an equivalent certification program.

G. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant, each aggregate from one source, and each admixture from the same manufacturer.

H. Welding: Qualify procedures and personnel according to AWS D1.4, "Structural Welding Code--Reinforcing Steel."

### 1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle steel reinforcement to prevent bending and damage.

## PART 2 PRODUCTS

### 2.01 FORMWORK

A. Formwork Design and Construction: Comply with guidelines of ACI 347R to provide formwork that will produce concrete complying with tolerances of ACI 117.

B. Form Materials: Contractor's choice of standard products with sufficient strength to withstand hydrostatic head without distortion in excess of permitted tolerances.
   1. Form Facing for Exposed Finish Concrete: Contractor's choice of materials that will provide smooth, stain-free final appearance including:
      a. Plywood, metal, or other approved panel materials.
      b. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
         1) First imparts glossy finish, second imparts matte finish, and third and fourth impart coarser-textured finish depending on face-ply characteristics.
         2) High-density overlay, Class 1, or better.
         3) Medium-density overlay, Class 1, or better, mill-release agent treated and edge sealed.
         4) Structural 1, B-B, or better, mill oiled and edge sealed.
         5) B-B (Concrete Form), Class 1, or better, mill oiled and edge sealed.
   2. Rough-Formed Finished Concrete: Plywood, lumber, metal, or another approved material. Provide lumber dressed on at least two edges and one side for tight fit.
   3. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that will produce surfaces with gradual or abrupt irregularities not exceeding specified formwork surface class. Provide units with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.

C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch (19 by 19 mm), minimum.

D. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.
   1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

E. Form Ties: Factory-fabricated, removable or snap-off metal or glass-fiber-reinforced plastic form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.
   1. Furnish units that will leave no corrodible metal closer than 1 inch (25 mm) to the plane of the exposed concrete surface.

**2.02 REINFORCEMENT**

A. Reinforcing Steel: ASTM A615/A615M, Grade 60 (60,000 psi) (420 MPa).
   1. Type: Deformed billet-steel bars.
   2. Finish: Unfinished, unless otherwise indicated.

B. Steel Welded Wire Reinforcement: ASTM A 185/A 185M, plain type.
   1. Form: Coiled Rolls.
   2. Mesh Size and Wire Gage: As indicated on drawings.

C. Steel Welded Wire Reinforcement: ASTM A 497/A 497M, deformed type.
   1. Form: Coiled Rolls.
   2. Mesh Size and Wire Gage: As indicated on drawings.

D. Reinforcement Accessories:
   1. Tie Wire: Annealed, minimum 16 gage, 0.0508 inch (1.29 mm).
   2. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for adequate support of reinforcement during concrete placement.
      a. Provide solid concrete bricks to support bottom mats of spread footings and bottom bars in grade beams where rebar support will be in direct contact with soil. Concrete brick sizes as required to provide specified concrete cover.
      b. For concrete surfaces exposed to view where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected or CRSI Class 2 stainless-steel bar supports.
   3. Joint Dowel Bars: Plain-steel bars, ASTM A 615, Grade 60. Cut bars true to length with ends square and free of burrs.

**2.03 CONCRETE MATERIALS**

A. Cement: ASTM C150/C150M, Type I - Normal Portland Type

B. Fine and Coarse Aggregates: ASTM C 33.
   1. Nominal Maximum Aggregate Size: 3/4 inch (19 mm).

C. Fly Ash: ASTM C618, Class C or F.

D. Calcined Pozzolan: ASTM C618, Class N.

E. Silica Fume: ASTM C1240, proportioned in accordance with ACI 211.1.

F. Color Additives: Pure, concentrated mineral pigments specifically intended for mixing into concrete and complying with ASTM C979/C979M.
   1. Concentration: Base dosage rates on weight of Portland cement, fly ash, silica fume, and other cementitious materials but not aggregate or sand.
   2. Packaging: If pigments are to be added to mix at site, furnish pigments in premeasured disintegrating bags to minimize job site waste.
   3. Color(s): As selected by Owner & Architect from manufacturer's full range.

G. Water: Clean and not detrimental to concrete.

**2.04 ADMIXTURES**

A. Do not use chemicals that will result in soluble chloride ions in excess of 0.1 percent by weight of cement. Do not use admixtures containing calcium chloride.

B. Air Entrainment Admixture: ASTM C260/C260M.

C. High Range Water Reducing Admixture: ASTM C494/C494M Type F.

D. Water Reducing and Accelerating Admixture: ASTM C494/C494M Type E.

E. Water Reducing and Retarding Admixture: ASTM C494/C494M Type D.

F. Water Reducing Admixture: ASTM C494/C494M Type A.

**2.05 ACCESSORY MATERIALS**

A. Non-Shrink Cementitious Grout: Premixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing agents.
   1. Minimum Compressive Strength at 28 Days: 7,000 pounds per square inch (48 MPa).

**2.06 BONDING AND JOINTING PRODUCTS**

A. Latex Bonding Agent: Non-redispersable acrylic latex, complying with ASTM C1059/C1059M, Type II.

B. Epoxy Bonding System:
   1. Two-component epoxy resin, capable of humid curing and bonding to damp surfaces.
   2. Class and grade to suit requirements, and as follows:
      a. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

C. Waterstops: Rubber, complying with COE CRD-C 513.
   1. Factory fabricate corners, intersections, and directional changes.
   2. Profile: Flat, dumbbell with center bulb.
   3. Acceptable Manufacturers:
      a. Greenstreak..
      b. Progress Unlimited Inc..
      c. Westec Barrier Technologies; Div. of Western Textile Products, Inc..
      d. Williams Products, Inc.

D. Reglets: Formed steel sheet, galvanized, with temporary filler to prevent concrete intrusion during placement.
   1. Fabricate reglets of not less than 0.0217-inch- (0.55-mm-) thick galvanized steel sheet.

E. Slab Isolation Joint Filler: 1/2 inch (13 mm) thick, height equal to slab thickness, with removable top section that will form 1/2 inch (13 mm) deep sealant pocket after removal.

F. Joint Filler: Nonextruding, resilient asphalt impregnated fiberboard, felt, or cork, complying with ASTM D 1751, 1/4 inch thick (6 mm thick) and 4 inches deep (200 mm deep); tongue and groove profile.

G. Dovetail Anchor Slots: Hot-dip galvanized steel sheet, not less than 0.0336 inch (0.85 mm) thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

H. Epoxy Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Shore A hardness of 80 per ASTM D 2240.

I. Sealant and Primer: As specified in Section 07 9005.

**2.07 CURING MATERIALS**

A. Moisture-Retaining Sheet: ASTM C171.
   1. Polyethylene film, clear, minimum nominal thickness of 0.0040 inch (0.10 mm).
   2. White-burlap-polyethylene sheet, weighing not less than 10 ounces per linear yard, 40 inches wide (305 g/sq m).

B. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

C. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) dry.

D. Clear, Waterborne, Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.

E. Products: Subject to compliance with requirements, provide one of the following:
   1. Evaporation Retarder:
      a. Spray-Film; ChemMasters.
      b. Eucobar; Euclid Chemical Co.
      c. E-Con; L&M Construction Chemicals, Inc.
      d. Rich Film; Richmond Screw Anchor Co.
      e. Finishing Aid; Symons Corporation.
   2. Clear, Waterborne, Membrane-Forming Curing Compound:
      a. AH Clear Cure WB; Anti-Hydro International, Inc.
      b. High Seal; Conspec Marketing & Manufacturing Co., Inc.
      c. Cure & Seal 309 Emulsion; Kaufman Products Inc.
      d. Vocomp-20; W. R. Meadows, Inc.

F. Water: Potable, not detrimental to concrete.

**2.08 CONCRETE MIX DESIGN**

A. Refer to Structural drawings for additional concrete design mixes, where conflicts existing, use the most stringent requirements.

B. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
   1. Replace as much Portland cement as possible with fly ash, ground granulated blast furnace slag, silica fume, or rice hull ash as is consistent with ACI recommendations.

C. Concrete Strength: Establish required average strength for each type of concrete on the basis of field experience or trial mixtures, as specified in ACI 301.
   1. For trial mixtures method, employ qualified, independent testing agency acceptable to Architect for preparing and reporting proposed mix designs.

D. Footings and Retaining Walls Piers: Proportion normal-weight concrete mix as follows:
   1. Compressive Strength (28 Days): 3000 psi (20.7 MPa), unless noted otherwise.
   2. Maximum Slump: 4 inches (100 mm).
   3. Maximum Slump for Concrete Containing High-Range Water-Reducing Admixture: 8 inches (200 mm) after admixture is added to concrete with 2- to 3-inch (50- to 100-mm) slump.

E. Slab-on-Grade: Proportion normal-weight concrete mix as follows:
   1. Compressive Strength (28 Days): 3000 psi (20.7 MPa), unless otherwise noted.
   2. Maximum Slump: 4 inches (100 mm).

F. Suspended Slabs, Slabs on Metal Deck, Beams, and Columns: Proportion normal-weight concrete mix as follows:
   1. Compressive Strength (28 Days): 4000 psi, unless otherwise noted.
   2. Maximum Slump: 4 inches (100 mm).

G. Cementitious Materials: For concrete exposed to deicers, limit percentage, by weight, of cementitious materials other than portland cement according to ACI 301 requirements.

H. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
   1. Fly Ash: 20 percent.

I. Maximum Water-Cementitious Materials Ratio: 0.50 for concrete with a 28 day compressive strength of F'c = 3000 psi, unless otherwise noted.

J. Maximum Water-Cementitious Materials Ratio: 0.45 for concrete with a 28 day compressive strength of F'c = 4000 psi, unless otherwise noted.

K. Limit water - soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

L. Air Content: Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content of 4 to 6 percent, unless otherwise indicated.

M. Admixtures: Add acceptable admixtures as recommended in ACI 211.1 and at rates recommended or required by manufacturer.
   1. Use water-reducing admixture or high-range water-reducing admixture (superplasticizers) in concrete, as required, for placement and workability.
   2. Use water-reducing and retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

## 2.09 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3.2 mm) and that can be feathered at edges to match adjacent floor elevations.
   1. Cement Binder: ASTM C 150, portland cement or hydraulic or blended hydraulic cement as defined in ASTM C 219.
   2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
   3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3 to 6 mm) or coarse sand as recommended by underlayment manufacturer.
   4. Compressive Strength: Not less than 4100 psi (29 MPa) at 28 days when tested according to ASTM C 109/C 109M.

## 2.10 MIXING

A. Transit Mixers: Comply with ASTM C94/C94M.

B. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete according to ASTM C 94, and furnish batch ticket information.
   1. When air temperature is between 85 and 90 deg F (30 and 32 deg C), reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F (32 deg C), reduce mixing and delivery time to 60 minutes.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify lines, levels, and dimensions before proceeding with work of this section.

### 3.02 PREPARATION

A. Formwork: Comply with requirements of ACI 301. Design and fabricate forms to support all applied loads until concrete is cured, and for easy removal without damage to concrete.

B. Verify that forms are clean and free of rust before applying release agent.

C. Where new concrete is to be bonded to previously placed concrete, prepare existing surface by cleaning and applying bonding agent in according to bonding agent manufacturer's instructions.
   1. Use epoxy bonding system for bonding to damp surfaces, for structural load-bearing applications, and where curing under humid conditions is required.
   2. Use latex bonding agent only for non-load-bearing applications.

D. In locations where new concrete is doweled to existing work, drill holes in existing concrete, insert steel dowels and pack solid with non-shrink grout.

E. Interior Slabs on Grade: Install vapor retarder under interior slabs on grade. Lap joints minimum 6 inches (150 mm). Seal joints, seams and penetrations watertight with manufacturer's recommended products and follow manufacturer's written instructions. Repair damaged vapor retarder before covering.
   1. Vapor Retarder Over Granular Fill: Install compactible granular fill before placing vapor retarder as indicated on drawings. Do not use sand.

F. Ensure vapor barrier is installed in accordance with project specifications prior to placing concrete. Refer to Division 07.

### 3.03 FORMWORK

A. Design, erect, shore, brace, and maintain formwork, according to ACI 301, to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until concrete structure can support such loads.

B. Construct formwork so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117.

C. Limit concrete surface irregularities, designated by ACI 347R as abrupt or gradual, as follows:
   1. Classes are taken from ACI 347R. See Evaluations.
   2. Class A, 1/8 inch (3 mm).

D. Construct forms tight enough to prevent loss of concrete mortar.

E. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical. Kerf wood inserts for forming keyways, reglets, recesses, and the like, for easy removal.
   1. Do not use rust-stained steel form-facing material.

F. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces. Provide and secure units to support screed strips; use strike-off templates or compacting-type screeds.

G. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar. Locate temporary openings in forms at inconspicuous locations.

H. Chamfer exterior corners and edges of permanently exposed concrete.

I. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work. Determine sizes and locations from trades providing such items.

J. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

K. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

L. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

**3.04 REMOVING AND REUSING FORMS**

A. General: Formwork, for sides of beams, walls, columns, and similar parts of the Work, that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete provided concrete is hard enough to not be damaged by form-removal operations and provided curing and protection operations are maintained.

B. Leave formwork, for beam soffits, joists, slabs, and other structural elements, that supports weight of concrete in place until concrete has achieved the following:
   1. At least 75 percent of 28-day design compressive strength.
   2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

C. Clean and repair surfaces of forms to be reused in the Work. Split, frayed, delaminated, or otherwise damaged form-facing material will not be acceptable for exposed surfaces. Apply new form-release agent.

D. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints. Align and secure joints to avoid offsets. Do not use patched or damaged forms for concrete surfaces unless approved by Architect

**3.05 SHORES AND RESHORES**

A. Comply with ACI 318, ACI 301, and recommendations in ACI 347R for design, installation, and removal of shoring and reshoring.

**3.06 EMBEDDED ITEMS**

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete. Use Setting Drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
   1. Install anchor bolts, accurately located, to elevations required.
   2. Install reglets to receive top edge of foundation sheet waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
   3. Install dovetail anchor slots in concrete structures as indicated and required.

**3.07 INSTALLING REINFORCEMENT AND OTHER EMBEDDED ITEMS**

A. General: Comply with CRSI's "Manual of Standard Practice" for placing reinforcement.
   1. Do not cut or puncture vapor barrier. Repair damage and reseal vapor barrier before placing concrete. Refer to Division 07.

B. Comply with requirements of ACI 301. Clean reinforcement of loose rust and mill scale, and accurately position, support, and secure in place to achieve not less than minimum concrete coverage required for protection.

C. Install welded wire reinforcement in maximum possible lengths on bar supports spaced to minimize sagging and offset end laps in both directions. Lap edges and ends of adjoining sheets at least one mesh spacing. Offset laps of adjoining sheet widths to prevent continuous laps in either direction. Lace overlaps with wire.

D. Verify that anchors, seats, plates, reinforcement and other items to be cast into concrete are accurately placed, positioned securely, and will not interfere with concrete placement.
   1. Shop- or field-weld reinforcement according to AWS D1.4, where indicated.

E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

**3.08 VAPOR RETARDERS**

A. Vapor Retarder: Refer to Division 7.

B. Granular Fill: Cover compacted subgrade with granular fill, moisten, and compact with mechanical equipment to elevation tolerances of plus 0 inch (0 mm) or minus 3/4 inch (19 mm).

**3.09 PLACING CONCRETE**

A. Place concrete in accordance with ACI 304R.

B. Place concrete for floor slabs in accordance with ACI 302.1R.

C. Notify Architect not less than 24 hours prior to commencement of placement operations.

D. Maintain records of concrete placement. Record date, location, quantity, air temperature, and test samples taken.

E. Ensure reinforcement, inserts, waterstops, embedded parts, and formed construction joint devices will not be disturbed during concrete placement.

F. Finish floors level and flat, unless otherwise indicated, within the tolerances specified below.

**3.10 SLAB JOINTING**

A. Locate joints as indicated on drawings.

B. Anchor joint fillers and devices to prevent movement during concrete placement.

C. Isolation Joints: Use preformed joint filler with removable top section for joint sealant, total height equal to thickness of slab, set flush with top of slab.

D. Saw Cut Contraction Joints: Saw cut joints before concrete begins to cool, within 4 to 12 hours after placing; use 3/16 inch (5 mm) thick blade and cut at least 1 inch (25 mm) deep but not less than one quarter (1/4) the depth of the slab.

E. General: Construct joints true to line with faces perpendicular to surface plane of concrete.

F. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
   1. Place joints perpendicular to main reinforcement. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of strip placements of slabs on grade.
   2. Form from preformed, plastic keyway-section forms, or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.
   3. Locate joints for beams, slabs, joists, and girders in the middle third of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.

4. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
5. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
6. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

G. Contraction Joints in Slabs-on-Grade: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of concrete thickness, as follows:
1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch (3 mm). Repeat grooving of contraction joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.

H. Isolation Joints in Slabs-on-Grade: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface, unless otherwise indicated.
2. Terminate full-width joint-filler strips not less than 1/2 inch (12 mm) or more than 1 inch (25 mm) below finished concrete surface where joint sealants, specified in Division 7 Section "Joint Sealants," are indicated.
3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

I. Dowel Joints: Install dowel sleeves and dowels or dowel bar and support assemblies at joints where indicated.
1. Use dowel sleeves or lubricate or asphalt-coat one-half of dowel length to prevent concrete bonding to one side of joint.

## 3.11 FLOOR FLATNESS AND LEVELNESS TOLERANCES

A. Maximum Variation of Surface Flatness:
1. Exposed Concrete Floors: 1/4 inch (6 mm) in 10 feet (3 m).
2. Under Seamless Resilient Flooring: 1/4 inch (6 mm) in 10 feet (3 m).
3. Under Carpeting: 1/4 inch (6 mm) in 10 feet (3 m).

B. Correct the slab surface if tolerances are less than specified.

C. Correct defects by grinding or by removal and replacement of the defective work. Areas requiring corrective work will be identified. Re-measure corrected areas by the same process.

## 3.12 WATERSTOPS

A. Flexible Waterstops: Install in construction joints as indicated to form a continuous diaphragm. Install in longest lengths practicable. Support and protect exposed waterstops during progress of Work. Field-fabricate joints in waterstops according to manufacturer's written instructions.

## 3.13 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, and embedded items is complete and that required inspections have been performed.

B. Do not add water to concrete during delivery, at Project site, or during placement, unless approved by Architect.

C. Deposit concrete continuously or in layers of such thickness that no new concrete will be placed on concrete that has hardened enough to cause seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as specified. Deposit concrete to avoid segregation.

D. Deposit concrete in forms in horizontal layers no deeper than 24 inches (600 mm) and in a manner to avoid inclined construction joints. Place each layer while preceding layer is still plastic, to avoid cold joints.
   1. Consolidate placed concrete with mechanical vibrating equipment. Use equipment and procedures for consolidating concrete recommended by ACI 309R.
   2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations no farther than the visible effectiveness of the vibrator. Place vibrators to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing mix constituents to segregate.

E. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
   1. Consolidate concrete during placement operations so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
   2. Maintain reinforcement in position on chairs during concrete placement.
   3. Screed slab surfaces with a straightedge and strike off to correct elevations.
   4. Slope surfaces uniformly to drains where required.
   5. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, free of humps or hollows, before excess moisture or bleedwater appears on the surface. Do not further disturb slab surfaces before starting finishing operations.

F. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
   1. When air temperature has fallen to or is expected to fall below 40 deg F (4.4 deg C), uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F (10 deg C) and not more than 80 deg F (27 deg C) at point of placement.
   2. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade or on subgrade containing frozen materials.
   3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mix designs.

G. Hot-Weather Placement: Place concrete according to recommendations in ACI 305R and as follows, when hot-weather conditions exist:
   1. Cool ingredients before mixing to maintain concrete temperature below 90 deg F (32 deg C) at time of placement. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
   2. Cover steel reinforcement with water-soaked burlap so steel temperature will not exceed ambient air temperature immediately before embedding in concrete.
   3. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

### 3.14 CONCRETE FINISHING

A. Finishing Formed Surfaces
   1. Rough-Formed Finish: As-cast concrete texture imparted by form-facing material with tie holes and defective areas repaired and patched. Remove fins and other projections exceeding ACI 347R limits for class of surface specified.
      a. Apply to concrete surfaces of retaining walls to be covered with earth backfill.
   2. Smooth-Formed Finish: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams. Repair and patch tie holes and defective areas. Remove fins and other projections exceeding 1/8 inch (3 mm) in height.
      a. Apply to concrete surfaces exposed to public view or to be covered with a coating or covering material applied directly to concrete, such as waterproofing, dampproofing, veneer plaster, or painting.
      b. Do not apply rubbed finish to smooth-formed finish.
   3. Rubbed Finish: Apply the following to smooth-formed finished concrete:
      a. Smooth-Rubbed Finish: Not later than one day after form removal, moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture. Do not apply cement grout other than that created by the rubbing process.
   4. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a texture matching adjacent formed surfaces. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces, unless otherwise indicated.
   5. All exposed finished concrete of areaway walls which would include surfaces above grade and inside the areaway shall be formed with MDO plywood.
      a. All tie holes shall be pointed and patched with matching material. Grind all joints smooth. Smooth rub finish as noted above.

B. Finishing Floors and Slabs
   1. General: Comply with recommendations in ACI 302.1R for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
   2. Float Finish: Consolidate surface with power-driven floats or by hand floating if area is small or inaccessible to power driven floats. Restraighten, cut down high spots, and fill low spots. Repeat float passes and restraightening until surface is left with a uniform, smooth, granular texture.
      a. Apply float finish to surfaces indicated, to surfaces to receive trowel finish, and to floor and slab surfaces to be covered with fluid-applied or sheet waterproofing, built-up or membrane roofing, or sand-bed terrazzo.
   3. Trowel Finish: After applying float finish, apply first trowel finish and consolidate concrete by hand or power-driven trowel. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
      a. Apply a trowel finish to surfaces indicated and to floor and slab surfaces exposed to view or to be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin film-finish coating system
      b. Finish surfaces to the following tolerances, measured within 24 hours according to ASTM E 1155/E 1155M for a randomly trafficked floor surface:
         1) Specified overall values of flatness, F(F) 35; and levelness, F(L) 25; with minimum local values of flatness, F(F) 24; and levelness, F(L) 17; for slabs-on-grade.

2) For slab on grade areas receiving thin set tile, the overall minimum values of flatness shall be, F(F) 50 and the levelness, F(L) 35. Local values of flatness shall be, F(F) 35, and levelness, F(L) 20.

4. Trowel and Fine-Broom Finish: Apply a partial trowel finish, stopping after second troweling, to surfaces indicated and to surfaces where ceramic or quarry tile is to be installed by either thickset or thin-set method. Immediately after second troweling, and when concrete is still plastic, slightly scarify surface with a fine broom.

### 3.15 MISCELLANEOUS CONCRETE ITEMS

A. Filling In: Fill in holes and openings left in concrete structures, unless otherwise indicated, after work of other trades is in place. Mix, place, and cure concrete, as specified, to blend with in-place construction. Provide other miscellaneous concrete filling indicated or required to complete Work.

B. Equipment Bases and Foundations: Provide machine and equipment bases and foundations as shown on Drawings. Set anchor bolts for machines and equipment at correct elevations, complying with diagrams or templates of manufacturer furnishing machines and equipment.

### 3.16 CURING AND PROTECTION

A. Surfaces Not in Contact with Forms:
1. Slabs and Floors To Receive Adhesive-Applied Flooring: Curing compounds and other surface coatings are usually considered unacceptable by flooring and adhesive manufacturers. If such materials must be used, either obtain the approval of the flooring and adhesive manufacturers prior to use or remove the surface coating after curing to flooring manufacturer's satisfaction.

B. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and with recommendations in ACI 305R for hot-weather protection during curing.

C. Evaporation Retarder: Apply evaporation retarder to unformed concrete surfaces if hot, dry, or windy conditions cause moisture loss approaching 0.2 lb/sq. ft. x h (1 kg/sq. m x h) before and during finishing operations. Apply according to manufacturer's written instructions after placing, screeding, and bull floating or darbying concrete, but before float finishing.

D. Formed Surfaces: Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces. If forms remain during curing period, moist cure after loosening forms. If removing forms before end of curing period, continue curing by one or a combination of the following methods:

E. Unformed Surfaces: Begin curing immediately after finishing concrete. Cure unformed surfaces, including floors and slabs, concrete floor toppings, and other surfaces, by one or a combination of the following methods:
1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
   a. Water.
   b. Continuous water-fog spray.
   c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch (300-mm) lap over adjacent absorptive covers.
2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive. Cure for not less than seven days. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

a. Moisture cure or use moisture-retaining covers to cure concrete surfaces to receive floor coverings.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

### 3.17 LIQUID FLOOR TREATMENTS

A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.
   1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.
   2. Do not apply to concrete that is less than seven days old.
   3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing. Rinse with water; remove excess material until surface is dry. Apply a second coat in a similar manner if surface is rough or porous.

### 3.18 JOINT FILLING

A. Prepare, clean, and install joint filler according to manufacturer's written instructions.
   1. Defer joint filling until concrete has aged at least six months. Do not fill joints until construction traffic has permanently ceased.

B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joint clean and dry.

### 3.19 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to sample materials, perform tests, and submit test reports during concrete placement. Sampling and testing for quality control may include those specified in this Article.

B. Testing Services: Testing of composite samples of fresh concrete obtained according to ASTM C 172 shall be performed according to the following requirements: **All retesting as a result of failed test to be provided by and paid for by the General Contractor.**
   1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mix exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.
   2. Slump: ASTM C 143; one test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mix. Perform additional tests when concrete consistency appears to change.
   3. Air Content: ASTM C 231, pressure method, for normal-weight concrete; one test for each composite sample, but not less than one test for each day's pour of each concrete mix.
   4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4.4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each composite sample.
   5. Compression Test Specimens: ASTM C 31; cast and laboratory cure one set of four standard cylinder specimens for each composite sample.
   6. Compressive-Strength Tests: ASTM C 39; test one laboratory-cured specimens at 7 days and two at 28 days. Hold fourth specimen for future specimen for future testing if required. Discard if not required.

a. The contractor shall engage a qualified independent testing laboratory to make, field cure, and test standard cylinder specimens. The results of these tests shall be used by the contractor to evaluate field curing and for form removal.
b. A compressive-strength test shall be the average compressive strength from two specimens obtained from same composite sample and tested at age indicated.

C. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor shall evaluate operations and provide corrective procedures for protecting and curing in-place concrete.

D. Strength of each concrete mix will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa).

E. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 48 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing and inspecting agency, location of concrete batch in Work, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-and 28-day tests.

F. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

G. Additional Tests: Testing and inspecting agency shall make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42 or by other methods as directed by Architect.

**3.20 CONCRETE SURFACE REPAIRS**

A. Defective Concrete: Repair and patch defective areas when approved by Architect. Remove and replace concrete that cannot be repaired and patched to Architect's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of one part portland cement to two and one-half parts fine aggregate passing a No. 16 (1.2-mm) sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch (13 mm) in any dimension in solid concrete but not less than 1 inch (25 mm) in depth. Make edges of cuts perpendicular to concrete surface. Clean, dampen with water, and brush-coat holes and voids with bonding agent. Fill and compact with patching mortar before bonding agent has dried. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement so that, when dry, patching mortar will match surrounding color. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching. Compact mortar in place and strike off slightly higher than surrounding surface.
3. Repair defects on concealed formed surfaces that affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces: Test unformed surfaces, such as floors and slabs, for finish and verify surface tolerances specified for each surface. Correct low and high areas. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
   1. Repair finished surfaces containing defects. Surface defects include spalls, popouts, honeycombs, rock pockets, crazing and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
   2. After concrete has cured at least 14 days, correct high areas by grinding.
   3. Correct localized low areas during or immediately after completing surface finishing operations by cutting out low areas and replacing with patching mortar. Finish repaired areas to blend into adjacent concrete.
   4. Correct other low areas scheduled to receive floor coverings with a repair underlayment. Prepare, mix, and apply repair underlayment and primer according to manufacturer's written instructions to produce a smooth, uniform, plane, and level surface. Feather edges to match adjacent floor elevations.
   5. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete. Remove defective areas with clean, square cuts and expose steel reinforcement with at least 3/4 inch (19 mm) clearance all around. Dampen concrete surfaces in contact with patching concrete and apply bonding agent. Mix patching concrete of same materials and mix as original concrete except without coarse aggregate. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
   6. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar. Groove top of cracks and cut out holes to sound concrete and clean off dust, dirt, and loose particles. Dampen cleaned concrete surfaces and apply bonding agent. Place patching mortar before bonding agent has dried. Compact patching mortar and finish to match adjacent concrete. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

**3.21 DEFECTIVE CONCRETE**

A. Test Results: The testing agency shall report test results in writing to Architect and Contractor within 24 hours of test.

B. Defective Concrete: Concrete not conforming to required lines, details, dimensions, tolerances or specified requirements.

C. Repair or replacement of defective concrete will be determined by the Architect. The cost of additional testing shall be borne by Contractor when defective concrete is identified.

D. Do not patch, fill, touch-up, repair, or replace exposed concrete except upon express direction of Architect for each individual area.

**3.22 PROTECTION**

A. Do not permit traffic over unprotected concrete floor surface until fully cured.

**END OF SECTION**

# SECTION 03 3550
# ARCHITECTURAL CONCRETE

## PART 1 GENERAL

### 1.01 SUMMARY

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to Work of this Section.

B. Section Includes:
   1. Stain
   2. Sealer

### 1.02 RELATED SECTIONS

A. Section 03300 – Cast-in-Place Concrete.

B. Section 071923 - Masonry Cleaner.

### 1.03 REFERENCES

A. Other useful publications about colored concrete include:

B. PCA PA124 - Finishing Concrete Slabs with Color and Texture.

C. PCA SP021 - Color and Texture in Architectural Concrete.

D. American Concrete Institute (ACI):
   1. ACI 301 -Specification for Structural Concrete for Buildings.
   2. ACI 302 IR - Recommended Practice for Concrete Floor and Slab Construction.
   3. ACI 303.1 -Standard Specification for Cast-In-Place Architectural Concrete.
   4. ACI 304 - Recommended Practice for Measuring, Mixing, Transporting and Placing of Concrete.
   5. ACI 305R - Recommended Practice for Hot Weather Concreting.
   6. ACI 306R - Recommended Practice for Cold Weather Concreting.
   7. ACI 316 - Recommendations for Construction of Concrete Pavements and Bases.
   8. American Society of Testing and Materials (ASTM):
      a. ASTM C 33 - Standard Specification for Concrete Aggregates.
      b. ASTM C 94 - Standard Specification for Ready-Mixed Concrete.
      c. ASTM C 150 - Standard Specification for Portland Cement.
      d. ASTM C 309 - Liquid Membrane - Forming Compounds for Curing Concrete.
      e. ASTM C 979 - Standard Specification for Pigments for Integrally Colored Concrete.

### 1.04 SUBMITTALS

A. Comply with Section 01330 - Submittal Procedures.

B. Product Data: Submit manufacturer's complete technical information sheets for the following:
   1. APC Stain  Color
   2. APC Sealer

C. Samples for Initial Selection: Manufacturer's color charts showing full range of colors available.

D. Qualification Data: For firms indicated in 1.5 Quality Assurance, including list of completed projects.

## 1.05 QUALITY ASSURANCE

A. Concrete Contractor Qualifications: Concrete work shall be performed by firm with three years experience and must have successfully completed not less than 6 projects comparable in scale and complexity.
   1. Statement of Contractor Qualifications
      a. Submit list of [at least 6] completed projects including project name, project address and owner contact information.

B. Comply with the requirements of ACI 301, and 316.

C. Obtain specified material from same source and maintain high degree of consistency in workmanship throughout Project.

D. Notification of manufacturer's authorized representative shall be given at least 1-week before start of Work.

**Color charts and small sample submittals provide only a general indication of color.**

**Provide mockups to demonstrate that proposed materials and workmanship produce an acceptable concrete appearance. Proceed only after written approval of architect.**

E. Colored Concrete Mockup:
   1. Provide under provisions of Division 1, Section 014000 Quality Requirements.
   2. At location on Project selected by Architect, place and finish 4' x 4' area.
   3. Accepted mockup provides visual standard for work of Section. Mockup shall remain through completion of the work for use as a quality standard for finished work.
   4. Remove mockup when directed.

## 1.06 DELIVERY, STORAGE, AND HANDLING

A. Products shall be delivered in original factory packaging, unopened and undamaged. Packaging will bear identification of product, manufacturer’s identification and batch numbers. A technical information sheet and MSDS should be available for each product throughout the project.

B. Store the product in strict accordance with the manufacturer's recommendations in a location protected from damage, construction activity, and weather conditions.

## 1.07 JOBSITE CONDITIONS

A. Schedule placement to minimize exposure to wind and hot sun

B. Avoid placement if rain, snow, or frost is forecast within a 24-hour period. Protect fresh concrete from moisture and freezing.
   1. Comply with professional practices described in ACI 305R and ACI 306R.

## 1.08 PRE-JOB CONFERENCE

A. One week prior to placement of concrete a meeting shall be held to discuss the Project and application methods including delivery and mix design requirements.

B. It is suggested that the Architect, General Contractor, Construction Manager, Subcontractor, Ready-Mix Concrete Representative, and a Manufacturer's Representative be present.

**PART 2 PRODUCTS**

**2.01 ACCEPTABLE MANUFACTURER**

**3.01 APC PRECISION AS MANUFACTURED BY ALABAMA PIGMENTS COMPANY, MC CALLA, AL CONFORMS TO THE REQUIREMENTS OF THIS SPECIFICATION.**

**3.02 MATERIALS**

A. Stain: APC Precision Stain Midnight for exterior use on concrete or approved equal.

B. Sealers : APC Precision Sealers (Seal 19 for exterior use on concrete) or approved equal. should be used to seal and protect colored concrete. Sealers shall be matt. Refer to manufacturer for technical data and installation guides.

**3.03 COLORS AND FINISHES**

A. Colors: As selected by Architect from the APC Precision **Midnight** (APC). Tint color to be determined. Coordinate in field with Architect.

B. Finishes: As selected by Architect. Surfaces shall be finished uniformly with the following finish:

**PART 3 EXECUTION**

**4.01 APPLICATION**

**4.02 INSTALLATION**

**4.03 PROTECTION OF FINISHED WORK**

A. Barricade area to protect sorrunding flooring ans slabs, etc. .

B. Protect floor surface from damage until final inspection and acceptance by Owner.

**4.04 TOLERANCES**

A. Minor variations in appearance of integrally colored concrete, which are similar to natural variations in color and appearance of uncolored concrete are acceptable.

**END OF SECTION**

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# SECTION 03 5400
# SELF-LEVELING CAST UNDERLAYMENTS (LATICRETE® SUPERCAP® SC500-SERIES)

## PART I – GENERAL

### 1.01 SUMMARY

A. This is the specification for all self-leveling underlayment and moisture control requirements for the concrete slabs on this project in order to bring the floors to an acceptable level of flatness or level.

B. All self-leveling will be done with LATICRETE SUPERCAP Underlayments or approved equal by addendum; pumpable and/or pourable, low-alkali, premium self-leveling underlayments used to finish concrete slabs, precast or cast-in-place, and/or level uneven floor surfaces. Apply them over concrete, wood and other types of sound flooring before installing wood, resilient, cork, sports, ceramic, stone, carpet or other flooring systems. Floor covering adhesives that are suitable for concrete can be used on LATICRETE SUPERCAP Underlayments.
   1. Apply a minimum of 1/2" thick underlayment system throughout the entire floor areas.
      a. Refer to paragraph D below for locations to receive Vapor Ban E Coating.

C. LATICRETE SUPERCAP Underlayments shall be installed using the LATICRETE SUPERCAP Mobile Blending Unit (MBU)is a high-output, computer controlled, self-contained, truck-mounted system which allows for rapid installation and keeps dusty materials outside, eliminating OSHA-regulated crystalline silica dust that would be otherwise generated from the handling of powder materials inside the building.

D. As part of the base bid, LATICRETE Vapor Ban E Coating shall be applied at locations noted below :
   1. Moisture testing shall be done in all areas of Building E except the future fit out space to determine if the use of a moisture vapor barrier is necessary. If determined necessary, Vapor Ban E Coating shall be applied in these areas or portions thereof by Unit Price. Refer to Unit Prices Section 01 2200 for additional requirements. The flooring manufacturer / applicator shall test the floor by their own requirements and methods at no additional cost to the owner.
   2. The Self-leveling Cast Underlayment System is not required in basements.

### 1.02 SECTION INCLUDES

A. LATICRETE SUPERCAP SC500, Self-Leveling Cement Underlayments

B. LATICRETE Primer Plus

C. LATICRETE Vapor Ban E

D. Mako Pump 3000 PSI small aggregate concrete shall be part of this specification and be installed where existing recessed concrete slabs require 1 1/2 inches to 4 1/2 inches thick infill to bring recessed area up to elevation of existing adjacent concrete floors. These floors will also receive 1/2" thick self leveling underlayment on top of the Mako concrete. Applications shall be done by underlayment applicator approved by underlayment manufacturer. See paragraph 1.01.D for Vapor Ban E Coating requirements.

### 1.03 ENVIRONMENTAL PERFORMANCE REQUIREMENTS

A. Environmental Performance Criteria: The following criteria are required for products included in this section.
   1. Refer to Division 1 for additional requirements:

a. Adhesive products must meet or exceed the VOC limits of South Coast Air Quality Management District Rule (SCAQMD) #1168 and Bay Area Air Quality Management District (BAAQMD) Reg. 8, Rule 51.

**1.04 SUBMITTALS**

1) UL GREENGUARD Certification Program For Chemical Emissions For Building Materials, Finishes And Furnishings, UL 2818 or UL GREENGUARD Gold certificates provided by the tile installation materials manufacturer on UL GREENGUARD letterhead stating “This product has been UL GREENGUARD Gold Product Certified For Low Chemical Emissions by the UL Environment under the UL GREENGUARD Certification Program For Chemical Emissions For Building Materials, Finishes And Furnishings” for each tile installation product used to verify Low VOC product information.
2) Material Safety Data Sheets for all applicable products.

B. Submit proof of warranty.

C. Submit Health Product Declarations (HPD) for each material.

D. For alternate materials, at least thirty (10) days before bid date approved by architect by addendum, submit independent laboratory test results confirming compliance with specifications listed in Part 2 - Products. Gypsum underlayments will not be considered under any circumstances.

**1.05 QUALITY ASSURANCE**

A. Installation of LATICRETE SUPERCAP Underlayments must be by a qualified applicator using specialized mixing equipment and tools approved by the manufacturer. Contact Joseph Rizzo @ 475-228-2020, jrizzo@laticrete.com - manufacturer's representative.

B. LATICRETE SUPERCAP SC500 is to be applied at 1/8” to 3” average depth (3 – 76 mm) can be installed up to 4” depth. Consult Technical Services at +1.866.704.2247 for average depths outside of these ranges.

C. Finished floor goods may be installed as soon as 16 hours after application over SC500, subject to site conditions and type of flooring materials. Liquid membranes and coatings such as urethane cement may be installed no sooner than 7 days after aplication over SC500. Always refer to finished floor manufacturer’s recommendations regarding installation instructions, restrictions, moisture conditions and compatibility. Always test performance suitability and compatibility of finished floor systems prior to their application. Sample surfaces should be installed as a field test so as to be representative of entire surface and tested for intended use.

D. LATICRETE SUPERCAP Underlayments are cement-based product and, as with any cementitious material, slight variations in color can occur as a function of job-site conditions. Some water-marks similar to veins in stone are a natural result of a pour/spread/smooth installation process.

E. Testing Agency Qualifications: Contractor/Manufacturer/Applicator to secure an independent agency qualified according to ASTM C 1077 and ASTM E 329 for testing indicated, as documented according to ASTM E 548.

F. Mockups: Place mockups of LATICRETE SUPERCAP Underlayments (approx. 100 sq. ft.) to demonstrate typical joints, surface finish, bonding, texture, tolerances, and standard of workmanship. Mock up may remain in place if acceptable

G. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01.

H. The Contractor shall provide a topographic survey of all floors receiving self-leveling cast underlayment before and after underlayment is installed. The topographic survey should be conducted by a third party (i.e., separate from the subcontractor installing the self-leveling cast underlayment).

**1.06 DELIVERY, STORAGE AND HANDLING**

A. Deliver materials in their unopened packages and protect from moisture. Protect liquids from freezing and from excessive heat. Store off the floor on dry pallets or equivalent. LATICRETE SUPERCAP SC500 materials are packaged in bulk sacks and should be used within 6 months of the date of manufacture. LATICRETE SUPERCAP SC500 is additionally packaged in 50 LB plastic bags and should be used within 1 year of the date of manufacture.

B. Use all means necessary to protect the materials of the section before, during and after installation and to protect the installed work and materials of all other trades.

**1.07 SITE CONDITIONS**

A. LATICRETE SUPERCAP Underlayments are cementitious materials. Observe the basic rules of concrete work. Substrate temperature should be a minimum of 40□ F (4□ C) during the application and the ambient temperature maintained at 50□–90□ F (10□–32□ C).

B. Install quickly if floor is warm and follow hot weather precautions available from LATICRETE SUPERCAP Technical Service Department or www.laticretesupercap.com. Never mix with cement or additives other than LATICRETE SUPERCAP approved products.

C. During application and curing, LATICRETE SUPERCAP Underlayments should not be exposed to rapid air movement, especially if area is heated or cooled. Air flow from HVAC systems in areas of application should be directed away from the floor during application of LATICRETE SUPERCAP Underlayments and at least 24 hours after work is completed.

**1.08 PRE-INSTALLATION CONSIDERATIONS**

A. Applicator must review TDS-230 - LATICRETE SUPERCAP Substrate Preparation and Primer Guide, available at www.laticretesupercap.com. Applicator must show proof of manufacturers approval. Approved applicator JEFFCO concrete contractors @ 205-345-3443
   a. CONCRETE FINISH: Concrete contractor to bull-float trowel finish the surface of the slab to FF 15 minimum. Do not steel or power trowel. Do not use curing compounds.
   b. PREPARE FOR CALCIUM ALUMINATE BASED SELF LEVELING UNDERLAYMENT: See 1.08.B.2 through .4
   c. MITIGATE MOISTURE EMISSIONS IF REQUIRED FOR FLOOR GOODS INSTALLATION (Optional, based on conditions): See 1.08.C for details.
   d. INSTALL CALCIUM ALUMINATE BASED UNDERLAYMENT: See Sections 2 and 3.

2. New Concrete: For installation over concrete earlier than 28 days after placement, LATICRETE SUPERCAP Underlayments may be installed when the substrate concrete has reached 70% of its 28-day design compressive strength. For further information, contact LATICRETE SUPERCAP Technical Services. Joseph Rizzo, Ph No. 475-2020, jrizzo@latticrete.com

3. Use of curing compounds on new concrete slabs is not recommended. If a curing compound is used on new concrete, the curing compound (including “self-dissipating” curing compounds) must be removed by shot blasting, scarifying or other mechanical means to a minimum CSP of 3 per ICRI Guideline No. 03732 then vacuumed clean.

B. Review finished floor goods recommendations for substrate moisture limitations. Flooring adhesive and floor goods manufacturers may separately specify maximum allowable moisture vapor emission rates or concrete relative humidity. If the concrete slab measures above these limits than a moisture vapor control system is required. If a moisture mitigation system is required, LATICRETE Vapor Ban E must be installed on the concrete slab prior to installation of LATICRETE SUPERCAP Underlayment.
   1. Refer to Section 01 2200 Unit Prices for additional requirements.

### 1.09 WARRANTY

A. The Contractor warrants the work of this Section to be in accordance with the Contract Documents and free from faults and defects in materials and workmanship for a period of 10 years. The underlayment manufacturer shall provide a written ten (10) year warranty, reference LATICRETE Warranty Data Sheet LSC-DS030.10S for complete details and requirements.

B. For installations under Premium LATICRETE Tile & Stone Installation Systems, as manufactured by LATICRETE INTERNATIONAL, Inc., the underlayment manufacturer shall provide a written twenty-five (25) year warranty, reference LATICRETE Warranty Data Sheet LSC-DS230.25S for complete details and requirements.

## PART 2 – PRODUCTS

### 2.01 MATERIALS MANUFACTURER

A. LATICRETE INTERNATIONAL, 1 Laticrete Park North, Bethany, CT 06524-3423 USA Toll Free (866) 704-2247 Fax (203) 393-1948 www.laticretesupercap.com

### 2.02 MATERIALS – BASIS OF DESIGN

A. Calcium Aluminate Based Self-Leveling Cement Underlayment: LATICRETE SUPERCAP SC500.
   1. Compressive Strength: 4200 PSI (28.9 MPa) after 28 days, tested to ASTM C1708.

B. Underlayment Primer: LATICRETE SUPERCAP Primer Plus.
   1. Acrylic Primer for all underlayments and substrate types shall be as recommended by the Underlayment manufacturer.

C. Moisture Vapor Control (Moisture Mitigation): LATICRETE Vapor Band E
   1. Applicable Standard ASTM F3010: If required to meet this standard, minimum thickness of moisture vapor control must be 12 mils.
   2. Moisture Vapor Emission Rate (MVER) Reduction: from ≤25 lbs/1000-ft2/24hr (1415 µg/(s • m)) to below 3 lbs/1000-ft2/24hr (170 µg/(s • m)) per ASTM F1869, at 12 mils minimum thickness. Concrete Substrate Humidity: up to 100% RH / 14 pH, per ASTM F2170. VOC Content: <10 g/L, UL GREENGUARD Gold Certified.
   3. Tensile Bond Strength (to concrete substrate): 410 PSI (2.8 MPa) minimum in 7 days per ASTM C1583.

D. Water: Clean, Potable, and Cool.

### 2.03 MIX DESIGNS

A. LATICRETE SUPERCAP SC500 is supplied in bulk supersacks and 50 lb bags.

B. Super Sacks – Pre-condition LATICRETE SUPERCAP underlayment materials to approved application temperature, typically between 50–90°F (10–32°C). Materials for LATICERETE SUPERCAP SC500 are to be blended by qualified LATICRETE SUPERCAP Applicators with the mobile blending unit that mixes LATICRETE SUPERCAP underlayment materials onsite at street level to manufacturer specifications.

a. Mix bulk sacked, engineered materials and water, utilizing computerized remote-controlled, self-contained mobile blending units, precisely weighing and mixing materials into a uniformly consistent, highly fluid mixture.
b. Utilize established recipes (mix designs) programmed into computer controlled batch mixing procedure to achieve the specified fluid consistency for mobile blending unit delivery to placement areas.

C. 50 lb bags only to be used in small areas that are unfeasible or impractical for the MBU to reach – Pre-condition LATICRETE SUPERCAP SC500 to approved application temperature, between 50–90°F (10–32°C). Add the entire bag to 3.7 quarts (3.5 ℓ) to 4.5 quarts of clean, cool water and mix with a high speed drill (650 RPM). CAUTION: DO NOT OVER WATER OR OVER MIX. OVER WATERING WILL CAUSE BLEEDING OR SAND SEGREGATION. Mix thoroughly for approximately 1 ½ – 2 minutes to obtain a uniform, lump-free consistency; scrape container's sides and remix to incorporate remaining powder. If a multiple bag mix is performed, additional mix time may be required to obtain a lump-free, uniform mix.

## PART 3 – EXECUTION

### 3.01 GENERAL

A. Refer to LATICRETE SUPERCAP SC500, LATICRETE SUPERCAP Primer Plus, and LATICRETE VAPOR BAN E product data sheets at www.laticrete.com for current product installation instructions.

B. Concrete Slab Finishing in accordance with ACI 117 (Straight Edge Method).

C. Provide ventilation to promote curing and reduce humidity.

D. Do NOT install underlayment over moving cracks in substrate.

### 3.02 INSPECTION

A. Verify that installed work of other trades is complete to the point where work of this Section may properly commence.

B. Verify conformance to Field Conditions specified by this Section and to manufacturer instructions.

C. Examine the areas and conditions where the Underlayment is to be installed and notify the architect of conditions detrimental to the proper and timely completion of the work. Verify that substrate surfaces are protected from weather, wind, water and clean, dry, unfrozen, do not contain petroleum byproducts, or other compounds detrimental to underlayment material bond to substrate. Do not proceed with the work until unsatisfactory conditions are corrected to permit proper installation of the work.

D. Beginning work constitutes acceptance of site conditions and responsibility for defective installation caused by prior observable conditions.

### 3.03 PREPARATION

A. Substrate finishing or remedial method for cast underlayment:

SUBSTRATE PREPARATION – Refer to TDS-230 - LATICRETE Substrate Preparation and Primer Guide, available at www.laticretesupercap.com

1. Concrete:
   a. Concrete is acceptable substrates per LATICRETE SUPERCAP TDS230.
   b. New Slab: Bull Float to minimum FF15. No finishing or hard troweling is needed prior to LATICRETE SUPERCAP underlayment application.

c. Existing Slab: Existing slab areas not receiving Vapor Ban E shall be brush blasted to ICRI CSP 1-2. Existing slab areas to receive Vapor Ban E shall be brush blasted to be mechanically profiled to ICRI CSP 3.
d. Weak or Contaminated Surfaces: If the substrate surface is weak or contaminated, mechanically clean to ICRI CSP-3 by shot blasting, scarifying or grinding. If the substrate surface is suspected of having bond breakers core testing of the slab is recommended to confirm depth and type of contamination.
e. Do not acid etch or use chemicals to clean the substrates.

2. Existing Finishes:
   a. Verify the substrate and construction below existing finishes does not exceed industry deflection standards under all live, dead and impact loads for the type of finish flooring being installed.
   b. Acceptable existing floor finishes include Vinyl Tile, Cement Terrazzo, Ceramic Tile & Stone, and Cement Mortar Beds. Refer to previous section for installation over existing wood.
   c. Surface Prep:
      1) 1. Follow current priming instructions in TDS 230S, available on www.laticrete.com.
3. Cleaning:
   a. Remove dirt, wax, sealers, curing compounds, efflorescence, and other unsuitable surface conditions not part of concrete matrix that may inhibit the underlayment bond to the surface.
   b. Vacuum surfaces to pick up remaining dust and debris.
   c. Where removal of existing bond breaking substances is impractical, conform to manufacturer's instructions for application of bonding agent before installation of cementitious underlayment.
4. All cracks in the subfloor shall be repaired to minimize telegraphing through the Underlayment. See Section 3.02 B.
5. Substrate temperature should be a minimum of 40 degrees F (4 degrees C) during the application and the ambient temperature maintained at 50 degrees – 90 degrees F (10 degrees – 32 degrees C).
6. LATICRETE SUPERCAP SC500 may be installed on concrete having up to 100% relative humidity (RH) per ASTM F2170, however, the finished flooring and adhesive manufacturers' guidelines must be followed (see below). Do not install LATICRETE SUPERCAP products when there is standing water or visible moisture on the slab. It is important to note that concrete slabs may be dry enough to successfully install LATICRETE SUPERCAP SC500; however, concrete slab may not be dry enough to meet moisture conditions required for finish flooring, and in that case LATICRETE Vapor Ban E may be used.
   a. Concrete slabs should be tested for appropriate moisture conditions in accordance with the finish flooring manufactures specifications prior to installing LATICRETE SUPERCAP. LATICRETE Primer Plus primer and self-leveling underlayments are not moisture mitigation systems. When a moisture mitigation system is needed use LATICRETE Vapor Ban E. Refer to Moisture Mitigation System section and DS-061.0 for more information. Refer to Section 01 2200 Unit Prices for additional requirements

7. Surface bond strength of the substrate should be no less than 100 PSI (0.7 MPa) per ASTM C1583 or ICRI Guideline No. 03739 for the application of all LATICRETE SUPERCAP SC500. Weak or contaminated surfaces must be mechanically cleaned by shot blasting, Never use chemicals to clean the substrate. If installing LATICRETE Vapor Ban E, per ASTM F3010, concrete slab to receive LATICRETE Vapor Ban E must have a tensile pull-off strength of 200 PSI (1.4 MPa) or greater when tested in accordance with ASTM C1583.
8. LATICRETE Vapor Ban E (as required): Apply to concrete substrates using squeegee and paint roller achieving a minimum thickness of 12 mils. ILATICRETE Vapor Ban E is only approved for concrete substrates.
9. Containment: Close and seal floor openings and install dams at edges of floor area to receive treatment as necessary to contain self-leveling underlayment while in plastic state.
10. Concrete Floor Flatness and Floor Levelness Benchmarks: Use a digital level device to determine elevations on a 4x4 foot grid, depending on tolerances, to establish and set self-adhering LEVEL PEGS at heights to indicate installation depths and top surface of underlayment application or other approved method.
11. Joint Preparation:
    a. Expansion and Isolation Joints: Honor through underlayment by marking with screws or similar and saw cutting after self leveling application..
    b. Static (Non-Moving) Saw Cuts and Control Joints: Fill with joint sealer under provisions of Section 03 30 00.
    c. Other Static (Non-Moving) Joints: Patch and repair using cementitious patching product.
    d. Dynamic (Active) Cracks: Bring to Architects attention for direction.
12. Priming:
    a. Maintain adequate ventilation during and following primer application to promote faster drying.
        1) Insufficient drying time, low temperatures, and high humidity may result insufficient drying, poor film formation, and pinholes in surface.
        2) Do not apply at surface temperatures below 40 degrees F (4 degrees C).
    b. LATICRETE Primer Plus: Dilute primer concentrate with water according to the ratios given in LATICRETE Primer Plus Data Sheet.
        1) Apply to substrates using stiff broom, roller or spray as instructed by manufacturer.
        2) Roll, spray, or broom to uniform film thickness over prepared substrate. Avoid puddling and allow surface film to become dry to touch, typically 3 - 5 hours after application. For best results, and while primer is still fresh, it should be lightly brushed to ensure a complete, uniform film has been applied.
        3) Primer also to be installed over areas applied with Vapor Ban E as per manufacturer's written instructions.

## 3.04 REFERENCE STANDARDS

A. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2016a.

B. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.

C. ASTM F3010 - Standard Practice for Two-Component Resin Based Membrane-Forming Moisture Mitigation Systems for Use Under Resilient Floor Coverings; 2018.

### 3.05 INSTALLATION OF UNDERLAYMENT

A. Install underlayment in accordance with manufacturer's instructions, and after installation of moisture vapor mitigation and underlayment primer.

B. Mixing: Measure components and mechanically mix, as recommended by the manufacturer.

C. Substrate temperature must be a minimum 40°F (4°C) during application and air temperature maintained between 50–90°F (10–32°C). Protect areas from direct sunlight and exposure to weather.

D. Pump or pour LATICRETE SUPERCAP SC500 onto substrate at an average thickness ranging between 1/8" to 3" (3–76 mm) for all surfaces may be placed onto substrate up to 4” in thickness. Wood substrates require a minimum thickness of 3/4" (19 mm). If using the LATICRETE SUPERCAP Mobile Blending Unit (MBU) for high output, zero interior dust application, the installer shall be a LATICRETE-approved applicator, qualified to operate the MBU.

E. Immediately following placement lightly smooth the surface and pour lines. When not using level pegs the use of a gauge rake will assist in controlling material depth.

F. Adequate ventilation should be provided to ensure uniform drying.

G. Do not expose LATICRETE SUPERCAP SC500 to rolling dynamic loads, such as forklifts or scissor lifts, for at least 72 hours after installation.

H. Proper application is the responsibility of the user.

I. Place underlayment before partition installation if construction schedule allows.

J. If a fine, feathered edge is desired, steel trowel the edge after initial set, but before it is completely hard.

### 3.06 CURING

A. Once underlayment starts to set, prohibit foot traffic until final set has been reached.

B. Air cure in accordance with manufacturer's instructions.

C. Provide continuous ventilation and adequate heat until walkable; provide mechanical ventilation if necessary.

D. Remove and replace underlayment areas that evidence lack of bond with substrate, including areas that emit a "hollow" sound when tapped.

E. Do not install floor coverings over underlayment until all conditions required by the floor covering manufacturer have been met. Floor covering manufacturer’s requirements may vary greatly.

### 3.07 PROTECTION

A. Protect against direct sunlight, heat, weather and wind; prevent rapid drying to avoid shrinkage and cracking during the curing process.

B. Protect underlayment from traffic as follows:
   1. Do not permit foot traffic over underlayment surfaces for 2 to 4 hours, 24 hours for trade traffic.
   2. Do not permit trade vehicle traffic for 72 hours.
   3. Standing water is to be removed by squeegee or other acceptable method daily.

### 3.08 FIELD QUALITY CONTROL

A. Field flow tests should be performed by contractor on site periodically to ensure mix is homogeneous and free from separation.

B. Field visits by LATICRETE SUPERCAP personnel are for the purpose of making technical recommendations only and not for supervising or providing quality control on the jobsite.

**END OF SECTION**

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# SECTION 04 2000
# UNIT MASONRY

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Concrete Block.

B. Clay Facing Brick.

C. Mortar and Grout.

D. Reinforcement and Anchorage.

E. Flashings.

F. Lintels.

G. Accessories.
   1. Adjustable Concealed Lintel System for brick and Stone Cladding

H. RELATED REQUIREMENTS
   1.
      a. Section - 01 2200 Unit Prices
      b. 03 2000 - Concrete Reinforcing
      c. Section - 07 6526 Self Adhering Sheet Flashing
      d. 03 3000 - Cast In Place Concrete
      e. 04 5600 - Tuck Pointing
      f. 04 7200 - Architectural Cast Stone

### 1.02 REFERENCE STANDARDS

A. TMS 402/602 - Building Code Requirements and Specification for Masonry Structures; 2016.

B. ACI 530.1/ASCE 6/TMS 602 - Specification For Masonry Structures; American Concrete Institute International; 2008.

C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

D. ASTM A615/A615M - Standard Specification for Deformed and Plain Carbon-Steel Bars for Concrete Reinforcement; 2020.

E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.

F. ASTM C62 - Standard Specification for Building Brick (Solid Masonry Units Made From Clay or Shale); 2017.

G. ASTM C67 - Standard Test Methods for Sampling and Testing Brick and Structural Clay Tile; 2017.

H. ASTM C90 - Standard Specification for Loadbearing Concrete Masonry Units; 2016a.

I. ASTM C91/C91M - Standard Specification for Masonry Cement; 2018.

J. ASTM C129 - Standard Specification for Nonloadbearing Concrete Masonry Units; 2017.

K. ASTM C140/C140M - Standard Test Methods for Sampling and Testing Concrete Masonry Units and Related Units; 2021.

L. ASTM C150/C150M - Standard Specification for Portland Cement; 2021.

M. ASTM C207 - Standard Specification for Hydrated Lime for Masonry Purposes; 2018.

N. ASTM C216 - Standard Specification for Facing Brick (Solid Masonry Units Made From Clay or Shale); 2021.

O. ASTM C270 - Standard Specification for Mortar for Unit Masonry; 2026.

P. ASTM C404 - Standard Specification for Aggregates for Masonry Grout; 2018.

Q. ASTM C476 - Standard Specification for Grout for Masonry; 2023.

R. ASTM C780 - Standard Test Method for Preconstruction and Construction Evaluation of Mortars for Plain and Reinforced Unit Masonry; 2020.

S. ASTM C979/C979M - Standard Specification for Pigments for Integrally Colored Concrete; 2024.

T. ASTM C1088 - Standard Specification for Thin Veneer Brick Units Made from clay or shale.

**1.03 ADMINISTRATIVE REQUIREMENTS**

A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all relevant installers.

**1.04 SUBMITTALS**

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data for masonry units, fabricated wire reinforcement, mortar, and masonry accessories.

C. Shop Drawings: Indicate pertinent dimensions, materials, anchorage, size and type of fasteners, and accessories for brickwork support system.

D. Samples: Submit four samples of decorative block units to illustrate color, texture, and extremes of color range.

E. Manufacturer's Certificate: Certify that masonry units meet or exceed specified requirements.

F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.

G. Fire Rated Assemblies: Conform to applicable code for UL (FRD) Assembly No. ____.

H. Special Procedure Submittals
   1. Certificates: Submit documentation, signed by manufacturers, that products in tested wall
   2. Certificates: Provide Manufacturer’s written certification that components are compatible with all adjacent materials that come into contract with the materials during construction and throughout the life of the building including insulation and attached membranes.

**1.05 MOCK-UPS**

A. Construct a masonry wall as a mock-up panel sized as indicated on drawings; include mortar and accessories, structural backup, wall openings, flashings, and wall insulation in mock-up.

B. Locate as indicated on drawings.

C. Mock-up may remain as part of the Work upon approval by the Architect.

D. Refer to section 01 4000.

**1.06 DELIVERY, STORAGE, AND HANDLING**

A. Deliver, handle, and store masonry units by means that will prevent mechanical damage and contamination by other materials.

## PART 2 PRODUCTS

### 2.01 CONCRETE MASONRY UNITS

A. Concrete Block: Comply with referenced standards and as follows:
   1. Size: Standard units with nominal face dimensions of 16 by 8 inches (400 by 200 mm) and nominal depths as indicated on drawings for specific locations.
   2. Special Shapes: Provide non-standard blocks configured for corners.
   3. Load-Bearing Units: ASTM C90, normal weight.
      a. Hollow block, as indicated.
      b. Exposed Faces: Manufacturer's standard color and texture where indicated.
   4. Non-Loadbearing Units: ASTM C129.
      a. Hollow block.
   5. Bullnosed CMU: Provide radiused edge exposed CMU at outside vertical corners.

### 2.02 BRICK UNITS

A. Facing Brick: ASTM C216, Type ____, Grade SW.
   1. Color and texture to match Architect's sample of the existing brick.
   2. Prior to ordering Brick contractor shall receive Owner and Archietcts written approval.
   3. Nominal size: As indicated on drawings.Verify on site.
   4. Special shapes: Molded units as required by conditions indicated, unless standard units can be sawn to produce equivalent effect.
   5. **The intent is to match the existing face Brick and Mortar. Submit sample and build mock up Panels as required for architect's review and written approval.**

### 2.03 MORTAR AND GROUT MATERIALS

A. Portland Cement: ASTM C150/C150M, Type I; color as required to produce approved color sample.

B. Grout Aggregate: ASTM C404.

C. Pigments for Colored Mortar: Pure, concentrated mineral pigments specifically intended for mixing into mortar and complying with ASTM C979/C979M.
   1. Color(s): Color to be selected by Architect from manufacturer’s full range of colors as required to match the mortar installedon existing buildings.
   2. Prior to ordering mortar contractor shall receive architects and owner's written approval.

### 2.04 REINFORCEMENT AND ANCHORAGE

A. Manufacturers:
   1. Dur-O-Wal: www.dur-o-wal.com.
   2. Hohmann & Barnard, Inc: www.h-b.com.
   3. WIRE-BOND: www.wirebond.com/#sle.

B. Reinforcing Steel: Type specified in Section 03 2000; size as indicated on drawings; galvanized finish.

C. Reinforcing Steel: ASTM A615/A615M Grade 60 (420) deformed billet bars.

D. Joint Reinforcement: Use ladder type joint reinforcement where vertical reinforcement is involved and truss type elsewhere, unless otherwise indicated. Size to provide not more than 1 inch (25 mm) and not less than 1/2 inch of mortar coverage from masonry face. Some coursing may not align and will need 2 parts.

E. Flexible Anchors: 2-piece anchors that permit differential movement between masonry and building frame, sized to provide not more than 1 inch (25 mm) and not less than 1/2 inch (13 mm) of mortar coverage from masonry face.
   1. Steel frame: Crimped wire anchors for welding to frame, 0.25 inch (6.3 mm) thick, with trapezoidal wire ties 0.1875 inch (4.75 mm) thick, hot dip galvanized to ASTM A 153/A 153M, Class B.

**2.05 FLASHINGS**

A. Thru Wall Flashing - Refer to Division 07. Section 07 6526 - Self Adhering Sheet Flashing.

B. Provide manufacture recommened bond release membrane between dissimilar materials (Stone veneer and Custom Cast Stone.)

**2.06 ACCESSORIES**

A. Preformed Control Joints: Polyvinyl chloride material. Provide with corner and tee accessories, fused joints.
   1. Manufacturers:
      a. Dur-O-Wal: www.dur-o-wal.com.
      b. Hohmann & Barnard, Inc; _____: www.h-b.com/#sle.
      c. WIRE-BOND: www.wirebond.com/#sle.
      d. Substitutions: See Section 01 6000 - Product Requirements.

B. Joint Filler: Closed cell polyvinyl chloride; oversized 50 percent to joint width; self expanding; maximum lengths available.

C. Cavity Mortar Control: Semi-rigid polyethylene or polyester mesh panels, sized to thickness of wall cavity, and designed to prevent mortar droppings from clogging weeps and cavity vents and allow proper cavity drainage.
   1. Mortar Diverter: Semi-rigid mesh designed for installation at flashing locations.
      a. Manufacturers:
         1) Advanced Building Products Inc; Mortar Break: www.advancedflashing.com/#sle.
         2) Mortar Net Solutions; _____: www.mortarnet.com/#sle.
         3) Hohmann & Barnard
         4) Substitutions: See Section 01 6000 - Product Requirements.

D. Weeps:
   1. Equal to Hohmann Barnard Quadro Vent, polyproylene honey comb, Astm D2240, D790B, D638, D1238B. 3/8" x 2 1/2" x 3 1/2", color as selected by architect from standard manufacturers colors.

E. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

F. Where truss reinforcement is specified, provide prefabricated "L" and "T" sections. Cut and bend reinforcing units as directed by manufacturer for continuity at returns, offsets, column fireproofing, pipe enclosures, and other special conditions.

G. Stainless Steel Termination Bar install continuous termination bar - refer to Section 07 6500.

H. Metal Through Wall Flashing refer to drawings.

I. Stainless Steel Metal Drip Edge: Refer to Section 07 6526.

**2.07 MORTAR AND GROUT MIXES**

A. Mortar for Unit Masonry: ASTM C270, using the Proportion Specification.
   1. Masonry below grade and in contact with earth: Type S.

2. Exterior, loadbearing masonry: Type S.
3. Exterior, non-loadbearing masonry: Type S.
4. Interior, loadbearing masonry: Type S.

B. Colored Mortar: Proportion selected pigments and other ingredients to match Architect's sample, without exceeding manufacturer's recommended pigment-to-cement ratio.
   1. To be selected Bama Buff, UA Blend , Capst

C. Mortar to be LaFarge, Cemex, Holcim, Citadel

D. Grout: ASTM C476. Consistency required to fill completely volumes indicated for grouting; fine grout for spaces with smallest horizontal dimension of 2 inches (50 mm) or less; coarse grout for spaces with smallest horizontal dimension greater than 2 inches (50 mm). Provide 28 day compressive strength indicated on drawings.

E. Mixing: Use mechanical batch mixer and comply with referenced standards.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive masonry.

B. Verify that related items provided under other sections are properly sized and located.

C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

### 3.02 PREPARATION

A. Direct and coordinate placement of metal anchors supplied for installation under other sections.

B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

### 3.03 COLD AND HOT WEATHER REQUIREMENTS

A. Maintain materials and surrounding air temperature to minimum 40 degrees F (5 degrees C) prior to, during, and 48 hours after completion of masonry work.

B. Maintain materials and surrounding air temperature to maximum 90 degrees F (32 degrees C) prior to, during, and 48 hours after completion of masonry work.

### 3.04 COURSING

A. Establish lines, levels, and coursing indicated. Protect from displacement.

B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

C. Concrete Masonry Units:
   1. Bond: Running.
   2. Coursing: One unit and one mortar joint to equal 8 inches (200 mm).
   3. Mortar Joints: Concave.
   4. Refer to structural for addditional requirements.

D. Brick Units:
   1. Bond: Running.
   2. Coursing: Three units and three mortar joints to equal 8 inches (200 mm).
   3. Mortar Joints: Concave.

E. Special Brick Shapes called out on Plans.

### 3.05 PLACING AND BONDING

A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

B. Lay hollow masonry units with face shell bedding on head and bed joints.

C. Buttering corners of joints or excessive furrowing of mortar joints is not permitted.

D. Remove excess mortar and mortar smears as work progresses.

E. Interlock intersections and external corners, except for units laid in stack bond.

F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

G. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

H. Cut mortar joints flush where wall tile is scheduled or resilient base is scheduled.

I. Isolate masonry partitions from vertical structural framing members with a control joint as indicated.

J. Isolate top joint of masonry partitions from horizontal structural framing members and slabs or decks with compressible joint filler.

K. **All Head and Bed joints shall be completely filled with mortar and tooled with matching weather joints per the ACSS Standards. The Contractor must receive wriotten approval of all Brick, mortar, and mortar joints from the architect and owner prior to proceeding.**

### 3.06 WEEPS/CAVITY VENTS

A. Install weeps in veneer and cavity walls at 24 inches (600 mm) on center horizontally above through-wall flashing, above shelf angles and lintels, at bottom of walls, and at top of walls for ventilation. Install weeps at approximately 16" on center horizontally at cast stone head joints and as shown on drawings. **Weeps to, match color of mortar or provide clear weeps.**

B. Provide top of wall weeps at 24” on center horizontally. Locate as indicated on the drawings and at the top of all masonry veneer air space cavities as directed by Architect. Locate at consistent elevations within 8” of the top of the masonry cavities.

### 3.07 CAVITY MORTAR CONTROL

A. Do not permit mortar to drop or accumulate into cavity air space or to plug weep/cavity vents.

B. For cavity walls, build inner wythe ahead of outer wythe to accommodate accessories.

C. Install cavity mortar control panels continuously throughout exterior masonry cavities during construction of exterior wythe, complying with manufacturer's installation instructions. Verify that airspace width is no more than 3/8 inch (9 mm) greater than panel thickness. Install horizontally between joint reinforcement. Stagger end joints in adjacent rows. Fit to perimeter construction and penetrations without voids.

D. Install cavity mortar diverter at base of cavity and at other flashing locations as recommended by manufacturer to prevent mortar droppings from blocking weep/cavity vents.

### 3.08 REINFORCEMENT AND ANCHORAGE - GENERAL

A. Unless otherwise indicated on drawings or specified under specific wall type, install horizontal joint reinforcement 16 inches (400 mm) on center.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of opening.

C. Lap joint reinforcement ends minimum 6 inches (150 mm).

D. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Unless otherwise indicated on drawings or closer spacing is indicated under specific wall type, space anchors at maximum of 36 inches (900 mm) horizontally and 16 inches (400 mm) vertically.

E. Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.

**3.09 REINFORCEMENT AND ANCHORAGE - SINGLE WYTHE MASONRY**

A. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of opening.

B. Lap joint reinforcement ends minimum 6 inches (150 mm).

**3.10 REINFORCEMENT AND ANCHORAGE - MASONRY VENEER**

A. Install horizontal joint reinforcement 16 inches (400 mm) on center.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of opening.

C. Lap joint reinforcement ends minimum 6 inches (150 mm).

D. **At Concrete Masonry Unit back up walls provide Trussed or Ladder hot dipped galvaized reinforcement per structural. Provide Pintle and Eye anchors equal to Holmann Barnard for the muti- wythe masonry and comply with the University of Alabama Design Standards at 16 inches on center each way ( horizontally and vertically) .**

E. Masonry Back-Up: Provide continuous masonry reinforcing at 16” O.C. unless otherwise specified

F. **Stud Back-Up**: Secure veneer anchors to stud framed back-up and embed into masonry veneer at **maximum 16” on center vertically and horizontally unless noted otherwise**. Place additional anchors at perimeter of openings and ends of panels so maximum spacing of anchors is 8 inches on center. **Brick Anchors to be hot dipped galvanied equal to Holmann Barnard X Seal at metal stud walls where cavity insulation is used. Install per manufacturer's instructions. Fasten with gasketed Stainless steel fasteners of manufacturer's recommended type and size.**

**3.11 REINFORCEMENT AND ANCHORAGES - CAVITY WALL MASONRY**

A. Install horizontal joint reinforcement 16 inches (400 mm) on center.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of openings.

C. Lap joint reinforcement ends minimum 6 inches (150 mm).

D. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Space anchors at maximum of 24 inches (600 mm) horizontally and 16 inches (400 mm) vertically.

**3.12 REINFORCEMENT AND ANCHORAGES - MULTIPLE WYTHE UNIT MASONRY**

A. Install horizontal joint reinforcement 16 inches (400 mm) on center.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 16 inches (400 mm) each side of opening.

C. Lap joint reinforcement ends minimum 6 inches (150 mm).

D. Fasten anchors to structural framing and embed in masonry joints as masonry is laid. Space anchors at maximum of ___ inches (___ mm) horizontally and 16 inches (400 mm) vertically.

### 3.13 MASONRY FLASHINGS

A. Whether or not specifically indicated, install masonry flashing to divert water to exterior at all locations where downward flow of water will be interrupted.
   1. Extend flashings full width at such interruptions and at least 6 inches (152 mm), minimum, into adjacent masonry or turn up at least 8 inches (203 mm), minimum, to form watertight pan at non-masonry construction.

### 3.14 GROUTED COMPONENTS

A. Reinforce bond beams as shown on structural.

B. Lap splices minimum 24 bar diameters, unless noted otherwise.

C. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch (13 mm) of dimensioned position.

D. Place and consolidate grout fill without displacing reinforcing.

E. At bearing locations, fill masonry cores with grout as shown on structural.

### 3.15 CONTROL AND EXPANSION JOINTS

A. Do not continue horizontal joint reinforcement through control or expansion joints.

B. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

### 3.16 BUILT-IN WORK

A. As work progresses, install built-in metal door frames and other items to be built into the work and furnished under other sections.

B. Install built-in items plumb, level, and true to line.

C. Bed anchors of metal door and glazed frames in adjacent mortar joints. Fill frame voids solid with grout.
   1. Fill adjacent masonry cores with grout minimum 12 inches (300 mm) from framed openings.

D. Do not build into masonry construction organic materials that are subject to deterioration.

### 3.17 TOLERANCES

A. Maximum Variation from Alignment of Columns: 1/4 inch (6 mm).

B. Maximum Variation From Unit to Adjacent Unit: 1/16 inch (1.6 mm).

C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft (6 mm/3 m) and 1/2 inch in 20 ft (13 mm/6 m) or more.

D. Maximum Variation from Plumb: 1/4 inch (6 mm) per story non-cumulative; 1/2 inch (13 mm) in two stories or more.

E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft (3 mm/m) and 1/4 inch in 10 ft (6 mm/3 m); 1/2 inch in 30 ft (13 mm/9 m).

F. Maximum Variation of Mortar Joint Thickness: Head joint, minus 1/4 inch, plus 3/8 inch (minus 6.4 mm, plus 9.5 mm).

G. Maximum Variation from Cross Sectional Thickness of Walls: 1/4 inch (6 mm).

### 3.18 CUTTING AND FITTING

A. Cut and fit for chases. Coordinate with other sections of work to provide correct size, shape, and location.

B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

**3.19 FIELD QUALITY CONTROL**

A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.

B. Clay Masonry Unit Tests: Test each variety of clay masonry in accordance with ASTM C67 requirements, sampling 5 randomly chosen units for each 50,000 installed.

C. Concrete Masonry Unit Tests: Test each variety of concrete unit masonry in accordance with ASTM C140/C140M for conformance to requirements of this specification.

D. Mortar Tests: Test each type of mortar in accordance with ASTM C780, testing with same frequency as masonry samples.

**3.20 CLEANING**

A. Remove excess mortar and mortar droppings.

B. Replace defective mortar. Match adjacent work.

C. Clean soiled surfaces with cleaning solution.

D. Use non-metallic tools in cleaning operations.

**3.21 PROTECTION**

A. Without damaging completed work, provide protective boards at exposed external corners that are subject to damage by construction activities.

**END OF SECTION**

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# SECTION 04 5600
# TUCKPOINTING MASONRY WALLS

## PART 1 - GENERAL

### 1.01 SUMMARY:

A. Work included in this section:

B. Tuck Pointing of existing masonry brick walls as determined by architect and owner's representative during construction. Refer to Specification Section 01 2200 UNIT PRICES for additional requirements.
   1. Selective tuckpointing of deteriorated and defective mortar joints in masonry walls

C. Definitions:
   1. Tuckpointing: The process of removing deteriorated and defective mortar from the joints of existing masonry wall and replacing with new mortar.
   2. Deteriorated and defective mortar: Any mortar joint exhibiting cracks, spalls, voids, powdering, efflorescence or any other noted deficiencies that may prevent high resistance to water penetration.
   3. Refer to Section 01 2200, Unit Prices.

### 1.02 SUBMITTALS:

A. Product data: Submit manufacturer's product specifications and mixing and installation instructions for each manufactured product.

B. Samples:
   1. Submit actual mortar samples for colored mortar, or mortar chosen to match existing work and, indicating color range of each color selected.
      a. Provide (1) 4’ x 4’ tuckpointing mockups at locations selected by Owner on the building, showing tuckpointing mortar and masonry craftsmanship for project acceptability prior to commencing work.
         1) Do not proceed further until mockup is approved.

### 1.03 DELIVERY, STORAGE AND HANDLING:

A. Deliver materials, except aggregate, in original unopened containers displaying product name, type, grade and mixing instructions.

### 1.04 JOB CONDITIONS:

A. Environmental requirements:
   1. Perform no tuckpointing when temperature of surrounding air has dropped below 45 degrees F., unless it is rising; and at no time when it has dropped below 40 degrees F.
   2. Maintain air temperature above 40 degrees F. on both sides of masonry for at least 72 hours after performing tuckpointing.

B. Protection of work:
   1. During repairs, keep walls dry by covering at end of each day or shutdown period with a waterproof membrane, anchored and overhanging each side of wall at least 2'-0".
   2. Remove misplaced mortar or grout immediately.
   3. Protect face materials against staining.
   4. Protect sills, ledges and offsets from mortar droppings during construction.

C. Sequencing and scheduling: Do not enclose or cover work requiring inspection until such work has been accepted.

**1.05 QUALITY ASSURANCE:**

A. For each type of cement specified, only one brand shall be used throughout project.

B. Applicable standards:
   1. Standard of the American Society for Testing and Materials (ASTM), as referenced herein.
   2. “Technical Notes on Brick Construction”, by The Brick Institute.

C. Tuckpointing shall be done only by qualified and experienced tuckpointing craftsmen. Individuals who are excellent masons/bricklayers may not be good tuckpointing craftsmen. Contractor shall test and evaluate the skills of its personnel prior to the selection of the craftsmen for the project. Project mockups are required to verify skills. Only craftsmen who have demonstrated their skill via approved mockups shall perform tuckpointing on the project.
   1. Mortal removal mock-up
      a. The selected Contractor shall perform a 4 sq. ft. mock-up if the Contractor wants to use mechanical tools for mortar removal.

**PART 2 - PRODUCTS**

**2.01 MORTAR AND ACCESSORY MATERIALS:**

A. Portland cement: Meeting ASTM C150-92, Type I, natural color, domestic manufacturer.

B. Masonry cement: Meeting ASTM C91-91, Type N, non-staining, 22% maximum air content by volume and proportioned to comply with requirements of ASTM C270-89 for Type N mortar.

C. Hydrated lime: Meeting ASTM C207-91 (1992), Type S.

D. Mortar color: Inert, pure mineral additives in colors selected to match existing mortar.

E. Aggregate for mortar: Clean, hard, natural, washed sand meeting ASTM C144-91.

F. Water: Clean, potable, free from deleterious amounts of alkalies, acids and organic materials.

G. Bonding agent: Thoro Systems, Acryl-60 to be mixed into tuckpointing mortar, as part of mixing water.

H. Integral Water Repellent: W. R, Grace Dry Block, to be mixed into tuckpointing mortar

**2.02 MORTAR PROPORTIONS:**

A. Type N job-mixed or bag-mixed mortar for pre-mixed, colored masonry cement: Proportion materials by volume in accord with ASTM C270 (current version), as follows: One part pre-mixed Type N masonry cement to aggregate proportioned not less than 2-1/4 nor more than three times the volume of masonry cement used, and as directed by masonry cement manufacturer's product data to produce Type N mortar.

**2.03 JOB MIXING:**

A. Mix mortar in power-driven drum type mixers. Operate mixer minimum of five minutes after addition of all materials. Do not retemper mortar. Discard partially set material.

B. Bonding agent: Liquid bonding agent for tuckpointing mortar is to be mixed within the water used to prepare the tuckpointing mortar. Mix the acrylic-based bonding agent additive 1:3 with clean potable water (1 part additive to 3 parts water) to prepare the mix water. Prepare the remaining mortar proportions as specified. Do not apply a brush-on coat of pure acrylic additive or additive mixed with water, to cut back mortar joints.

C. Addition of other admixtures, including antifreeze ingredients, will not be permitted.

D. Measure materials for job-mixed mortars in a one cubic foot container. Do not measure by shovels.

E. Pre-hydrate tuckpointing mortar, to reduce excessive shrinkage, as follows:

1. Mix all dry ingredients thoroughly.
2. Add only enough clean water (no bonding agent) to produce a damp workable consistency which will retain its shape when formed into a ball.
3. Allow mortar to stand in dampened condition for 1 to 1-1/2 hours.
4. After pre-hydration time period, add water with bonding agent to bring to a workable consistency (somewhat drier than conventional mortar).
5. Proceed with tuckpointing.

**PART 3 - EXECUTION**

**3.01 TUCKPOINTING:**

A. Rout or cut out mortar joints to a uniform depth of 1-1/2 times the width of joint, or ¾" minimum, whichever is greater. If sound mortar is not reached at a depth of 1-1/2", confer with Consultant on required tuckpointing depth. The base bid shall be 1.5" in depth.

B. Square shoulder all cuts. Ensure all mortar is removed from brick surfaces within the joints.

C. Exercise care when removing mortar to prevent damage to brick faces or edges. All masonry units damaged during mortar removal shall be removed and replaced with matching units, at the Contractor's expense.

D. Remove mortar from joints using hand tools only. Mechanical tools will be permitted only on specific written approval of the Construction Consultant and demonstrated ability by operators to use tools without damage to masonry.

E. Clean joints of all dirt and debris and rinse clean. Leave damp immediately prior to installing pointing mortar.

F. Fill joint with mortar type specified.

G. Install mortar in 1/4" deep layers until full depth of cut is reached, ensuring a densified placement of mortar. Do not leave voids or gaps in installation. Compact and tool each layer as placed. Maximum depth of pointing on a given day shall be ¾".

H. Tool exterior joints when "thumb print" hard. Joints shall be tooled flush to match existing, using a jointer at least 1'-0" in length for bed joints, and appropriate tool for head joints. Pointing mortar for exterior joints shall be in color matching existing mortar.

I. When mortar reaches green state, cut and lightly brush mortar with a soft bristle brush to seal edges and remove excess mortar and droppings.

J. Mask off lower stone wall areas to prevent mortar droppings from rebounding or splattering walls. Cover all roof areas and sidewalks to prevent staining. Remove stains and repair or replace damage from staining.

K. Immediately remove and dry clean all misplaced and excess mortar and residue from faces of units using stiff bristle brush.

L. If shrinkage cracking develops within the newly installed mortar due to rapid drying, installed mortar should be lightly tempered with a fine spray of water by means of a garden sprayer.

**3.02 CLEANING: REFER TO SPECIFICATION SECTION 04 2000 UNIT MASONRY**

**3.03 SITE CLEANUP:**

A. Perform site cleanup as specified elsewhere.

B. Return landscaping to similar condition prior to start of project.

**3.04 CAUTION:**

A. Two of the most common mistakes in tuckpointing are:

1. Using a mortar that has not been prehydrated, resulting in many shrinkage cracks.
2. Using a mortar that is “too wet” resulting in excess mortar smear on the masonry wall face, requiring harsh excessive cleaning.

B. Skilled mechanics and approved mockups are required to avoid these problems.

**END OF SECTION**

# SECTION 04 7200
# ARCHITECTURAL CAST STONE

## PART 1 GENERAL

### 1.01 SECTION INCLUDES – ARCHITECTURAL CAST STONE.

A. Scope – Cast Stone shown on architectural drawings and as described in this specification.
   1. Manufacturer shall furnish Cast Stone covered by this specification.

### 1.02 RELATED SECTIONS

A. Section – 01 3000 – Adminisrative Requirements

B. Section – 04 2000 – Unit Masonry.

C. Section – 07 90 00 – Joint Protection.

### 1.03 REFERENCES

A. ACI 318 – Building Code Requirements for Reinforced Concrete.

B. ASTM A 185 – Standard Specification for Steel Welded Wire Reinforcement, Plain, for Concrete.

C. ASTM A 615/A 615M – Standard Specification for Deformed and Plain Billet Steel Bars for Reinforced Concrete.
   1. ASTM C 33 – Standard Specification for Concrete Aggregates.
   2. ASTM C 150 – Standard Specification for Portland Cement.
   3. ASTM C 595 – Blended Cement.
   4. ASTM C 1157 – Hydraulic Cement.

D. ASTM C 173 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Volume Method.

E. ASTM C 231 – Standard Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method.
   1. ASTM C 260 – Standard Specification for Air-Entrained Admixtures for Concrete.
   2. ASTM C 270 – Standard Specification for Mortar for Unit Masonry.
   3. ASTM C 426 – Standard Test Method for Linear Shrinkage of Concrete Masonry Units.
   4. ASTM C 494/C 494M – Standard Specification for Chemical Admixtures for Concrete.

F. ASTM C 618 – Specification for Coal Fly Ash and Raw or Calcined Natural Pozzolan for Use as a Mineral Admixture in Concrete.

G. ASTM C 666 – Standard Test Method for Resistance of Concrete to Rapid Freezing and Thawing.
   1. ASTM C 979 – Standard Specification for Coloring Pigments for Integrally Pigmented Concrete.

H. ASTM C 989 – Standard Specification for Ground Granulated Blast-Furnace Slag for Use in Concrete.
   1. ASTM C 1116 – Standard Specification for Fiber Reinforced Concrete and Shotcrete.
   2. ASTM C 1194 – Standard Test Method for Compressive Strength of Architectural Cast Stone.
   3. ASTM C 1195 – Standard Test Method for Absorption of Architectural Cast Stone.
   4. ASTM C 1364 – Standard Specification for Architectural Cast Stone.

I. ASTM D 2244 – Standard Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.

1. Cast Stone Institute Technical Manual (Current Edition).

**1.04 DEFINITIONS**

A. Cast Stone – A refined architectural concrete building unit manufactured to simulate natural cut stone, used in Division 4 masonry applications, produced by the Dry Cast Method and meets ASTM 1364 requirements.
   1. Dry Cast Method – Manufactured from zero slump concrete.
      a. Vibrant Dry Tamp (VDT) casting method: Vibratory ramming of earth moist, zero-slump concrete against a rigid mold until it is densely compacted.
      b. Machine Casting Method: Manufactured from earth moist, zero-slump concrete compacted by machinery using vibration and pressure against a mold until it becomes densely consolidated.

**1.05 SUBMITTAL PROCEDURES**

A. Comply with Section 01 33 00 - Submittal Procedures.

B. Samples: Submit pieces of the Cast Stone that are representative of the general range of finish and color proposed to be furnished for the project.

C. Test Results: Submit manufacturer's test results of Cast Stone previously made by the manufacturer.

D. Shop Drawings: Submit manufacturer's shop drawings including profiles, cross-sections, reinforcement, exposed faces, arrangement of joints (optional for standard or semi-custom installations), anchoring methods, anchors (if required), annotation of stone types and their location.

E. Warranty: Submit Cast Stone Institute Member Limited Warranty or equal.

F. Certification: Submit valid Cast Stone Institute Plant Certification or equal.

**1.06 QUALITY ASSURANCE**

A. Manufacturer Qualifications:
   1. Cast Stone shall be produced in a plant certified by the Cast Stone Institute or APA or Equal.
   2. Manufacturer shall have sufficient plant facilities to produce shapes, quantities and size of Cast Stone required in accordance with the project schedule.
   3. Manufacturer shall submit a written list of projects similar in scope and at least ten (10) years of age, along with owner, architect and contractor references.

B. Standards: Comply with requirements of Cast Stone Institute Technical Manual and the project specifications. Where a conflict may occur, the contract documents shall prevail.

C. Mock-up (optional): Provide full size unit(s) for use in construction of sample wall. The approved mock-up shall become the standard for appearance and workmanship for the project.

D. Warranty Period: 10 years.

**PART 2 PRODUCTS**

**2.01 MANUFACTURER**

A. Indiana Cast Stone, Inc., 650 W. Market St. Spencer, IN 47460.

B. Phone (317) 847-5429. Website: www.indianacaststone.com .

C. Email: jim@indianacaststone.com

## 2.02 ARCHITECTURAL CAST STONE

A. Cast Stone: Comply with ASTM C 1364
   1. Casting Method: Vibrant Dry Tamp; Machine Produced
   2. Compressive Strength: ASTM C 1194: 6,500 psi (44815.94 kPa) minimum for products at 28 days.
   3. Absorption: ASTM C 1195: 6 percent maximum by the cold water method, or 10% maximum by the boiling method for products at 28 days.
   4. Freeze-thaw: ASTM C 1364: The CPWL shall be less than 5% after 300 cycles of freezing and thawing.
   5. Linear Shrinkage – ASTM C 426: Shrinkage shall not exceed 0.065%.

B. Job Site Testing: One sample from production units may be selected at random from the field for each 500 cubic feet delivered to the job site.
   1. Three field cut cube specimens from each of these samples shall have an average compressive strength of not less than 85% with no single specimen testing less than 75% of design strength as allowed by ACI 318.
   2. Three field cut cube specimens from each of these samples shall have an average maximum cold-water absorption of 6%.
   3. Field specimens shall be tested in accordance with ASTM C 1194 and C 1195.

## 2.03 CAST STONE MATERIALS

A. Portland Cement: ASTM C 150, Type I, white or gray as required to match specified color.

B. Coarse Aggregate: ASTM C 33, except for gradation; granite, quartz, or limestone.

C. Fine Aggregate: ASTM C 33, except for gradation; natural or manufactured sands.

D. Pigments: ASTM C 979, inorganic iron oxides.

E. Admixtures:
   1. ASTM C 494.
   2. Integral water repellants and other chemicals for which no ASTM standard exists. Previously established as suitable for use in concrete by proven field performance or through laboratory testing.

F. Water: Potable.

G. Reinforcing Bars: ASTM A 615/A 615M, galvanized or epoxy coated.

H. All anchors, dowels and other anchoring devices and shims shall be standard building stone anchors commercially available in a non-corrosive material such as zinc plated, galvanized steel, brass, or stainless steel Type 302 or 304.

## 2.04 COLOR AND FINISH

A. Provide samples for architects selection. **The intent is to match the monumental sign stone on the corner of the By - Pass and Executive Park Dive.**

B. Indiana Cast Stone Color: _____.

C. All surfaces intended to be exposed to view shall have a fine-grained texture similar to natural stone, with no air voids in excess of 1/32 inch (0.79 mm). and the density of such voids shall be less than 3 occurrences per any 1 inch (25.4 mm).² and not obvious under direct daylight illumination at a 5 feet (152.4 cm) distance.

D. Units shall exhibit a texture approximately equal to the approved sample when viewed under direct daylight illumination at a 10 feet (304.8 cm) distance.

1. ASTM D 2244 permissible variation in color between units of comparable age subjected to similar weathering exposure.
   a. Total color difference – not greater than 6 units.
   b. Total hue difference – not greater than 2 units.

E. Minor chipping resulting from shipment and delivery shall not be grounds for rejection. Minor chips shall not be obvious under direct daylight illumination from a 20 feet (609.6 cm) distance.

F. The occurrence of crazing or efflorescence shall not constitute a cause for rejection.

G. Remove cement film, if required, from exposed surfaces prior to packaging for shipment.

**2.05 REINFORCING**

A. Reinforce the units as required by the drawings and for safe handling and structural stress.

B. Minimum reinforcing shall be 0.25 percent of the cross-section area.

C. Reinforcement shall be noncorrosive where faces exposed to weather are covered with less than 1.5 inch (38.1 mm). of concrete material. All reinforcement shall have minimum coverage of twice the diameter of the bars.

D. Panels, soffits and similar stones greater than 24 inch (609.6 mm). in one direction shall be reinforced in that direction. Units less than 24 in. in both their length and width dimension shall be non-reinforced unless otherwise specified.

E. Welded wire fabric reinforcing shall not be used.

**2.06 CURING**

A. Cure Cast Stone components with a direct fired steam generator at a minimum temperature of 110 degrees Fahrenheit (43.33 degrees Celsius) for a minimum of 6-8 hours.

**2.07 MANUFACTURING TOLERANCES**

A. Cross section dimensions shall not deviate by more than ± 1/8 inch (3.18 mm). from approved dimensions.

B. Length of units shall not deviate by more than length/ 360 or ± 1/8 inch (3.18 mm)., whichever is greater, not to exceed ± ¼ in.
   1. Maximum length of any unit shall not exceed 15 times the average thickness of such unit unless otherwise agreed by the manufacturer.

C. Warp, bow or twist of units shall not exceed length/ 360 or ± 1/8 inch (3.18 mm)., whichever is greater.

D. Location of dowel holes, anchor slots, flashing grooves, false joints and similar features – on formed side of unit, 1/8 inch (3.18 mm)., on unformed sides of unit, 3/8 inch (9.52 mm). maximum deviation.

**2.08 PRODUCTION QUALITY CONTROL**

A. Testing
   1. Test compressive strength and absorption from specimens taken from every 500 cubic feet of product produced.
   2. Perform tests in accordance ASTM C 1194 and C 1195.
   3. Have test performed by an independent testing laboratory every six months.
   4. New and existing mix designs shall be tested for strength and absorption compliance prior to producing units.
   5. Retain copies of all test reports for a minimum of two years.

### 2.09 DELIVERY, STORAGE AND HANDLING

A. Mark production units with the identification marks as shown on the shop drawings.

B. Package units and protect them from staining or damage during shipping and storage.

C. Provide an itemized list of product to support the bill of lading.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Installing contractor shall examine Cast Stone materials for fit and finish prior to installation. Unacceptable components shall not be set.

### 3.02 SETTING TOLERANCES

A. Comply with Cast Stone Institute Technical Manual.

B. Set stone 1/8 inch (3.18 mm). or less, within the plane of adjacent units.

C. Joints, plus – 1/16 inch (1.59 mm)., minus – 1/8 inch (3.18 mm).

### 3.03 JOINTING

A. Joint size:
   1. At stone/brick joints 3/8 inch (9.52 mm)
   2. At Stone/stone joints in vertical position 1/4 in. (3/8 in. optional)
   3. Stone/stone joints exposed on top 3/8 inch (9.52 mm)

B. Joint Materials:
   1. Mortar, Type N, ASTM C 270
   2. Manufacturer Optional - Dry-Block Mortar Admixture to be added to the mortar mix on site by the mason contractor. The Dry-Block Mortar Admixture must be incorporated into the project mortar specification, either in Section 04 20 00, Unit Masonry, or in a separate Section 04 06 00, Mortar.
   3. Use a full bed of mortar at all bed joints.
   4. Flush vertical joints full with mortar.
   5. Leave all joints with exposed tops or under relieving angles open for sealant.
   6. Leave head joints in copings and projecting components open for sealant.

C. Location of joints:
   1. As shown on shop drawings.
   2. At control and expansion joints unless otherwise shown.

### 3.04 SETTING

A. Drench units with clean water prior to setting when IRA > 30. Check with manufacturer.

B. Do not use pry bars or other equipment in a manner that could damage Cast Stone components.

C. Fill dowel holes and anchor slots completely with mortar or non-shrink grout.

D. Set units in a full bed of mortar, unless otherwise detailed.

E. Rake mortar joints ¾ in. in for pointing.

F. Remove excess mortar from unit faces immediately after setting.

G. Tuck point unit joints to a slight concave profile.

### 3.05 JOINT PROTECTION

A. Comply with requirements of Section 07 90 00.

B. Prime ends of units, insert properly sized backing rod, and install required sealant.

C. Provide sealant joints at following locations and as indicated on the drawings.
   1. Cast stone components with exposed tops.
   2. Joints at relieving angles.
   3. Control and expansion joints

**3.06 REPAIR AND CLEANING**

A. Repair chips with touchup materials furnished by manufacturer.

B. Saturate units to be cleaned prior to applying an approved masonry cleaner. Never use a power washer, muratic acid, sandblasting, to clean units. Harsh cleaners or methods could damage or discolor units.

C. Consult with manufacturer for appropriate cleaners.

D. After selection of proper cleaning solution, test a small area of stone (approx.. 4 feet (121.92 cm) by 4 ft.). Test on each color of stone on the project. Let test area dry for 4 or more days and have approved by Architect before cleaning the entire stone area.

**3.07 INSPECTION AND ACCEPTANCE**

A. Inspect in accordance with Cast Stone Institute Technical Bulletin #36.

**3.08 WATER REPELLENT**

A. Apply water repellent in accordance with Cast Stone Institute Technical Bulletin #35 or water repellent manufacturer’s directions.

B. Do not field apply water repellent until repair, cleaning, inspection and acceptance is completed.

**END OF SECTION**

# SECTION 05 1200
# STRUCTURAL STEEL FRAMING

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Structural steel framing members.

B. Base plates, shear stud connectors and expansion joint plates.

C. Grouting under base plates.

D. Refer to Structural Drawings for additional requirements.

### 1.02 RELATED REQUIREMENTS

A. Section 01 2200 - Unit Prices

B. Section 05 3100 - Steel Decking: Support framing for small openings in deck.

C. Section 05 5000 - Metal Fabrications: Steel fabrications affecting structural steel work.

### 1.03 REFERENCE STANDARDS

A. AISC (MAN) - Steel Construction Manual; 2017.

B. AISC S303 - Code of Standard Practice for Steel Buildings and Bridges; 2016.

C. AISC S348 - Specification for Structural Joints Using ASTM A325 or A490 Bolts; 2004.

D. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

E. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished; 2024.

F. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

G. ASTM A242/A242M - Standard Specification for High-Strength Low-Alloy Structural Steel; 2024.

H. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2021.

I. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2014.

J. ASTM A325M - Standard Specification for Structural Bolts, Steel, Heat Treated 830 MPa Minimum Tensile Strength (Metric); 2014.

K. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2023.

L. ASTM A563 - Standard Specification for Carbon and Alloy Steel Nuts; 2021a.

M. ASTM A563M - Standard Specification for Carbon and Alloy Steel Nuts (Metric); 2021a.

N. ASTM A992/A992M - Standard Specification for Structural Steel Shapes; 2020.

O. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2026.

P. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2025.

Q. ASTM C1107/C1107M - Standard Specification for Packaged Dry, Hydraulic-Cement Grout (Nonshrink); 2020.

R. ASTM E94 - Standard Guide for Radiographic Examination; 2004 (Reapproved 2010).

S. ASTM E164 - Standard Practice for Contact Ultrasonic Testing of Weldments; 2019.

T. ASTM E165/E165M - Standard Test Method for Liquid Penetrant Examination for General Industry; 2018.

U. ASTM E709 - Standard Guide for Magnetic Particle Testing; 2021.

V. ASTM F436 - Standard Specification for Hardened Steel Washers; 2011.

W. ASTM F436/F436M - Standard Specification for Hardened Steel Washers Inch and Metric Dimensions; 2019.

X. ASTM F959 - Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners; 2013.

Y. ASTM F1554 - Standard Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength; 2020.

Z. ASTM F3125/F3125M - Standard Specification for High Strength Structural Bolts and Assemblies, Steel and Alloy Steel, Heat Treated, Inch Dimensions 120 ksi and 150 ksi Minimum Tensile Strength, and Metric Dimensions 830 MPa and 1040 MPa Minimum Tensile Strength; 2019, with Editorial Revision (2020).

AA. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.

BB. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020.

CC. RCSC (HSBOLT) - Specification for Structural Joints Using High-Strength Bolts; Research Council on Structural Connections; 2014, with Errata (2015).

## 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings:
   1. Indicate profiles, sizes, spacing, locations of structural members, openings, attachments, and fasteners.
   2. Indicate cambers and loads.
   3. Indicate welded connections with AWS A2.4 welding symbols. Indicate net weld lengths.

C. Manufacturer's Mill Certificate: Certify that products meet or exceed specified requirements.

## 1.05 QUALITY ASSURANCE

A. Fabricate structural steel members in accordance with AISC (MAN) "Steel Construction Manual."

B. Maintain one copy of each document on site.

C. Fabricator: Company specializing in performing the work of this section with minimum 5 years of documented experience.

D. Erector: Company specializing in performing the work of this section with minimum 5 years of documented experience.

E. Design of connections not detailed on the drawings shall be the responsibility of the fabricator. Proposed connections shall be submitted to the engineer of record in the State in which the Project is located for review.

## PART 2 PRODUCTS

### 2.01 MATERIALS

A. Steel Angles and Plates: ASTM A36/A36M.

B. Steel W Shapes and Tees: ASTM A992/A992M.

C. Rolled Steel Structural Shapes: ASTM A992/A992M.

D. Steel Shapes, Plates, and Bars: ASTM A242/A242M high-strength, corrosion-resistant structural steel.

E. Cold-Formed Structural Tubing: ASTM A500/A500M, Grade B.

F. Steel Sheet: ASTM A1011/A1011M, Designation SS, Grade 30 hot-rolled, or ASTM A1008/A1008M, Designation SS, Grade 30 cold-rolled.

G. Shear Stud Connectors: Made from ASTM A108 Grade 1015 bars.

H. High-Strength Structural Bolts, Nuts, and Washers: ASTM F3125/F3125M, Type 1, with matching compatible ASTM A563 or ASTM A563M nuts and ASTM F436/F436M washers.

I. Headed Anchor Rods: ASTM F 1554 Grade 36, plain.

J. Load Indicator Washers: Provide washers complying with ASTM F959 at connections requiring high-strength bolts.

K. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

L. Grout: Non-shrink, non-metallic aggregate type, complying with ASTM C 1107/C 1107M and capable of developing a minimum compressive strength of 7,000 psi (48 MPa) at 28 days.

M. Shop and Touch-Up Primer: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.

N. Touch-Up Primer for Galvanized Surfaces: Fabricator's standard, complying with VOC limitations of authorities having jurisdiction.

### 2.02 FABRICATION

A. Shop fabricate to greatest extent possible.

B. Continuously seal joined members by continuous welds. Grind exposed welds smooth.

C. Fabricate connections for bolt, nut, and washer connectors.

D. Develop required camber for members.

### 2.03 FINISH

A. Shop prime structural steel members. Do not prime surfaces that will be fireproofed, field welded, in contact with concrete, or high strength bolted.

### 2.04 SOURCE QUALITY CONTROL

A. Provide shop testing and analysis of structural steel.

B. High-Strength Bolts: Provide testing and verification of shop-bolted connections in accordance with RCSC (HSBOLT) "Specification for Structural Joints Using High-Strength Bolts", testing at least 10 percent of bolts at each connection.

C. Welded Connections: Visually inspect all shop-welded connections and test at least 10 percent of welds using one of the following:
   1. Radiographic testing performed in accordance with ASTM E94.
   2. Ultrasonic testing performed in accordance with ASTM E164.
   3. Liquid penetrant inspection performed in accordance with ASTM E165/E165M.

4. Magnetic particle inspection performed in accordance with ASTM E709.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify that conditions are appropriate for erection of structural steel and that the work may properly proceed.

### 3.02 ERECTION

A. Erect structural steel in compliance with AISC S303 "Code of Standard Practice for Steel Buildings and Bridges".

B. Allow for erection loads, and provide sufficient temporary bracing to maintain structure in safe condition, plumb, and in true alignment until completion of erection and installation of permanent bracing.

C. Do not field cut or alter structural members without approval of Architect.

D. After erection, prime welds, abrasions, and surfaces not shop primed, except surfaces to be in contact with concrete.

E. Grout solidly between column plates and bearing surfaces, complying with manufacturer's instructions for nonshrink grout. Trowel grouted surfaces smooth, splaying neatly to 45 degrees.

### 3.03 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch (6 mm) per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch (6 mm).

### 3.04 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.

B. High-Strength Bolts: Provide testing and verification of field-bolted connections in accordance with AISC "Specification for Structural Joints Using ASTM A325 or A490 Bolts", testing at least 25 percent of bolts at each connection. Visually inspect all bolts for snug tight condition.

C. Welded Connections: Visually inspect all field-welded connections and test at least 10 percent of welds using one of the following:
   1. Radiographic testing performed in accordance with ASTM E94.
   2. Ultrasonic testing performed in accordance with ASTM E164.
   3. Liquid penetrant inspection performed in accordance with ASTM E165/E165M.
   4. Magnetic particle inspection performed in accordance with ASTM E709.

**END OF SECTION**

# SECTION 05 1330
# ALUMINUM LADDERS AND ALUMINUM ROOF HATCHES

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Aluminum Fixed Vertical Ladders to roof hatch.

B. Metal Security Door with Piano hinge and lock hasp

C. Aluminum Guard Rail System

D. Ladder Saftey Post

E. Aluminum Roof Hatch

### 1.02 RELATED SECTION

A. Section 06 1000 - Rough Carpentry.

B. Section 05 5000 - Metal Fabrications

C. Section 05 100 - Structural Steel Framing - Roof Structure & Opening Support.

D. Division 7 - Roofing

### 1.03 REFERENCES

A. ANSI A14.3: Ladders - Fixed - Safety Requirements.

B. OSHA 1910.23: Ladders

C. OSHA 1910.28: Duty to have fall protection and falling object protection.

D. OSHA 1910.29: Fall protection systems and falling object protection-criteria and practices.

E. IBC 2018.

### 1.04 SUBMITTALS

A. Submit under provisions of Section 01 3000.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

C. Shop Drawings for Ladders:
   1. Plan and section of ladder installation.
   2. Plan and section of stair installation.
   3. Plan and section of aluminum guard rail system installation.
   4. Plan and section of aluminum roof hatches. Indicate rough opening dimensions for ceiling, roof openings, and roof hatch size.

### 1.05 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store stairway until installation inside under cover. If stored outside, under a tarp or suitable cover.

### 1.06 WARRANTY

A. Limited Warranty: Five years against defective material and workmanship, covering parts only, no labor or freight. Defective parts will be replaced at no charge, freight excluded, upon inspection at manufacturer's plant which warrants same.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. Acceptable Manufacturer: **Precision Ladders, LLC**, which is located at: P. O. Box 2279; Morristown, TN 37816-2279; Toll Free Tel: 800-225-7814 - Joe Richie or Tel: 423-586-2265; Email: info@PrecisionLadders.com; Web: www.PrecisionLadders.com , Manufacturer's Representative - **Emack Slate 205-879-3424 or equal.**

B. Verify all critical dimensions and job conditions prior to ordering all products specified within this specification.

C. Requests for substitutions will be considered in accordance with provisions of Section 01 6310.

### 2.02 ALUMINUM GUARD RAIL SYSTEM

A. Aluminum Guard Rail System and Components: Vertical and horizontal rails, mounting brackets, self-closing gate, hardware, and finishes.

B. **Basis of Design**: **Model AGRS-H** by Precision Ladders LLC.

C. Capacity: System shall support a load of 200 lbs applied in any direction.

D. Performance: Unit shall comply with OSHA 1910.28 and OSHA 1910.29.

E. Components:
   1. Vertical and horizontal rails: Aluminum (6005-T5) 1-1/4” (32 mm) schedule 40 pipe with 1-5/8” (42 mm)OD.
   2. Brackets: Y style 5” x 1-1/4” x 1/8” (127 mm by 32 mm by 4 mm) aluminum square tubing.
   3. Self-closing gate: Aluminum (6005-T5) 1-1/4” (32 mm) schedule 40 pipe with 1-5/8” (42 mm) OD hinged on open side.
   4. Hardware: Corrosion resistant hardware and fasteners is standard.
   5. Finish: Mill finish aluminum

### 2.03 ALUMINUM ROOF HATCHES

A. **Basis of Design**: **(Model PH-A4040 ladder saftey post)** Equal to Precision Ladders LLC. Minimum size of opening is **3 ft by 5ft 6in**. Size Roof hatch for ladder accordingly. Refer to drawings for locations.

B. Performance Characteristics
   1. Cover shall be reinforced to support a minimum live load of 40 psf with a maximum deflection of 0.67% of the span and a 20 psf wind uplift.
   2. Operation of the cover shall be smooth and easy with controlled operation throughout the entire arc of opening and closing.
   3. Operation of the cover shall not be affected by temperature.
   4. Entire hatch shall be weather tight with fully welded corner joints on cover and curb.

C. Curb
   1. Formed from **11 gauge aluminum sheet on aluminum models)**
   2. Sheathed with 1 inch of rigid fiber board insulation.
   3. Height of 12 inches minimum unless required to be higher for roofing manufacturer's warranty. Contractor to coordinate height of all curbs to comply with roofing manufacturer's warranty requirements.
   4. 4 inch integral flange for securing to roof.
   5. Hinges connecting curb to door shall be 1/8 inch, 2 piece formed steel with 3/8 inch pivot pin.

6. Extruded rubber gasket within a 20 guage extruded aluminum track shall be securely attached to the frame to make the unit weathertight.

D. Cover
1. Formed from 11 gauge aluminum of lock forming quality
2. Liner shall be Aluminum on aluminum models).
3. Insulation between cover and liner to be 1" thick U.L. plain fiberglass 0.75# density.
4. Lid shall be reinforced as required with 11 ga. aluminum channel (.090 Aluminum H-14 3003 on aluminum models).
5. A one point cab lock is to be provided with a built-in inside handle on units with a length of 4' 6" or less. On units of greater length, a 2 point slam lock will be used.
6. Exterior of cover shall be devoid of hardware with the exception of the outside handle.
7. Outside handle shall be vinyl coated, steel T-handle.
8. Automatic hold-open device shall be formed from 3/16" steel flat bar and 1/2" diameter steel round stock with a vinyl grip.
9. Padlock provisions provided on both interior and exterior of unit.
10. Extruded rubber gasket shall be securely attached to the liner, thus providing a weather-tight seal.

E. Pressure Control
1. Opening/closing assistance/resistance shall be provided with spring-loaded pressure intensifiers consisting of a telescoping tube; the top(outer) tube shall be 1 5/16",bottom (inner) tube shall be 1 1/2". Tubes shall be cadmium plated and chromate-sealed.

F. Hardware
1. Provide corrosion resistant hardware and fasteners.

G. Finish
1. Mill Finish Aluminum

**2.04 ALUMINUM FIXED VERTICAL LADDER**

A. Aluminum Fixed Vertical Ladder and Components: Ladder, floor mounting brackets and side rails. Aluminum Fixed Ladder with Aluminum Walk Thru.
1. Model **FL-02**: Aluminum Fixed Vertical Ladder to Roof Hatch as manufactured by Precision Ladders LLC. **Basis of Design**. Refer to drawings for location and vertical distance; contractor to verify all job conditions including vertical height.
2. Retractable post -**model ER-1** Anodized aluminum
3. Security Option - Security door at the lower end of the ladder to prevent unauthiorized access with pad lock provisions.
4. Capacity: Unit shall support **a 1500 lb** loading without failure.
5. Performance Standard: Units designed and manufactured to meet or exceed ANSI A14.3 and **OSHA 1910.23.**
6. If required by applicable codes and OSHA requirements provide appropriate fall protection system, safety cage, and rest platform.

B. Components:
1. Ladder Width - 20 inches.
2. Ladder Stringer: 2-1/2 inch by 1-1/16 inch by 1/8 inch (64 mm by 27 mm by 3 mm) extruded 6005-T5 aluminum channel. Pitch: 90 degrees.
3. Ladder Tread: 2-1/4 inch by 3/4 inch by 1/4 inch (57 mm by 19 mm by 6 mm) extruded 6005-T5 aluminum with deeply serrated top surface.

4. Ladder Mounting Bracket: 8-1/2 inch by 2 inch by 3 inch by 1/4 inch thick (216 mm by 51 mm by 76 mm by 6 mm) aluminum angle. Prior to installation the general contractor shall provide concealed solid wood blocking in metal stud wall cavity for secure fastening of wall brackets. Provide all mounting brackets for floor and walls.
5. Finishes: Mill finish on aluminum ladder components.
6. Fasteners: To be per manufacturer's requirements, non corrosive type.

C. FABRICATION
1. Completely fabricate ladder ready for installation before shipment to the site.
2. Completely fabricate handrail components ready for field assembly to ladder before shipment to site.

**2.05 FABRICATION**

A. Completely fabricate stair ready for instllation before shipment to the site.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

A. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

B. Examine materials upon arrival at site. Notify the carrier and manufacturer of any damage.

C. Verify vertical distance and other job conditions prior to manufacture.

**3.02 INSTALLATION**

A. Install in accordance with manufacturer's instructions.

B. The final installation to be inspected by manufacturer’s representative and certified as code compliant and approved.

C. Top tread of ladder level with base of hatch; job verify.

D. Provide P.T. Wood Blocking under Roof Hatch Curb to accomodate thickness of rigid roof insulation.

E. Provide sealants per Section 07-9005 Joint Sealants for a waterproof installation at all fasteners and penetrations.

F. Coordinate the installation of roof hatch with other trades for a waterproof installation.

**3.03 PROTECTION**

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

**3.04 WARRANTY**

A. On Ladder, Roof Hatch and specified components, Aluminum Walk-thru, and Guard Rail System: 5 year manufacturer warranty. on all products in this specification.

**END OF SECTION**

# SECTION 05 2100
# STEEL JOIST FRAMING

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Open web steel joists and shear stud connectors, with bridging, attached seats and anchors.

B. Loose bearing members, such as plates or angles, and anchor bolts for site placement.

C. Supplementary framing for floor and roof openings greater than 18 inches (450 mm).

D. Refer to structural drawings.

### 1.02 RELATED REQUIREMENTS

A. Section 042000 - Unit Masonry

B. Section 05 1200 - Structural Steel Framing: Superstructure framing.

C. Section 05 3100 - Steel Decking: Bearing plates and angles.

D. Section 05 3100 - Steel Decking: Support framing for openings less than 18 inches (450 mm) in decking.

E. Section 055400 - Cold Form Metal Framing

F. Section 05 5000 - Metal Fabrications: Non-framing steel fabrications attached to joists.

### 1.03 REFERENCE STANDARDS

A. AISC S348 - Specification for Structural Joints Using ASTM A325 or A490 Bolts; 2004.

B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

D. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2021.

E. ASTM E94 - Standard Guide for Radiographic Examination; 2004 (Reapproved 2010).

F. ASTM E164 - Standard Practice for Contact Ultrasonic Testing of Weldments; 2019.

G. ASTM E165/E165M - Standard Test Method for Liquid Penetrant Examination for General Industry; 2018.

H. ASTM E709 - Standard Guide for Magnetic Particle Testing; 2021.

I. AWS B2.1/B2.1M - Specification for Welding Procedure and Performance Qualification; 2014 (Amended 2015).

J. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020.

K. RCSC (HSBOLT) - Specification for Structural Joints Using High-Strength Bolts; Research Council on Structural Connections; 2014, with Errata (2015).

L. SJI (SPEC) - Catalog of Standard Specifications Load Tables and Weight Tables for Steel Joists and Joist Girders; 2011.

M. SJI Technical Digest No. 9 - Handling and Erection of Steel Joists and Joist Girders; 2008.

N. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.

O. SSPC-Paint 25 - Zinc Oxide, Alkyd, Linseed Oil Primer for Use Over Hand Cleaned Steel, Type I and Type II; Society for Protective Coatings; 1997 (Ed. 2004).

P. SSPC-SP 2 - Hand Tool Cleaning; 2024.

**1.04 SUBMITTALS**

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate standard designations, joist coding, configurations, sizes, spacings, cambers, locations of joists, joist leg extensions, bridging, connections, and attachments.

C. Welders' Certificates: Submit manufacturer's certificates, certifying welders employed on the Work, verifying AWS qualification within the previous 12 months.

**1.05 QUALITY ASSURANCE**

A. Perform Work, including that for headers and other supplementary framing, in accordance with SJI (SPEC) Standard Specifications Load Tables and SJI Technical Digest No. 9.
   1. Maintain one copy of document on site.

B. Erector Qualifications: Company specializing in performing the work of this section with minimum _____ years documented experience.

**1.06 DELIVERY, STORAGE, AND HANDLING**

A. Transport, handle, store, and protect products to SJI requirements.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

A. Steel Joists:
   1. Canam Group Inc: www.canam-steeljoists.ws
   2. CMC Joist: www.cmcjoist.com.
   3. Nucor-Vulcraft Group: www.vulcraft.com/#sle.
   4. Substitutions: See Section 01 6000 - Product Requirements.

**2.02 MATERIALS**

A. Open Web Joists: Refer to Structural drawings and notes :
   1. Provide bottom chord extensions as indicated.
   2. Minimum End Bearing on Steel Supports: As shown on the drawings.
   3. Minimum End Bearing on Concrete or Masonry Supports: Comply with referenced SJI standard.
   4. End bearing of 4 inches (100 mm) on masonry supports, unless shown otherwise.
   5. Finish: Shop primed.

B. Structural Steel For Supplementary Framing and Joist Leg Extensions: ASTM A 36/A 36M.

C. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

D. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

**2.03 FABRICATION**

A. Frame special sized openings in joist web framing, if indicated.

**2.04 FINISH**

A. Shop prime joists as specified.

B. Prepare surfaces to be finished in accordance with SSPC-SP 2.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify existing conditions prior to beginning work.

### 3.02 ERECTION

A. Erect joists with correct bearing on supports.

B. Allow for erection loads. Provide sufficient temporary bracing to maintain framing safe, plumb, and in true alignment.

C. Coordinate the placement of anchors for securing loose bearing members furnished as part of the work of this section.

D. After joist alignment and installation of framing, field weld joist seats to steel bearing surfaces.

E. Position and field weld joist chord extensions and wall attachments as detailed.

F. Install supplementary framing for floor and roof openings greater than 8 inches (<> mm), unless shown otherwise on drawings.

G. Do not permit erection of decking until joists are braced, bridged, and secured or until completion of erection and installation of permanent bridging and bracing.

H. Do not field cut or alter structural members without approval of joist manufacturer.

I. After erection, prime welds, damaged shop primer, damaged galvanizing, and surfaces not shop primed , except surfaces specified not to be primed.

### 3.03 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch (6 mm).

B. Maximum Offset From True Alignment: 1/4 inch (6 mm).

### 3.04 FIELD QUALITY CONTROL

A. An independent testing agency will perform field quality control tests, as specified in Section 01 4000 - Quality Requirements.

B. High-Strength Bolts: Provide testing and verification of field-bolted connections in accordance with RCSC (HSBOLT) "Specification for Structural Joints Using High-Strength Bolts", testing at least ____ percent of bolts at each connection.

C. Welded Connections: Visually inspect all field-welded connections and test at least ____ percent of welds using one of the following:
   1. Radiographic testing performed in accordance with ASTM E94.
   2. Ultrasonic testing performed in accordance with ASTM E164.
   3. Liquid penetrant inspection performed in accordance with ASTM E165/E165M.
   4. Magnetic particle inspection performed in accordance with ASTM E709.

**END OF SECTION**

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# SECTION 05 3100
# STEEL DECKING

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Roof deck.

B. Floor deck.

C. Supplementary framing for openings up to and including 18 inches (450 mm).

D. Bearing plates and angles.

E. Refer to Structural Drawings for additional requirements.

### 1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Concrete topping over metal deck.

B. Section 04 2000 - Unit Masonry Assemblies: Placement of anchors for bearing plates embedded in unit masonry assemblies.

C. Section 05 1200 - Structural Steel Framing: Support framing for openings larger than 18 inches (450 mm) and shear stud connectors.

D. Section 05 2100 - Steel Joist Framing: Support framing for openings larger than 18 inches (450 mm) and shear stud connectors.

E. Section 05 5000 - Metal Fabrications: Steel angle concrete stops at deck edges.

### 1.03 REFERENCE STANDARDS

A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

B. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold-Finished; 2024.

C. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.

D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.

E. ASTM A1008/A1008M - Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Required Hardness, Solution Hardened, and Bake Hardenable; 2026.

F. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020.

G. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2018.

H. SDI (DM) - Publication No.30, Design Manual for Composite Decks, Form Decks, and Roof Decks; 2007.

I. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.

J. SSPC-Paint 25 - Zinc Oxide, Alkyd, Linseed Oil Primer for Use Over Hand Cleaned Steel, Type I and Type II; Society for Protective Coatings; 1997 (Ed. 2004).

K. UL (FRD) - Fire Resistance Directory; Current Edition.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittals procedures.

B. Shop Drawings: Indicate deck plan, support locations, projections, openings, reinforcement, pertinent details, and accessories.

C. Product Data: Provide deck profile characteristics, dimensions, structural properties, and finishes.

D. Certificates: Certify that products furnished meet or exceed specified requirements.

E. Submit manufacturer's installation instructions.

F. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

**1.05 QUALITY ASSURANCE**

A. Design deck layout, spans, fastening, and joints in accordance with manufacturers written recommendations in and for the the State in which the Project is located for project conditions.

B. Installer Qualifications: Company specializing in performing the work of this Section with minimum 5 years of experience.

**1.06 DELIVERY, STORAGE, AND HANDLING**

A. Cut plastic wrap to encourage ventilation.

B. Separate sheets and store deck on dry wood sleepers; slope for positive drainage.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

A. Steel Deck:
1. Canam Steel Corporation; ____: www.canam-steeljoists.ws.
2. Nucor-Vulcraft Group; ____: www.vulcraft.com/#sle.
3. Wheeling Corrugating Co: www.wheelingcorrugating.com.
4. Substitutions: See Section 01 6000 - Product Requirements.

**2.02 STEEL DECK**

A. All Deck Types: Select and design metal deck in accordance with SDI Design Manual.
1. Calculate to structural working stress design and structural properties specified.
2. Maximum Vertical Deflection of Floor Deck: 1/360 of span.

B. Roof Deck: Non-composite type, fluted steel sheet: See structural drawings.
1. Galvanized Steel Sheet: ASTM A 653/A 653M, Structural Steel (SS) Grade 33/230, with G90/Z275 galvanized coating.
2. Structural Properties:
   a. Section Modulus: _____.
   b. Span Design: Double.
3. Minimum Metal Thickness, Excluding Finish: As noted on drawings.
4. Nominal Height: 1-1/2 inch (38 mm).
5. Profile: Fluted; SDI ___.see structural.
6. Side Joints: Lock seam or nested
7. End Joints: Lapped, welded.

C. Roof Decking: Refer to structural drawings.

D. Floor Deck: floor deck . Refer to structural drawings.
1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 33/230, with G90/Z275 galvanized coating.
2. Minimum Base Metal Thickness: 22 gage, 0.0299 inch (0.76 mm).
3. Nominal Height: 1-1/2 inches (38 mm).
4. Formed Sheet Width: 24 inch (600 mm).

5. Side Joints: Lapped, welded.
6. End Joints: Lapped, welded.

**2.03 ACCESSORY MATERIALS**

A. Bearing Plates and Angles: ASTM A36/A36M steelunfinished.

B. Stud Shear Connectors: Made from ASTM A 108 Grade 1015 bars.

C. Welding Materials: AWS D1.1/D1.1M.

D. Fasteners: Galvanized hardened steel, self tapping.

E. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

F. Flute Closures: Closed cell foam rubber, 1 inch (25 mm) thick; profiled to fit tight to the deck.

G. Acoustical Insulation: Glass fiber type, minimum 1.1 lb/cu ft (18 kg/cu m) density; profiled to suit deck.

**2.04 FABRICATED DECK ACCESSORIES**

A. Sheet Metal Deck Accessories: Metal closure strips, wet concrete stops, and cover plates, 22 gage (0.8 mm) thick sheet steel for roof and 20 gage for floor; of profile and size as indicated; finished same as deck.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

A. Verify existing conditions prior to beginning work.

**3.02 INSTALLATION**

A. Erect metal deck in accordance with SDI Design Manual and manufacturer's instructions. Align and level.

B. On concrete and masonry surfaces provide minimum 4 inch (100 mm) bearing.

C. On steel supports provide minimum 2 inch bearing.

D. Fasten deck to steel support members at ends and intermediate supports at 12 inches (300 mm) on center maximum, parallel with the deck flute and at each transverse flute using methods specified.
   1. Welding: Use fusion welds through weld washers.
   2. Place and secure special deep fluted sections for integral concrete bridging.

E. Clinch lock seam side laps, where applicable..

F. At mechanically fastened male/female side laps fasten at 24 inches (600 mm) on center maximum.

G. At welded male/female side laps weld at 18 inches (450 mm) on center maximum.

H. Weld deck in accordance with AWS D1.3/D1.3M.

I. At deck openings from 6 inches (150 mm) to 18 inches (450 mm) in size, provide 2 by 2 by 1/4 inch (50 by 50 by 6 mm) steel angle reinforcement. Place angles perpendicular to flutes; extend minimum two flutes beyond each side of opening and fusion weld to deck at each flute.

J. Where deck changes direction, install 6 inch (150 mm) minimum wide sheet steel cover plates, of same thickness as deck. Fusion weld 12 inches (300 mm) on center maximum.

K. At floor edges, install concrete stops upturned to top surface of slab, to contain wet concrete. Provide stops of sufficient strength to remain stationary without distortion.

L. At openings between deck and walls, columns, and openings, provide sheet steel closures and angle flashings to close openings.

M. Close openings above walls and partitions perpendicular to deck flutes with single row of foam cell closures.

N. Position roof drain pans with flange bearing on top surface of deck. Fusion weld at each deck flute.

O. Weld stud shear connectors through steel deck to structural members below.

P. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up primer.

**END OF SECTION**

# SECTION 05 4000
# COLD-FORMED METAL FRAMING

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Formed steel stud exterior wall framing and where shown or noted.

B. Exterior sheathing (gypsum sheathing) in locations where sheathing attaches to cold form framing (not on wood).

C. Refer to Structural drawings for additional requirements.

### 1.02 RELATED REQUIREMENTS

A. Section 04 2000 - Unit Masonry

B. Section 05 3100 - Steel Decking.

C. Section 06 1000 - Rough Carpentry: Wood blocking and miscellaneous framing.

D. Section 07 2500 - Weather Barriers: Weather barrier over sheathing.

E. Section 09 2116 - Gypsum Board Assemblies: Lightweight, non-load bearing metal stud framing.

F. Section 07 9005 - Joint Sealers.

G. Section 09 2116 - Gypsum Board Assemblies: Gypsum-based sheathing.

### 1.03 REFERENCE STANDARDS

A. AISI S100-12 - North American Specification for the Design of Cold-Formed Steel Structural Members; 2012.

B. AISI SG02-1 - North American Specification for the Design of Cold-Formed Steel Structural Members; American Iron and Steel Institute; 2001 with 2004 supplement. (replaced SG-971)

C. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.

E. ASTM C955 - Standard Specification for Cold-Formed Steel Structural Framing Members; 2018, with Editorial Revision.

F. ASTM C1007 - Standard Specification for Installation of Load Bearing (Transverse and Axial) Steel Studs and Related Accessories; 2011a.

G. ASTM C1177/C1177M - Standard Specification for Glass Mat Gypsum Substrate for Use as Sheathing; 2017.

H. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020.

### 1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with work of other sections that is to be installed in or adjacent to the metal framing system, including but not limited to structural anchors, cladding anchors, utilities, insulation, and firestopping.

### 1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on standard framing members; describe materials and finish, product criteria, and limitations.

C. Shop Drawings: Indicate component details, framed openings, bearing, anchorage, loading, welds, and type and location of fasteners, and accessories or items required of related work.
   1. Indicate stud.
   2. Describe method for securing studs to tracks and for bolted framing connections.
   3. Provide details and calculations for factory-made framing connectors.

D. Manufacturer's Installation Instructions: Indicate special procedures, conditions requiring special attention .

### 1.06 MOCK-UP

A. Provide mock-up of exterior framed wall, including components specified elsewhere, such as insulation, sheathing, window frame, door frame, exterior wall finish, and interior wall finish.

B. Location: As directed.

C. Mock-up may remain as part of the Work.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. Metal Framing:
   1. Clarkwestern Dietrich Building Systems LLC: www.clarkdietrich.com.
   2. Marino; ____: www.marinoware.com/#sle.
   3. The Steel Network, Inc; _____: www.SteelNetwork.com/#sle.
   4. Substitutions: See Section 01 6000 - Product Requirements.

B. Framing Connectors and Accessories:
   1. Same manufacturer as metal framing.
   2. Substitutions: See Section 01 6000 - Product Requirements.

### 2.02 FRAMING SYSTEM

A. Provide primary and secondary framing members, bridging, bracing, plates, gussets, clips, fittings, reinforcement, and fastenings as required to provide a complete framing system.

B. Deliver to site in largest practical sections.

### 2.03 FRAMING MATERIALS

A. Studs and Track: ASTM C955; studs formed to channel, "C", or "Sigma" shape with punched web; U-shaped track in matching nominal width and compatible height.

B. Framing Connectors: Factory-made, formed steel sheet.
   1. Material: ASTM A653/A653M SS Grade 33 and 40 (minimum), with G90/Z275 hot dipped galvanized coating for base metal thickness less than 10 gage, 0.1345 inch (3.42 mm), and factory punched holes and slots.
   2. Structural Performance: Maintain load and movement capacity required by applicable code, when evaluated in accordance with AISI S100-12.
   3. Fixed Connections: Provide non-movement connections for tie-down to foundation, floor-to-floor tie-down, roof-to-wall tie-down, joist hangers, gusset plates, and stiffeners.

### 2.04 FASTENERS

A. Self-Drilling, Self-Tapping Screws, Bolts, Nuts and Washers: Hot dip galvanized per ASTM A153/A153M.
   1. Products:

a. ITW Commercial Construction North America; ITW CCNA-Buildex Teks Select Series; _____: www.ITWBuildex.com/#sle.

B. Anchorage Devices: Powder actuated.

C. Welding: Comply with AWS D1.1/D1.1M.

**2.05 WALL SHEATHING (GYPSUM SHEATHING)**

A. Sheathing: Glass mat faced gypsum; ASTM C 1177/C 1177M, square, 5/8 inch Type X fire-resistant (16 mm Type X fire-resistant). Comply with all governing authorities.

**2.06 ACCESSORIES**

A. Bracing, Furring, Bridging: Formed sheet steel, match stud thickness unless noted on drawings; finish to match framing components.

**2.07 FASTENERS**

A. Self-Drilling, Self-Tapping Screws, Bolts, Nuts and Washers: Hot dip galvanized per ASTM A153/A153M.

B. Anchorage Devices: Powder actuated.

C. Anchorage Devices: Power actuated.

D. Welding: In conformance with AWS D1.1, when noted on drawings.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

A. Verify that substrate surfaces are ready to receive work.

B. Verify field measurements and adjust installation as required.

**3.02 INSTALLATION OF STUDS**

A. Install components in accordance with manufacturers' instructions and ASTM C1007 requirements.

B. Align floor and ceiling tracks; locate to wall layout. Secure in place with fasteners at maximum 16 inches (____ mm) on center. Coordinate installation of sealant with floor and ceiling tracks.

C. Construct corners using minimum of three studs. Install double studs at wall openings, door and window jambs.

D. Install load bearing studs full length in one piece. Splicing of studs is not permitted.

E. Install load bearing studs, brace, and reinforce to develop full strength and achieve design requirements.

F. Install intermediate studs above and below openings to align with wall stud spacing.

G. Attach cross studs to studs for attachment of fixtures anchored to walls.

H. Install framing between studs for attachment of mechanical and electrical items, and bridging to prevent stud rotation and buckling.

I. Touch-up field welds and damaged galvanized surfaces with primer.

**3.03 INSTALLATION OF JOISTS, PURLINS, AND RAFTERS**

A. Install framing components in accordance with manufacturer's instructions and drawings.

B. Make provisions for erection stresses. Provide temporary alignment and bracing.

### 3.04 WALL SHEATHING (GYPSUM SHEATHING)

A. Wall Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using self-tapping screws.
   1. Provide steel diagonal bracing at corners.

**END OF SECTION**

# SECTION 05 5000
# METAL FABRICATIONS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Shop fabricated steel items.

B. Cast iron downspout boots. Refer to specifications07 6200 Sheet Metal Flashing and Trim, including downspouts and accessories.

### 1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Placement of metal fabrications in concrete.

B. Section 04 2000 - Unit Masonry: Placement of metal fabrications in masonry.

C. Section 05 1330 - Aluminum Ladders and Roof hatches.

D. Section 05 7311 - Decorative Metal Railings

E. Section 09 9113 - Exterior Painting: Paint finish.

F. Section 09 9123 - Interior Painting: Paint finish.

### 1.03 REFERENCE STANDARDS

A. ANSI A14.3 - American National Standard for Ladders -- Fixed -- Safety Requirements; 2008 (Reaffirmed 2018).

B. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

C. ASTM A48/A48M - Standard Specification for Gray Iron Castings; 2003 (Reapproved 2021).

D. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2024.

E. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.

F. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

G. ASTM A283/A283M - Standard Specification for Low and Intermediate Tensile Strength Carbon Steel Plates; 2024.

H. ASTM A307 - Standard Specification for Carbon Steel Bolts, Studs, and Threaded Rod 60 000 PSI Tensile Strength; 2021.

I. ASTM A325 - Standard Specification for Structural Bolts, Steel, Heat Treated, 120/105 ksi Minimum Tensile Strength; 2014.

J. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2023.

K. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2021.

L. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.

M. ASTM A1011/A1011M - Standard Specification for Steel, Sheet and Strip, Hot-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, and Ultra-High Strength; 2025.

N. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.

O. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020.

P. SSPC-SP 2 - Hand Tool Cleaning; 2024.

**1.04 SUBMITTALS**

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, reinforcing, anchorage, size and type of fasteners, and accessories. Include erection drawings, elevations, and details where applicable.
   1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.

C. Welders' Certificates: Submit certification for welders employed on the project, verifying AWS qualification within the previous 12 months.

**1.05 QUALITY ASSURANCE**

A. Fabricator Qualifications: A firm experienced in producing metal fabrications similar to those indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

B. Welding: Qualify procedures and personnel according to the following:
   1. AWS D1.1, "Structural Welding Code--Steel."

**1.06 PROJECT CONDITIONS**

A. Field Measurements: Where metal fabrications are indicated to fit walls and other construction, verify dimensions by field measurements before fabrication and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
   1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabricating metal fabrications without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions. Allow for trimming and fitting.

**1.07 COORDINATION**

A. Coordinate installation of anchorages for metal fabrications. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

**PART 2 PRODUCTS**

**2.01 MATERIALS - STEEL**

A. Steel Sections: ASTM A 36/A 36M.

B. Steel Tubing: ASTM A501/A501M hot-formed structural tubing.

C. Plates: ASTM A283/A283M.

D. Pipe: ASTM A 53/A 53M Grade B Schedule 40, black finish.

E. Slotted Channel Framing: ASTM A653/A653M, Grade 33.

F. Slotted Channel Fittings: ASTM A1011/A1011M.

G. Fasteners:
   1. General: Provide Type 304 or 316 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633, Class Fe/Zn 5, where built into exterior walls. Select fasteners for type, grade, and class required.

2. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with hex nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.
3. Anchor Bolts: ASTM F 1554, Grade 36.
4. Machine Screws: ASME B18.6.3 (ASME B18.6.7M).
5. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).
6. Plain Washers: Round, carbon steel, ASME B18.22.1 (ASME B18.22M).
7. Lock Washers: Helical, spring type, carbon steel, ASME B18.21.1 (ASME B18.21.2M).
8. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to six times the load imposed when installed in unit masonry and equal to four times the load imposed when installed in concrete, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.
    a. Material: Carbon-steel components zinc-plated to comply with ASTM B 633, Class Fe/Zn 5.
    b. Subparagraph above and below are examples only. Above protects against corrosion in an indoor atmosphere. Revise to suit other conditions after verifying availability of thicker coatings.
    c. Material: Alloy Group 1 or 2 stainless-steel bolts complying with ASTM F 593 (ASTM F 738M) and nuts complying with ASTM F 594 (ASTM F 836M).
9. Toggle Bolts: FS FF-B-588, tumble-wing type, class and style as needed.

H. Cast-in-Place Anchors in Concrete: Anchors of type indicated below, fabricated from corrosion-resistant materials capable of sustaining, without failure, the load imposed within a safety factor of 4, as determined by testing per ASTM E 488, conducted by a qualified independent testing agency.
1. Threaded or wedge type; galvanized ferrous castings, either ASTM A 47 (ASTM A 47M) malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, hot-dip galvanized per ASTM A 153/A 153M.

I. Welding Materials: AWS D1.1/D1.1M; type required for materials being welded.

**2.02 FABRICATION**

A. Fit and shop assemble items in largest practical sections, for delivery to site.

B. Fabricate items with joints tightly fitted and secured.

C. Continuously seal joined members by continuous welds.

D. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

E. Exposed Mechanical Fastenings: Flush countersunk screws or bolts; unobtrusively located; consistent with design of component, except where specifically noted otherwise.

F. Supply components required for anchorage of fabrications. Fabricate anchors and related components of same material and finish as fabrication, except where specifically noted otherwise.

**2.03 FABRICATED ITEMS**

A. Bumper Posts and Guard Rails: As detailed; prime paint finish.

B. Bollards: Steel pipe, concrete filled, crowned cap, as detailed; prime paint finish. Refer to draw

C. Ledge Angles, Shelf Angles, Channels, and Plates Not Attached to Structural Framing: For support of metal decking; prime paint finish.

D. Lintels: As detailed; hot dippedgalvanized finish.

**2.04 DOWNSPOUT BOOTS REFER TO 07 6200**

A. Downspout Boots: Smooth interior without boxed corners or choke points; include integral lug slots, integral cleanout, cleanout cover, and tamper proof fasteners.
   1. Configuration: Angular.
   2. Material: Cast iron; ASTM A48/A48M; casting thickness 3/8 inch (9.5 mm), minimum.
   3. Finish: Manufacturer's standard factory applied powder coat finish.
   4. Accessories: Manufacturer's standard stainless steel fasteners, stainless steel building wall anchors, integral neoprene gaskets, and rubber coupling.
   5. Manufacturers:
      a. Downspoutboots.com, a division of J. R. Hoe & Sons; ____: www.downspoutboots.com/#sle.
      b. Neenah Foundry.Dandiong Foundry
   6. Coordinate size of roof downspouts and connecting underdrain piping with downspouts boots.
      a. Substitutions: See Section 01 6000 - Product Requirements.

**2.05 GROUT**

A. Nonshrink, Metallic Grout: Factory-packaged, ferrous-aggregate grout complying with ASTM C 1107, specifically recommended by manufacturer for heavy-duty loading applications.

B. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

**2.06 FINISHES - STEEL**

A. Prime paint steel items.

B. Prepare surfaces to be primed in accordance with SSPC-SP2.

C. Clean surfaces of rust, scale, grease, and foreign matter prior to finishing.

D. Prime Painting: One coat.

E. Galvanizing of Structural Steel Members: Galvanize after fabrication to ASTM A123/A123M requirements.

F. Galvanizing of Non-structural Items: Galvanize after fabrication to ASTM A123/A123M requirements.

**2.07 FABRICATION TOLERANCES**

A. Squareness: 1/8 inch (3 mm) maximum difference in diagonal measurements.

B. Maximum Offset Between Faces: 1/16 inch (1.5 mm).

C. Maximum Misalignment of Adjacent Members: 1/16 inch (1.5 mm).

D. Maximum Bow: 1/8 inch (3 mm) in 48 inches (1.2 m).

E. Maximum Deviation From Plane: 1/16 inch (1.5 mm) in 48 inches (1.2 m).

**PART 3 EXECUTION**

**3.01 EXAMINATION**

A. Verify that field conditions are acceptable and are ready to receive work.

### 3.02 PREPARATION

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply setting templates to the appropriate entities for steel items required to be cast into concrete or embedded in masonry.

### 3.03 INSTALLATION

A. Install items plumb and level, accurately fitted, free from distortion or defects.

B. Provide for erection loads, and for sufficient temporary bracing to maintain true alignment until completion of erection and installation of permanent attachments.

C. Perform field welding in accordance with AWS D1.1/D1.1M.

D. Obtain approval prior to site cutting or making adjustments not scheduled.

E. After erection, prime welds, abrasionsand surfaces not shop primed or galvanized , except surfaces to be in contact with concrete.

### 3.04 TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch (6 mm) per story, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch (6 mm).

C. Maximum Out-of-Position: 1/4 inch (6 mm).

**END OF SECTION**

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# SECTION 05 5213
# PIPE AND TUBE RAILINGS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Wall mounted handrails.

B. Stair railings and guardrails.

C. Free-standing railings at steps.

### 1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Placement of anchors in concrete.

B. Section 04 2000 - Unit Masonry: Placement of anchors in masonry.

C. Section 09 2116 - Gypsum Board Assemblies: Placement of backing plates in stud wall construction.

D. Section 09 9113 - Exterior Painting: Paint finish.

E. Section 09 9123 - Interior Painting: Paint finish.

### 1.03 REFERENCE STANDARDS

A. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2026.

B. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2026.

C. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

D. AISC 207 - Standard for Certification Programs; 2025.

E. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless; 2024.

F. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes; 2023.

G. ASTM A501/A501M - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing; 2021.

H. ASTM E935 - Standard Test Methods for Performance of Permanent Metal Railing Systems and Rails for Buildings; 2021.

I. AWS A2.4 - Standard Symbols for Welding, Brazing, and Nondestructive Examination; 2020.

J. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel AC172; 2019, with Editorial Revision (2025).

K. SSPC-Paint 15 - Steel Joist Shop Primer/Metal Building Primer; 2004.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate profiles, sizes, connection attachments, anchorage, size and type of fasteners, and accessories.

1. Indicate welded connections using standard AWS A2.4 welding symbols. Indicate net weld lengths.
2. Include the design engineer's seal and signature on each sheet of shop drawings.

C. Samples: Submit two, ____ inch (____ mm) long samples of handrail. Submit two samples of elbow, wall bracket, and end stop.

D. Designer's Qualification Statement.

E. Fabricator's Qualification Statement.

**1.05 QUALITY ASSURANCE**

A. Welder Qualifications: Show certification of welders employed on the Work, verifying AWS qualification within the previous 12 months.

B. Fabricator Qualifications:
1. A qualified steel fabricator that is certified by the American Institute for Steel Construction (AISC) under AISC 207.
2. A company specializing in manufacturing products specified in this section, with not less than ten years of documented experience.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

A. Handrails and Railings: Refer to drawings.

**2.02 RAILINGS - GENERAL REQUIREMENTS - COMPLY WITH IBC 2024**

A. Design, fabricate, and test railing assemblies in accordance with the most stringent requirements of applicable local code.

B. Distributed Loads: Design railing assembly, wall rails, and attachments to resist distributed force of 75 pounds per linear foot (1095 N/m) applied to the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E935

C. Concentrated Loads: Design railing assembly, wall rails, and attachments to resist a concentrated force of 200 pounds (890 N) applied at any point on the top of the assembly and in any direction, without damage or permanent set. Test in accordance with ASTM E935

D. Allow for expansion and contraction of members and building movement without damage to connections or members.

E. Dimensions: See drawings for configurations and heights. Refer to drawings for additional requirements. **Verify all dimensions and conditions prior to fabrication.**
1. Top Rails and Wall Rails: See drawings inches (____ mm) diameter, round.

F. Provide anchors and other components as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable provide flush countersunk fasteners.

G. Provide slip-on non-weld mechanical fittings to join lengths, seal open ends, and conceal exposed mounting bolts and nuts, including but not limited to elbows, T-shapes, splice connectors, flanges, escutcheons, and wall brackets.

**2.03 STEEL RAILING SYSTEM**

A. Steel Pipe: ASTM A53/A53M Grade B Schedule 40, black finish.

B. Flat Plates: A-36

C. Non-Weld Mechanical Fittings: Slip-on, galvanized malleable iron castings, for Schedule 40 pipe, with flush setscrews for tightening by standard hex wrench, no screw fasteners.

D. Welding Fittings: Factory- or shop-welded from matching pipe or tube; seams continuously welded; joints and seams ground smooth.

E. Exposed Fasteners: Flush countersunk screws or bolts; consistent with design of railing.

F. Shop and Touch-Up Primer: SSPC-Paint 15, complying with VOC limitations of authorities having jurisdiction.

**2.04 FABRICATION**

A. Accurately form components to suit specific project conditions and for proper connection to building structure.

B. Fit and shop assemble components in largest practical sizes for delivery to site.

C. Fabricate components with joints tightly fitted and secured. Provide spigots and sleeves to accommodate site assembly and installation.

D. Welded Joints:
   1. Exterior Components: Continuously seal joined pieces by intermittent welds and plastic filler. Drill condensate drainage holes at bottom of members at locations that will not encourage water intrusion.
   2. Interior Components: Continuously seal joined pieces by intermittent welds and plastic filler.
   3. Grind exposed joints flush and smooth with adjacent finish surface. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

A. Verify that field conditions are acceptable and are ready to receive work.

**3.02 PREPARATION**

A. Clean and strip primed steel items to bare metal where site welding is required.

B. Supply items required to be cast into concrete or embedded in masonry with setting templates, for installation as work of other sections.

**3.03 INSTALLATION**

A. Install in accordance with manufacturer's instructions.

B. Install components plumb and level, accurately fitted, free from distortion or defects, with tight joints.

C. Install railings in compliance with ADA Standards for accessible design at applicable locations.

D. Anchor railings securely to structure.

E. Field weld anchors as indicated on drawings. Touch-up welds with primer. Grind welds smooth.

F. Conceal anchor bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.

**3.04 TOLERANCES**

A. Maximum Variation From Plumb: 1/4 inch (6 mm) per floor level, non-cumulative.

B. Maximum Offset From True Alignment: 1/4 inch (6 mm).

C. Maximum Out-of-Position: 1/4 inch (6 mm).

**END OF SECTION**

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# SECTION 05 5813
# ALUMINUM COLUMN COVERS

## PART 1 - GENERAL

### 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. Section 07900 Joint Sealers.

### 1.02 SUMMARY

A. Section includes snap-together metal column covers.

### 1.03 ACTION SUBMITTALS

A. Product Data: For each type of product, including finishing materials.

B. Shop Drawings: Show fabrication and installation details for column covers, including but not limited to sub-framing connections to structural columns.

C. Samples for Verification: For each type of exposed finish required.

### 1.04 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator.

### 1.05 QUALITY ASSURANCE

A. Fabricator Qualifications: A firm experienced in producing column covers similar to that indicated for this Project and with a record of successful in-service performance, as well as sufficient production capacity to produce required units.

B. Paint Applicator Qualifications: A firm experienced in successfully applying paint coatings of type indicated to metals of types indicated and that employs competent control personnel to conduct continuing, effective quality-control program to ensure compliance with requirements.

### 1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver column covers wrapped in protective. Remove protective coverings before they stain or bond to finished surfaces.

## PART 2 PRODUCTS

### 2.01 COLUMN COVER

A. Basis of Design Manuf. & Product:
   1. Pittcon Industries – Series KS Key-slot System Column Cover manufactured by Pittcon Industries, 6409 Rhode Island Ave, Riverdale, MD 20737 301-927-1000
   2. **Metalwerks, 1-800-321-7816 - basis of design, the intent is to match existing covers on Building D.**
   3. Or comparable product, submit options for approval 10 work days prior to bid date.

B. Form column covers to shapes indicated from metal of type and minimum thickness indicated below. Return vertical edges and bend to form hook that engages mounting post.

C. Manufacturer shall supply all framing no less than 16ga steel, along with horizontal brackets and mounting feet as a complete package for installation.
   1. Aluminum Sheet: ASTM B209 (ASTM B209M), with not less than strength and durability properties of Alloy 3003 H14, 0.125 inch thick.
      a. Finish: Coraflon Fluoropolymer Paint 2-Coat by PPG Industries or approved equal.

2. Increase metal thickness or reinforce with concealed stiffeners, backing materials, or both, as needed to provide flat surfaces where indicated.
3. Support joints with concealed stiffeners as needed to hold exposed faces of adjoining sheets in flush alignment.
4. Form returns at vertical joints to provide hairline V-joints.
5. Fabricate ¾" top reveal.
6. Factory cut bottom of column cover to slope indicated on architectural drawings. Slope cuts to be field verified.
7. Installer to field verify all dimensions prior to fabrication.

## 2.02 MISCELLANEOUS MATERIALS

A. Fasteners: Fabricated from same basic metal and alloy as fastened metal unless otherwise indicated. Do not use metals that are incompatible with materials joined. Provide bond breaker material between dissimilar material.
   1. Provide concealed fasteners for interconnecting column covers and for attaching them to other work unless exposed fasteners are unavoidable or are the standard fastening method.
   2. Provide all clips, fastening components, sub-framing as required for full installation job conditions.

## 2.03 PAINTS AND COATINGS

A. Coraflon Fluoropolymer Paint 2-Coat by PPG Industries or equal as approved by architect.

## 2.04 FABRICATION

A. Coordinate dimensions and attachment methods of column covers with those of adjoining construction to produce integrated assemblies with closely fitting joints and with edges and surfaces aligned unless otherwise indicated.

B. Form Column Covers to profiles indicated on architectural drawings, in maximum lengths to minimize horizontal joints.

C. Column covers shall be fabricated in single length heights of 12'0" without horizontal joints.

D. Column covers shall be formed to specific dimensions and tolerances and accurately formed to radii shown on drawings.

## 2.05 GENERAL FINISH REQUIREMENTS

A. Complete mechanical finishes of flat sheet metal surfaces before fabrication where possible. After fabrication, finish all joints, bends, abrasions, and other surface blemishes to match sheet finish.

B. Apply finishes to formed metal after fabrication unless otherwise indicated.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## 2.06 ALUMINUM FINISHES

A. Custom Color:
   1. To match aluminum storefront framing system

B. PPG Coraflon ADS : AAMA 2605 except with a minimum dry film thickness of 1.5 – 2.2 mils. Comply with coating manufacturer's written instructions for cleaning, coating, and applying and finish.

1. Color and Gloss: Match Architect's sample.
2. Liquified touch up paint.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of column covers.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

C. Contractor shall verify all job conditions and dimensions prior to ordering materials and preparing shop drawings.

### 3.02 INSTALLATION

A. Locate and place column covers plumb and in alignment with adjacent construction. Perform cutting, drilling, and fitting required to install column covers.

B. Do not cut or abrade finishes that cannot be completely restored in the field. Return items with such finishes to the shop for required alterations, followed by complete refinishing, or provide new units as required.

C. Use concealed anchorages where possible.

D. Form tight joints with exposed connections accurately fitted together.

E. Provide 1/4” to 3/8” joints between aluminum column covers and adjacent materials per section 07900 Joint Sealers. Provide backer rod and sealant.

### 3.03 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean abraded areas of shop paint and paint exposed areas with the same material as used for shop painting.

B. Apply brush or spray application to provide a minimum 1.5 - 2.2-mil dry film thickness.

C. Restore finishes damaged during installation and construction period so no evidence remains of correction work. Return items that cannot be refinished in the field to the shop; make required alterations and refinish entire unit or provide new units.

### 3.04 PROTECTION

A. Protect finishes from damage during construction period. Remove temporary protective coverings at time of Substantial Completion.

**END OF SECTION**

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# SECTION 05 7311
# DECORATIVE METAL RAILINGS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Stainless Steel Railing and handrail assemblies.

B. Stainless Steel: Metal railings.

### 1.02 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

B. ASTM A276/A276M - Standard Specification for Stainless Steel Bars and Shapes; 2017.

C. ASTM A554 - Standard Specification for Welded Stainless Steel Mechanical Tubing; 2021.

D. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.

E. ASTM A780/A780M - Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings; 2020.

F. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020.

G. AWS D1.6/D1.6M - Structural Welding Code - Stainless Steel; 2017.

### 1.03 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Schedule and conduct a preinstallation meeting one week before starting work of this section. Attendees shall include, but not be limited to:
   1. Contractor.
   2. Manufacturer's representative.
   3. Architect.
   4. Owner's representative.
   5. Other subcontractors of adjacent work.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Submit manufacturer's product data, including description of materials, components, and finishes.

C. Samples: Submit one (1) of each item below for each type and condition shown.
   1. Railing: 12-inch (305 mm) long section of handrail showing color, finish and connection detail.

D. Manufacturer's qualification statement.

E. Installer's qualification statement.

F. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

### 1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with not less than 5 years of documented experience.

B. Installer Qualifications: Company specializing in installing decorative railing systems and acceptable to manufacturer.

### 1.06 MOCK-UPS

A. See Section 01 4000 - Quality Requirements for additional requirements.

B. Provide mock-up of railing system, freestanding center rail, and wall-mounted handrail, 4 feet (____ m) long by ____ feet (____ m) wide, indicating each type of material, cladding, and finish.

C. Mock-up may remain as part of the work.

### 1.07 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in factory-provided protective coverings and packaging.

B. Protect materials against damage during transit, delivery, storage, and installation at site.

C. Inspect materials upon delivery for damage. Replace damaged items.

D. Prior to installation, store materials and components under cover in a dry location.

### 1.08 FIELD CONDITIONS

A. Do not install railings until project ambient temperature of space is minimum 65 degrees F (18.3 degrees C) and maximum 95 degrees F (35 degrees C).

B. Maintain ambient temperature of space at minimum 65 degrees F (18.3 degrees C) and maximum 95 degrees F (35 degrees C) for 24 hours before, during, and after railing installation.

### 1.09 WARRANTY

A. Warranty: Manufacturer's standard one-year warranty against defects in materials, fabrication, finishes, and installation commencing on Date of Substantial Completion.

## PART 2 PRODUCTS

### 2.01 MANUFACTURER

A. Viva Railings, LLC: 151 W. Vista Ridge Mall Drive, Lewisville, TX 75067. 972-353-8482. www.vivarailings.com/#sle. or approved equal, as approved by addendum. **The design intent is to match the exterior SS railings provided in Phase 3 at Buildings A,B,C and D.**

B. Substitutions: See o1 3000 Adminisrative Proceedures

C. Approved equals:
   1. CSI Architectural Metlas

### 2.02 RAILING SYSTEMS, GENERAL

A. Factory- or shop-fabricate to suit project conditions, for proper connection to building structure, and in largest practical sizes for delivery to site.

B. Handrails: Comply with applicable accessibility requirements of ADA Standards.

C. Joints: Tightly fitted and secured, machined smooth with hairline seams.

D. Field Connections: Provide sleeves, anchors, and other devices required for site assembly and installation.

E. Welded Joints: Make visible joints butt tight, flush, and hairline; use methods that avoid discoloration and damage of finish; grind smooth, polish, and restore to required finish.

### 2.03 METAL RAILINGS - REFER TO DRAWINGS

A. Metal Railing: Schedule 40- Stainless Steel Engineered, post-supported railing system with cable infill.
   1. Product:

a. Viva Railings, LLC; CIRCA: www.vivarailings.com/#sle.Stainless steel.or approved equal.

2. End and Intermediate Posts: Stainless Steel; configuration shown on drawings.
3. Top Rail and Hand Rail: Round, Stainless Steel, ___-inch (___ mm) diameter. see drawings
4. Infill: Manufacturer's vertical supports Stainless Steel., see drawings.
5. Infill: Manufacturer's cable , see drawings.

**2.04 MATERIALS AND FINISHES**

A. Stainless Steel Components:
1. ASTM A666/A666M, Type 304 or Type 316.
2. Stainless Steel Tubing: ASTM A554, Type 304 or Type 316.
3. Stainless Steel Bars, Shapes, and Moldings: ASTM A276/A276M, Type 304 or Type 316.
4. Stainless Steel Finish: No.6 Satin.

**2.05 ACCESSORIES**

A. Anchors and Fasteners: Provide anchors and other materials as required to attach to structure, made of same materials as railing components unless otherwise indicated; where exposed fasteners are unavoidable, provide flush countersunk fasteners.
1. For anchorage to concrete, provide inserts to cast into concrete for bolt anchors.
2. For anchorage to masonry, provide brackets to embed in masonry for bolt anchors.
3. Exposed Fasteners: No exposed bolts or screws.

B. Finish Touch-Up Materials: As recommended by manufacturer for field application.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

A. Verify that substrate and site conditions are acceptable and ready to receive work.

B. Verify field dimensions of locations and areas to receive work.

C. Notify Architect immediately of conditions that would prevent satisfactory installation.

D. Do not proceed with work until detrimental conditions have been corrected.

E. Furnish components to be installed in other work to installer of that other work, including but not limited to blocking, sleeves, inserts, anchor bolts, embedded plates, and supports for attachment of anchors.

**3.02 PREPARATION**

A. Protect existing work.

B. Review installation drawings before beginning installation. Coordinate diagrams, templates, instructions, and directions for installation of anchorages and fasteners.

C. Clean surfaces to receive units. Remove materials and substances detrimental to the installation.

**3.03 INSTALLATION**

A. Use manufacturer's approved installer.

B. Comply with manufacturer's drawings and written instructions.

C. Install components plumb and level, accurately fitted, free from distortion or defects, and with tight joints, except where necessary for expansion.

D. Make exposed joints butt tight, flush, and hairline. Ease exposed edges to small uniform radius.

E. Anchor securely to structure.

F. Conceal anchor bolts and screws whenever possible. Where not concealed, use flush countersunk fastenings.

G. Weld connections that cannot be shop welded due to size limitations.
   1. Weld in accordance with AWS D1.1/D1.1M.
   2. Weld stainless steel in accordance with AWS D1.6/D1.6M.
   3. Match shop welding and bolting.
   4. Clean welds, bolted connections, and abraded areas.
   5. Touch up shop primer and factory-applied finishes.
   6. Repair galvanizing with galvanizing repair paint in accordance with ASTM A780/A780M.

H. Isolate dissimilar materials with bituminous coating, bushings, grommets, or washers to prevent electrolytic corrosion.

**3.04 TOLERANCES**

A. Maximum Variation From Plumb: 1/4 inch (6 mm) per floor level, noncumulative.

B. Maximum Offset From True Alignment: 1/4 inch (6 mm).

C. Maximum Out-of-Position: 1/4 inch (6 mm).

**3.05 FIELD QUALITY CONTROL**

A. Field Services: Provide the services of the manufacturer for field observation of installation of railings.

**3.06 CLEANING**

A. Metal: Clean exposed metal finishes with potable water and mild detergent, in accordance with manufacturer recommendations; do not use abrasive materials or chemicals, detergents, or other substances that may damage the material or finish.

**3.07 PROTECTION**

A. Repair damage to exposed finishes to be indistinguishable from undamaged areas.
   1. If damage to finishes and components cannot be repaired to be indistinguishable from undamaged finishes and components, replace damaged items.

**END OF SECTION**

# SECTION 06 1000
# ROUGH CARPENTRY

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Structural dimension lumber framing.

B. Non-structural dimension lumber framing.

C. Rough opening framing for doors, windows, and roof openings.

D. Concealed blocking for miscellaneous items.

E. Preservative treated wood materials.

F. Fire retardant treated wood materials.

G. Cabinetry.

H. Miscellaneous framing and sheathing.

I. Communications and electrical room mounting boards.

J. Concealed wood blocking, nailers, and supports.

K. Miscellaneous wood nailers, furring, and grounds.

### 1.02 RELATED REQUIREMENTS

A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 05 1200 - Structural Steel Framing: Prefabricated beams and columns for support of wood framing.

C. Section 05 5000 - Metal Fabrications: Miscellaneous steel connectors and support angles for wood framing.

D. Section 05 4000 - Cold Form Metal Framing

E. Section 07 2726 - Fluid Applied Membrane Air Barriers.

F. Section 07 6200 - Sheet Metal Flashing and Trim.

G. Section 09 2116 - Gypsum Board Assemblies: Gypsum-based sheathing.

### 1.03 REFERENCE STANDARDS

A. ANSI A208.1 - American National Standard for Particleboard; 2022.

B. AWC (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings; 2024, with Errata.

C. AFPA (WFCM) - Wood Frame Construction Manual for One- and Two-Family Dwellings; American Forest and Paper Association; 2012.

D. ASTM A153/A153M - Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware; 2023.

E. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.

F. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2021.

G. ASTM D2898 - Standard Practice for Accelerated Weathering of Fire-Retardant-Treated Wood for Fire Testing; 2010 (Reapproved 2024).

H. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.

I. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2021.

J. AWPA U1 - Use Category System: User Specification for Treated Wood; 2021.

K. PS 1 - Structural Plywood; 2023.

L. PS 20 - American Softwood Lumber Standard; 2025.

M. SPIB (GR) - Grading Rules; 2014.

N. WCLIB (GR) - Standard Grading Rules for West Coast Lumber No. 17; 2018.

O. WWPA G-5 - Western Lumber Grading Rules; 2021.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide technical data on wood preservative materials and application instructions.

C. Structural Composite Lumber: Submit manufacturer's published structural data including span tables, marked to indicate which sizes and grades are being used; if structural composite lumber is being substituted for dimension lumber or timbers, submit grading agency structural tables marked for comparison.

D. Samples: For rough carpentry members that will be exposed to view, submit two samples, ____by____ inch (____by____ mm) in size illustrating wood grain, color, and general appearance.

E. Manufacturer's Certificate: Certify that wood products supplied for rough carpentry meet or exceed specified requirements.

F. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

### 1.05 DELIVERY, STORAGE, AND HANDLING

A. General: Cover wood products to protect against moisture. Support stacked products to prevent deformation and to allow air circulation.

B. Fire Retardant Treated Wood: Prevent exposure to precipitation during shipping, storage, or installation.

### 1.06 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion.

## PART 2 PRODUCTS

### 2.01 GENERAL REQUIREMENTS

A. Dimension Lumber: Comply with PS 20 and requirements of specified grading agencies.
   1. Species: Southern Pine, unless otherwise indicated.
   2. If no species is specified, provide any species graded by the agency specified; if no grading agency is specified, provide lumber graded by any grading agency meeting the specified requirements.

3. Grading Agency: Any grading agency whose rules are approved by the Board of Review, American Lumber Standard Committee (www.alsc.org) and who provides grading service for the species and grade specified; provide lumber stamped with grade mark unless otherwise indicated.

**2.02 DIMENSION LUMBER FOR CONCEALED APPLICATIONS**

A. Grading Agency: Southern Pine Inspection Bureau, Inc; SPIB (GR).

B. Sizes: Nominal sizes as indicated on drawings, S4S.

C. Moisture Content: S-dry or MC19.

D. Stud Framing (2 by 2 through 2 by 6 (50 by 50 mm through 50 by 150 mm) ):
   1. Species: Douglas Fir-Larch or Spruce, Pine, Fir (South)
   2. Grade: No. 2.

E. Joist, Rafter, and Small Beam Framing (2 by 6 through 4 by 16 (50 by 150 mm through 100 by 400 mm) ):
   1. Species: Southern Pine.
   2. Grade: No. 2.

F. Miscellaneous Framing, Blocking, Nailers, Grounds, and Furring:
   1. Lumber: S4S, No. 2 or Standard Grade.
   2. Boards: Standard or No. 3.
   3. LVL beams: Refer to drawings

**2.03 EXPOSED DIMENSION LUMBER**

A. Grading Agency: Southern Pine Inspection Bureau, Inc; SPIB (GR).

B. Grading Agency: West Coast Lumber Inspection Bureau; WCLIB (GR).

C. Grading Agency: Western Wood Products Association; WWPA G-5.

D. Sizes: Nominal sizes as indicated on drawings.

E. Surfacing: S4S.

F. Sizes: Nominal sizes as indicated on drawings, S4S.

G. Moisture Content: S-dry or MC19.

**2.04 CONSTRUCTION PANELS**

A. Communications and Electrical Room Mounting Boards: PS 1 A-D plywood, or medium density fiberboard; 3/4 inch (19 mm) thick; flame spread index of 25 or less, smoke developed index of 450 or less, when tested in accordance with ASTM E84.

**2.05 ACCESSORIES**

A. Fasteners and Anchors:
   1. Metal and Finish: Hot-dipped galvanized steel complying with ASTM A153/A153M for high humidity and preservative-treated wood locations, unfinished steel elsewhere. Provide proof of long term compatability with fire retardant treatment.

B. Die-Stamped Connectors: Hot dipped galvanized steel, sized to suit framing conditions. Provide proof of long term compatability with fire retardant treatment. Equal to simpson.

C. Joist Hangers: Hot dipped galvanized steel, sized to suit framing conditions. Equal to Simpson.

### 2.06 FACTORY WOOD TREATMENT

A. Treated Lumber and Plywood: Comply with requirements of AWPA U1 - Use Category System for wood treatments determined by use categories, expected service conditions, and specific applications.
   1. Fire-Retardant Treated Wood: Mark each piece of wood with producer's stamp indicating compliance with specified requirements.
   2. Preservative-Treated Wood: Provide lumber and plywood marked or stamped by an ALSC-accredited testing agency, certifying level and type of treatment in accordance with AWPA standards.

B. Fire Retardant Treatment:
   1. Manufacturers:
      a. Arch Wood Protection, Inc; ____: www.wolmanizedwood.com/#sle.
      b. Hoover Treated Wood Products, Inc; ____: www.frtw.com/#sle.
      c. Koppers, Inc; ____: www.koppers.com/#sle.
   2. Interior Type A: AWPA U1, Use Category UCFA, Commodity Specification H, low temperature (low hygroscopic) type, chemically treated and pressure impregnated; capable of providing a maximum flame spread index of 25 when tested in accordance with ASTM E84, with no evidence of significant combustion when test is extended for an additional 20 minutes.
      a. Kiln dry wood after treatment to a maximum moisture content of 19 percent for lumber and 15 percent for plywood.
      b. Treat rough carpentry items as indicated .
      c. Do not use treated wood in applications exposed to weather or where the wood may become wet.

C. Preservative Treatment:
   1. Manufacturers:
      a. Arch Wood Protection, Inc; ____: www.wolmanizedwood.com/#sle.
      b. Viance, LLC; ____: www.treatedwood.com.
      c. Osmose, Inc: www.osmose.com.
   2. Preservative Pressure Treatment of Lumber Above Grade: AWPA U1, Use Category UC3B, Commodity Specification A using waterborne preservative.
      a. Kiln dry lumber after treatment to maximum moisture content of 19 percent.
      b. Treat lumber in contact with roofing, flashing, or waterproofing.
      c. Treat lumber in contact with masonry or concrete.
      d. Treat lumber less than 18 inches (450 mm) above grade.

## PART 3 EXECUTION

### 3.01 PREPARATION

A. Where wood framing bears on cementitious foundations, install full width sill flashing continuous over top of foundation, lap ends of flashing minimum of 4 inches (100 mm) and seal.

B. Coordinate installation of rough carpentry members specified in other sections.

### 3.02 INSTALLATION - GENERAL

A. Select material sizes to minimize waste.

B. Reuse scrap to the greatest extent possible; clearly separate scrap for use on site as accessory components, including: shims, bracing, and blocking.

C. Where treated wood is used on interior, provide temporary ventilation during and immediately after installation sufficient to remove indoor air contaminants.

**3.03 FRAMING INSTALLATION**

A. Set structural members level, plumb, and true to line. Discard pieces with defects that would lower required strength or result in unacceptable appearance of exposed members.

B. Make provisions for temporary construction loads, and provide temporary bracing sufficient to maintain structure in true alignment and safe condition until completion of erection and installation of permanent bracing.

C. Install structural members full length without splices unless otherwise specifically detailed.

D. Comply with member sizes, spacing, and configurations indicated, and fastener size and spacing indicated, but not less than required by applicable codes, AWC (WFCM) Wood Frame Construction Manual, and _____.

E. Construct double joist headers at floor and ceiling openings and under wall stud partitions that are parallel to floor joists; use metal joist hangers unless otherwise detailed.

F. Provide bridging at joists in excess of 8 feet (2.3 m) span as detailed. Fit solid blocking at ends of members.

G. Frame wall openings with two or more studs at each jamb; support headers on cripple studs.

**3.04 BLOCKING, NAILERS, AND SUPPORTS**

A. Provide framing and blocking members as indicated or as required to support finishes, fixtures, specialty items, and trim.

B. In framed assemblies that have concealed spaces, provide solid wood fireblocking as required by applicable local code, to close concealed draft openings between floors and between top story and roof/attic space; other material acceptable to code authorities may be used in lieu of solid wood blocking.

C. In walls, provide blocking attached to studs as backing and support for wall-mounted items, unless item can be securely fastened to two or more studs or other method of support is explicitly indicated.

D. Where ceiling-mounting is indicated, provide blocking and supplementary supports above ceiling, unless other method of support is explicitly indicated.

E. Specifically, provide the following non-structural concealed fire retardant framing and blocking:
   1. Cabinets and shelf supports.
   2. Wall brackets.
   3. Handrails.
   4. Grab bars.
   5. Toilet and bath accessories/Toilet partitions.
   6. Wall-mounted door stops.
   7. Chalkboards and marker boards.
   8. Wall paneling and trim.
   9. Interior ceiling and wall treatments.
   10. Joints of rigid wall coverings that occur between studs.
   11. Interior Wall Plaques.
   12. Mirror attachment clips.
   13. Acoustical Wall Panels.
   14. Audio/Visual Equipment.

15. Electrical Equipment/Fixtures/Panels.
16. Mechanical.
17. Plumbing Equipment/Fixtures.
18. Fire Extinguisher cabinets.
19. Medical wall mounted equipment
20. Food Service wall mounted equipment
21. Audio Visual wall mounted Equipment

### 3.05 ROOF-RELATED CARPENTRY

A. Coordinate installation of roofing carpentry with deck construction, framing of roof openings, and roofing assembly installation.

B. Provide wood curb at all roof openings except where prefabricated curbs are specified and where specifically indicated otherwise. Form corners by alternating lapping side members.

### 3.06 INSTALLATION OF CONSTRUCTION PANELS

A. Provide 3/4 " thick Fire Retardant Plywood between metal studs and at all wall mounted Food Service Equipment, Audio Visual Equipment, and other Equipment as noted.. Face of plywood to be flush with metal stud. Secure to metal studs with appropriate size and type screws. Add finishes as shown on finish schedule.

B. Roof Sheathing: Secure panels with long dimension perpendicular to framing members, with ends staggered and over firm bearing.
   1. At long edges provide solid edge blocking where joints occur between roof framing members, only where indicated on drawings.
   2. Nail panels to framing; staples are not permitted. Refer to drawings,

C. Ceiling Sheathing: Secure with long dimension perpendicular to wall studs, with ends over firm bearing and staggered, using nails or screws. Provide 2x by all areas required by job conditions and finish ceiling requirements.

D. Communications and Electrical Room Mounting Boards: Secure with screws to studs with edges over firm bearing; space fasteners at maximum 24 inches (610 mm) on center on all edges and into studs in field of board.
   1. At fire-rated walls, install board over wall board indicated as part of the fire-rated assembly.
   2. Where boards are indicated as full floor-to-ceiling height, install with long edge of board parallel to studs.
   3. Install adjacent boards without gaps.
   4. Size and Location: As indicated on drawings.

### 3.07 TOLERANCES

A. Framing Members: 1/4 inch (6 mm) from true position, maximum.

B. Variation from Plane (Other than Floors): 1/4 inch in 10 feet (2 mm/m) maximum, and 1/4 inch in 30 feet (7 mm in 10 m) maximum.

### 3.08 CLEANING

A. Waste Disposal:
   1. Comply with applicable regulations.
   2. Do not burn scrap on project site.
   3. Do not burn scraps that have been pressure treated.
   4. Do not send materials treated with pentachlorophenol, CCA, or ACA to co-generation facilities or “waste-to-energy” facilities.

B. Do not leave any wood, shavings, sawdust, etc. on the ground or buried in fill.

C. Prevent sawdust and wood shavings from entering the storm drainage system.

**END OF SECTION**

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# SECTION 06 4100
# ARCHITECTURAL PLASTIC LAMINATE CASEWORK

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Specially fabricated cabinet units.

B. Cabinet hardware.

C. Preparation for installing utilities.

### 1.02 RELATED REQUIREMENTS

A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 06 1000 - Rough Carpentry: Support framing, grounds, and concealed blocking.

C. Section 12 3600 - Countertops.

### 1.03 REFERENCE STANDARDS

A. ANSI A208.1 - American National Standard for Particleboard; 2009.

B. ANSI A208.2 - American National Standard for Medium Density Fiberboard for Interior Use; 2009.

C. BHMA A156.9 - American National Standard for Cabinet Hardware; Builders Hardware Manufacturers Association; 2010 (ANSI/BHMA A156.9).

D. GSA CID A-A-1936 - Adhesive, Contact, Neoprene Rubber; Federal Specifications and Standards; Revision A, 1996.

E. NEMA LD 3 - High-Pressure Decorative Laminates; National Electrical Manufacturers Association; 2005.

### 1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene a preinstallation meeting not less than one week before starting work of this section; require attendance by all affected installers.

### 1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate materials, component profiles, fastening methods, jointing details, and accessories. Provide 1/2" scaled floor plans, elevations, and 1 1/2" scaled sections of all cabinets.
   1. Minimum Scale of Detail Drawings: 1-1/2 inch to 1 foot (1:8).

C. Samples: Submit actual samples of architectural cabinet construction, minimum 12 inches (300 mm) square, illustrating proposed cabinet, Drawer, door, and shelf unit substrate and finish.

D. Samples: Submit actual sample items of proposed pulls, hinges, shelf standards, and locksets, demonstrating hardware design, quality, and all finishes and project colors. Provide as part of 1.05 C.

### 1.06 QUALITY ASSURANCE

A. Fabricator Qualifications: Company specializing in fabricating the products specified in this section with minimum five years of documented experience.
   1. Company with at least one project in the past 3 years with value of woodwork within 20 percent of cost of Plastic Laminate Casework work for this Project.

2. Warranty 5 year, life time unlimited warranty for original owner. Casework to be installed by manufacturer.

**1.07 DELIVERY, STORAGE, AND HANDLING**

A. Protect units from moisture damage.

**1.08 FIELD CONDITIONS**

A. During and after installation of custom cabinets, maintain temperature and humidity conditions in building spaces at same levels planned for occupancy.

B. Verify all project conditions prior to fabrication.

C. Coordinate with all trades.

**PART 2 PRODUCTS**

**2.01 CABINETS**

A. Plastic Laminate Faced Cabinets: equal to Case System, basis of design. Provide custom cabinets where manufacturer's standard is not available. Substitutions per specifications.

B. Cabinets at _____:
   1. Finish - Exposed Exterior Surfaces: Decorative laminate.
   2. Finish - Exposed Interior Surfaces: Decorative laminate.
   3. Finish - Concealed Surfaces: Manufacturer's cabinet liner unless noted otherwise.
   4. Door and Drawer Front Edge , : 3 mm thick, factory adhered PVC edging.
   5. Cabinet Body, Shelves, drawer box, and sub drawer front Edges: 1 mm thick PVC edging
   6. Casework Construction Type: Frameless.
   7. Cabinet Design Series: As indicated on drawings.
   8. Adjustable Shelf Loading: 50 lbs. per sq. ft..
      a. Deflection: L/144. 3/4" thick for sheves under 33" wide, 1" thick for shelves over 33" wide.
   9. Cabinet Style: Flush overlay.
   10. Cabinet Doors and Drawer Fronts: Flush style.
   11. Drawer Construction: Provide a four sided drawer box made of 1/2 inch thick industrial particle board ; finish same as semi exposed. Drawer box may be 1/2" birch or oak finished natural. Provide dovetailed or doweled and glued joints and 1/2 inch thick mechanically fastened bottom. Provide Plastic laminate drawer front with thermally fused 3 MM PVC edging. Blind screw front of drawer box into plastic laminate drawer face.
   12. Provide matching filler ends as required.

**2.02 LAMINATE MATERIALS, SEE FINISH SCHEDULE**

A. Manufacturers:
   1. Formica Corporation; ____: www.formica.com.
   2. Panolam Industries International, Inc; ____: www.nevamar.com.
   3. Wilsonart, LLC; ____: www.wilsonart.com.
   4. Substitutions: See Section 01 6000 - Product Requirements.

B. Thermally Fused Laminate (TFL): NEMA LD 3, Type VGL laminate panels.

C. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications.

D. Provide specific types as scheduled.

1. Horizontal Surfaces unless noted otherwise: HGS HDPL, 0.048 inch (1.22 mm) nominal minimum thickness, colors as scheduled, finish as scheduled. If plastic laminate tops are shown on the drawings, provide as a part of this section with 1 1/4-inch thick minimum MDF or industrial partical board, .048-inch laminate top 3 mm pvc edge, .020-inch backer board.
2. Vertical Surfaces and all exposed surfaces: VGS HDPL , 0.028 inch (0.71 mm) nominal **minimum** thickness, colors as scheduled, finish as scheduled.
3. Cabinet and drawer Liner: CLS, 0.020 inch (0.51 mm) nominal thickness, through color, colors as scheduled, finish as scheduled. White
4. Laminate Backer: BKL, 0.020 inch (0.51 mm) nominal thickness, undecorated; for application to concealed backside of panels faced with high pressure decorative laminate.

**2.03 ACCESSORIES**

A. Adhesive: Type recommended by fabricator to suit application.

B. Plastic Edge Banding: Extruded PVC, flat shaped; smooth finish; of width to match component thickness. Factory thermally fused,

C. Color: As selected by Architect from manufacturer's standard range.

D. Bolts, Nuts, Washers, Lags, Pins, and Screws: Of size and type to suit application; galvanized or chrome-plated finish in concealed locations and stainless steel or chrome-plated finish in exposed locations.

E. Concealed Joint Fasteners: Threaded steel.

F. Grommets: Standard plastic, painted metal, or rubber grommets for cut-outs, in color to match adjacent surface.

**2.04 HARDWARE**

A. Hardware: BHMA A156.9, types as recommended by fabricator for quality grade specified.

B. Adjustable Shelf Supports: Standard side-mounted system using multiple holes for pin supports and coordinated self rests, polished chrome finish, for nominal 1 inch (25 mm) spacing adjustments.

C. Drawer and Door pulls to be 4" Aluminum or Steel wire pulls, 8 mm. Color as selected by architect. Provide 5 colors minimum selection including black.

D. Hinges (grade 1) to be steel reveal overlay 5 knuckle .095" thick , with 9, #8 stainless steel screws, .187 dia. pin. To permit door open to 170 degrees. Doors under 48" to have two hinges. Doors over 48" to have 3 hinges. Color as selected by architect. European concealed hinges will be rejected. Provider 5 colors minimum selection including black.

E. Cabinet Locks: Keyed cylinder, two keys per lock, master keyed, steel with olor as selected by architect. Refer to drawings for location. Color as selected by architect including black.

F. Drawer Slides: Side mounted Full Extension soft closing type.
   1. 100 lb. load graded, 150 lb. loaded for lateral file drawers. Finish to be zinc coated , roller bearing.

G. Pilaster Standards and shelf clips for adjustable shelves injection molded plastic .

**2.05 FABRICATION**

A. Assembly: Shop assemble cabinets for delivery to site in units easily handled and to permit passage through building openings.

B. Edging: Fit shelves, doors, and exposed edges with specified edging. Do not use more than one piece for any single length.

C. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.

D. Plastic Laminate: Apply plastic laminate finish in full uninterrupted sheets consistent with manufactured sizes. Fit corners and joints hairline; secure with concealed fasteners. Slightly bevel arises. Locate counter butt joints minimum 2 feet (600 mm) from sink cut-outs.
   1. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.

E. Provide cutouts for plumbing fixtures. Verify locations of cutouts from on-site dimensions. Seal cut edges.

F. The architectural casework wood contractor shall coordinate their manufacturing and installation to accomodate the plumbing, mechanical, elecrical, and countertops for all rquirements to complete the project installation to include but not limited to sinks, pipes, conduit, troughs, overflows, neutralization cartridges, traps, umbilicals, fixtures, switches, outltets, tombstone outlets, receptacles, etc. as specified and or shown on contract documents. Job verify all wall and floor conditions prior to fabrication; make adjustments per architects prior written approval.`

**2.06 MANUFACTURERS/PRODUCTS:**

A. Acceptable Products:
   1. Case Systems
   2. TMI Systems
   3. Columbus Cabinets, Columbus, Ga.
   4. Alco - Montgomery AL - 334-264-3938
   5. Stevens Industries
   6. Varner Cabinets - Montgomery,AL
   7. Substitutions: See 01 6000 - Product Requirements

**2.07 FIRE RETARDANT TREATED MATERIALS**

A. Fire-Retardant-Treated Materials, General: Where fire-retardant-treated materials are indicated, use materials that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing indentical products per test method indicated by a qualified testing agency.
   1. Use treated materials that comply with requirements of referenced quality standard. Do not use materials that are warped, discolored, or otherwise defective.
   2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
   3. Identify fire-retardant-treated materials with appropriate classification marking of qualified testing agency in the form of removable paper label or imprint on surfaces that will be concealed from view after installation.

B. Fire-Retardant-Treated Lumber and Plywood: Products with a flame-spread index of 25 or less when tested according to ASTM E84, with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet beyond the centerline of the burners at any time during the test.
   1. Kiln-dry lumber and plywood after treatment to a maximum moisture content of 19 and 15 percent, respectively.
   2. For items indicated to receive a stained or natural finish, use organic resin chemical formulation.

C. Fire-Retardant Fiberboard: MDF panels complying with ANSI A208.2, made from softwood fibers, synthetic resins, and fire-retardant chemicals mixed together at time of panel manufacture to achieve flame-spread index of 25 or less and smoke-developed index of 200 or less per ASTM.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify adequacy of backing and support framing.

B. Verify location and sizes of utility rough-in associated with work of this section.

C. Verify all existing conditions.

### 3.02 INSTALLATION

A. Set and secure custom cabinets in place, assuring that they are rigid, plumb, and level.

B. Use fixture attachments in concealed locations for wall mounted components.

C. Use concealed joint fasteners to align and secure adjoining cabinet units.

D. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch (1 mm). Do not use additional overlay trim for this purpose.

E. Secure cabinets to floor using appropriate angles and anchorages.

F. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

### 3.03 ADJUSTING

A. Adjust installed work.

B. Adjust moving or operating parts to function smoothly and correctly.

### 3.04 CLEANING

A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

**END OF SECTION**

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# SECTION 06 8316
# FIBERGLASS REINFORCED PANELING

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Fiberglass reinforced plastic panels.

B. Trim.

### 1.02 RELATED REQUIREMENTS

A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 042000 - Unit Masonry

C. Section 09 6513 - Resilient Base

### 1.03 REFERENCE STANDARDS

A. 9 CFR 416.2 - Regulatory Requirements Under the Federal Meat Inspection Act and the Poultry Products Inspection Act, Part 416-Sanitation; current edition.

B. ASTM D256 - Standard Test Methods for Determining the Izod Pendulum Impact Resistance of Plastics; 2010 (Reapproved 2018).

C. ASTM D2583 - Standard Test Method for Indentation Hardness of Rigid Plastics by Means of Barcol Impressor; 2013a.

D. ASTM D3273 - Standard Test Method for Resistance to Growth of Mold on the Surface of Interior Coatings in an Environmental Chamber; 2016.

E. ASTM D5319 - Standard Specification for Glass-Fiber Reinforced Polyester Wall and Ceiling Panels; 2012.

F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.

G. FDA Food Code - Chapter 6 - Physical Facilities; current edition with Supplements, if any.

H. FM 4880 - Evaluating the Fire Performance of Insulated Building Panel Assemblies and Interior Finish Materials; 2017.

I. ISO 846 - Plastics - Evaluation of the Action of Microorganisms; 1997.

J. ISO 2812-1 - Paints and Varnishes - Determination of resistance to liquids - Part 1: Immersion in liquids; 2007.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; including sizes, patterns and colors available; and installation instructions.

C. Samples: Submit two samples ____by____ inch (____x____ mm) in size illustrating material and surface design of panels.

D. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.

### 1.05 DELIVERY, STORAGE, AND HANDLING

A. Store panels flat, indoors, on a clean, dry surface. Remove packaging and allow panels to acclimate to room temperature for 48 hours prior to installation.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. Fiberglass Reinforced Plastic Panels:
   1. Crane Composites, Inc; _____: www.cranecomposites.com/#sle.
   2. Marlite, Inc; _____: www.marlite.com/#sle.
   3. Nudo Products, Inc; _____: www.nudo.com/#sle.
   4. Substitutions: See Section 01 6000 - Product Requirements.

### 2.02 PANEL SYSTEMS

A. Wall Panels:
   1. Panel Size: 4 by 10 feet (1.2 by 3.0 m).
   2. Panel Thickness: 0.09 inch (2.3 mm).
   3. Surface Design: Embossed.
   4. Color: As selected by Architect.
   5. Attachment Method: Adhesive only, with trim and sealant in joints.

### 2.03 MATERIALS

A. Panels: Fiberglass reinforced plastic (FRP), complying with ASTM D5319.
   1. Surface Burning Characteristics: Maximum flame spread index of 25 and smoke developed index of 450; when system tested in accordance with ASTM E84.
   2. Mold Resistance: Score of 10, when tested in accordance with ASTM D3273.
   3. Sanitation and Cleanability: Comply with 9 CFR 416.2.
   4. Chemical Cleanability: Excellent chemical resistance to common cleaners and detergents when tested in accordance with ISO 2812-1.

B. Trim: Vinyl; color coordinating with panel.

C. Adhesive: Type recommended by panel manufacturer for flooring specified. .

D. Sealant: Type recommended by panel manufacturer; white.

E. Provide all fasteners and accessories for full and complete installation of sani cove base.

F. Provide premade corners at all 90 degree corners.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify existing conditions and substrate flatness before starting work.

B. Verify that substrate conditions are ready to receive the work of this section.

C. Verify that layout of hangers will not interfere with other work; make adjustments in layout as necessary.

D. Do not begin ceiling installation until services above ceiling are complete except for final trim

### 3.02 INSTALLATION - WALLS

A. Install panels in accordance with manufacturer's instructions. Coordinate fit between FRP Wall Panels and sani cove base where applicable.

B. Cut and drill panels with carbide tipped saw blades, drill bits, or snips.

C. Pre-drill fastener holes in panels, 1/8 inch (3.2 mm) greater in diameter than fastener, spaced as indicated by panel manufacturer.

D. Apply adhesive to the back side of the panel using trowel as recommended by adhesive manufacturer.

E. Apply panels to wall with seams plumb and pattern aligned with adjoining panels.
F. Install panels with manufacturer's recommended gap for panel field and corner joints.
G. Place trim on panel before fastening edges, as required.
H. Fill channels in trim with sealant before attaching to panel.
I. Install trim with adhesive and screws or nails, as required.
J. Seal gaps at floor, ceiling, and between panels with applicable sealant to prevent moisture intrusion.
K. Remove excess sealant after paneling is installed and prior to curing.

**END OF SECTION**

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# SECTION 07 0150.19
# PREPARATION FOR RE-ROOFING & RESTORATION

## PART 1 GENERAL

### 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.02 SUMMARY

A. This Section includes the following:
   1. Removal of existing Modified Roof Membrane including insulation, underlayment, base-flashings and sheet metal flashings as indicated down to the existing metal deck..

B. Related Sections include the following:
   1. Division 07 Section " Cold-Applied SBS-Modified Bituminous Membrane Roofing system for installation of new Cold-Applied SBS-Modified roof system and associated accessories as detailed and specified.
   2. Division 07 Section "Joint Sealants" for preparation and installation of joint sealants.

### 1.03 MATERIALS OWNERSHIP

A. Except for items or materials indicated to be reused, reinstalled, or otherwise indicated to remain Owner's property, demolished materials shall become Contractor's property and shall be removed from Project site.

### 1.04 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D 1079 and glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.

B. Existing Roof System: SBS-Modified Roof system, to include insulation, underlayments, and accessories between deck and roofing membrane.

C. Roof Tear-Off: Removal of existing mechanically attached SBS-Modified system, underlayment, and sheet metal flashings down to the existing metal deck as indicated.

D. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and reinstalled.

E. Existing to Remain: Existing items of construction that are not indicated to be removed.

### 1.05 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including exterior and interior finish surfaces that might be misconstrued as having been damaged by reroofing operations. Submit before Work begins.

C. Landfill Records: Indicate receipt and acceptance of hazardous wastes, such as asbestos-containing material, by a landfill facility licensed to accept hazardous wastes.

### 1.06 QUALITY ASSURANCE

A. Installer Qualifications: Installer of new roofing systems must be licensed to perform asbestos abatement in the State or jurisdiction where Project is located.

B. Regulatory Requirements: Comply with governing EPA notification regulations before beginning membrane roofing removal. Comply with hauling and disposal regulations of authorities having jurisdiction.

C. Re-roofing Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination". Review methods and procedures related to roofing system including, but not limited to, the following:
   1. Meet with Owner; Architect/Consultant; Owner's Representative, Owner's insurer if applicable; roofing system manufacturer's representative; roofing Installer including project manager, superintendent, and foreman; and installers whose work interfaces with or affects re-roofing including installers of roof accessories and roof-mounted equipment.
   2. Review methods and procedures related to re-roofing preparation, including roofing system manufacturer's written instructions.
   3. Review roof drainage during each stage of re-roofing and review roof drain plugging and plug removal procedures.
   4. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   5. Review procedures to determine condition and acceptance of existing decking.
   6. Review structural loading limitations of deck during re-roofing.
   7. Review special roofing details, drainage, penetrations, equipment curbs, and condition of other construction that will affect installation of roofing.
   8. Review shutdown of fire-suppression, -protection, and -alarm and -detection systems.
   9. Review governing regulations and requirements for insurance and certificates if applicable.
   10. Review existing conditions that may require notification of Architect/Consultant before proceeding.

**1.07 PROJECT CONDITIONS**

A. Owner will occupy portions of building immediately adjacent to the re-roofing area. Conduct re-roofing so Owner's operations will not be disrupted. Provide Owner with not less than 72 hours' notice of activities that may affect Owner's operations.
   1. Coordinate work activities daily with Owner so Owner can place protective dust or water leakage covers over sensitive equipment or furnishings, shut down HVAC and fire-alarm or -detection equipment if needed, and evacuate occupants from below the work area if desired.
   2. Before working over structurally impaired areas of deck, notify Owner to evacuate occupants from below the affected area. Verify that occupants below the work area have been evacuated prior to proceeding with work over the impaired deck area.

B. Protect building to be re-roofed, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from reroofing operations.

C. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.

D. Owner assumes no responsibility for condition of areas to be re-roofed.
   1. Conditions existing at time of inspection for bidding will be maintained by Owner as far as practical.

E. Limit construction loads on roof to rooftop equipment wheel loads and uniformly distribute material loads across the structure.

F. Weather Limitations: Proceed with re-roofing preparation only when existing and forecasted weather conditions permit Work to proceed without water entering into existing roofing system or building.

**PART 2 PRODUCTS (NOT USED)**

**PART 3 EXECUTION**

**3.01 PREPARATION**

A. Coordinate with Owner to shut down air intake equipment in the vicinity of the Work. Cover air intake louvers before proceeding with reroofing work that could affect indoor air quality or activate smoke detectors in the ductwork.

B. During removal operations, have sufficient and suitable materials on-site to facilitate rapid installation of temporary protection in the event of unexpected rain.

C. Verify that rooftop utilities and service piping have been shut off before commencing Work.

**3.02 ROOF TEAR-OFF**

A. General: Notify Architect/Consultant/Owner each day of extent of roof tear-off proposed and obtain authorization prior to proceeding demolition.

**3.03 DECK PREPARATION**

A. Inspect deck and/or structural framing after partial tear-off of roofing system.

B. If deck and/or structural framing is not suitable for receiving new roofing or if the structural integrity of the building to support additional structural support members or installation the new roof system is suspect, immediately notify Architect/Consultant. Do not proceed with installation until directed by Architect.

**3.04 DISPOSAL**

A. Collect and place all demolished materials in containers. Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.
   1. Storage or sale of demolished items or materials on-site will not be permitted.

B. Transport demolished materials off Owner's property and legally dispose of them.

**END OF SECTION**

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# SECTION 07 1616
# CRYSTALLINE WATERPROOFING

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Crystalline waterproofing.

B. Liquid waterproofing admixtures.

### 1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Concrete to be waterproofed.

B. Section 04 2000 - Unit Masonry: Concrete masonry units to be waterproofed.

### 1.03 REFERENCE STANDARDS

A. ASTM C157/C157M - Standard Test Method for Length Change of Hardened Hydraulic-Cement Mortar and Concrete; 2024, with Editorial Revision.

B. ASTM C1260 - Standard Test Method for Potential Alkali Reactivity of Aggregates (Mortar-Bar Method); 2023.

C. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating; 2023.

D. ASTM D4259 - Standard Practice for Preparation of Concrete by Abrasion Prior to Coating Application; 2024.

E. COE CRD-C 48 - Handbook for Concrete and Cement Standard Test Method for Water Permeability of Concrete; 1992.

F. NRCA (WM) - The NRCA Waterproofing Manual; 2021.

G. NSF 61 - Drinking Water System Components - Health Effects; 2025, with Addendum

H. UL (DIR) - Online Certifications Directory; Current Edition.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Test data showing hydraulic permeability.
   2. Preparation instructions and recommendations.
   3. Storage and handling requirements and recommendations.
   4. Installation methods.
   5. Details for waterproofing at joints, intersections, and other special conditions.
   6. Precautions for curing and filling water holding structures.

C. Manufacturer's qualification statement.

D. Installer's qualification statement.

E. Specimen warranty.

### 1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least three years of documented experience and providing technical representative to visit project site.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

1. Approved Installers: Summit Waterproofing, 205-664-3106; Performance Waterproofing, 334-277-2720

### 1.06 DELIVERY, STORAGE, AND HANDLING

A. See Section 01 7419 - Construction Waste Management and Disposal for packaging waste requirements.

B. Store products in manufacturer's unopened packaging until ready for installation.

C. Take necessary precautions to keep cementitious materials dry.

### 1.07 FIELD CONDITIONS

A. Maintain environmental conditions, such as temperature, humidity, and ventilation within limits recommended by manufacturer for acceptable results; do not install products under environmental conditions outside the manufacturer's indicated limits.

### 1.08 WARRANTY

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

B. Installer Warranty: Provide 2-year warranty commencing on the Date of Substantial Completion for correcting leaking waterproofing, unless leakage is caused by structural failure, structural movement, or other causes beyond the installer's control. Complete forms in Owner's name and register with installer.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. Crystalline Waterproofing:
1. Alchemco; ____: www.alchemco.com/#sle.
2. Euclid Chemical Company; VANDEX SUPER: www.euclidchemical.com/#sle.
3. Gemite Products Inc; ____: www.gemite.com/#sle.
4. KOSTER American Corporation; KOSTER NB 1 Grey: www.kosterusa.com/#sle.
5. Kryton International Inc; Krystol T1 Concrete Waterproofing: www.kryton.com/#sle.
6. Penetron; PENETRON - Crystalline Waterproofing Coating: www.penetron.com/#sle.
7. SINAK Corporation; HLQ-125 Concrete Sealer: www.sinak.com/#sle.
8. Tremco Commercial Sealants & Waterproofing; PermaQuik Crystalline Waterproofing: www.tremcosealants.com/#sle.
9. W. R. Meadows, Inc; CEM-KOTE CW PLUS: www.wrmeadows.com/#sle.
10. Xypex Chemical Corporation; Xypex Concentrate: www.xypex.com/#sle.
11. Substitutions: See Section 01 6000 - Product Requirements.

B. Liquid Waterproofing Admixture:
1. ISE Logik; ____: www.iselogik.com/#sle.
2. Substitutions: See Section 01 6000 - Product Requirements.

### 2.02 ASSEMBLIES

A. Crystalline Waterproofing for Concrete Building Surfaces:
1. Interior side of elevator pits.
2. Surfaces as indicated on drawings.

B. See Section 03 3000 for additional information on concrete substrate.

C. See Section 04 2000 for additional information on unit masonry substrate.

D. Concrete work; see Section 03 3000 for additional information.

### 2.03 MATERIALS

A. Crystalline Waterproofing: Portland cement, quartz or silica sand, and other active chemicals that when applied to surface of concrete forms insoluble crystals in capillary pores preventing passage of liquids, while having no adverse effect on normal properties of concrete.
   1. Water Permeability of Applied Concrete: No measurable leakage or water flow at pressure ranging from 175 psi (1.21 MPa) to 200 psi (1.38 MPa) when tested in accordance with COE CRD-C 48, using at least 2-inch (51 mm) thick sample, and with applied surface preparation and installation in accordance with NRCA (WM).
   2. Toxicity: Non-toxic.
      a. Potable Water and Drinking Water Safe: Provide UL (DIR) listed and labeled waterproofing; tested safe for use in potable drinking water applications in accordance with NSF 61.

B. Liquid Waterproofing Admixture: Nontoxic liquid admixture, free of Volatile Organic Compounds (VOCs), manufactured with deionized water, and formulated to react with hydroxide ion products by cement hydration process. Specifically formulated for use in normal and lightweight structural concrete mixes.
   1. Mitigating Effects: Alkali-Silica Reaction (ASR) mitigation in accordance with ASTM C1260, and mitigating effect on shrinkage in accordance with ASTM C157/C157M.
   2. Toxicity: Nontoxic.
   3. VOCs: None.
   4. Products:

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

### 3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.
   1. Remove dust, dirt, mortar, efflorescence, grease, oils, paint, form-release agents, and curing compounds in accordance with ASTM D4258.

B. Prepare surfaces using methods recommended by manufacturer for achieving best result for substrate under project conditions, and consider use of sandblasting, water blasting, or acid etching as recommended.
   1. Troweled Finish: Prepare concrete surface by abrasive cleaning in accordance with ASTM D4259 before coating application.

C. Plug water leaks.

D. Patch holes, construction joints, and cracks; remove defective concrete.

E. Obtain approval of manufacturer's field representative before beginning installation.

### 3.03 INSTALLATION

A. Install in accordance with manufacturer's written instructions, maintain environmental conditions required and recommended by manufacturer, and keep a copy of manufacturer's instructions on site.

B. Coordinate waterproofing installation with installation of products that must penetrate waterproofed surfaces.

C. Prevent excessive drying of surface.
   1. Cure waterproofing for at least three days, or length of time required by manufacturer, with water spray and adequate air circulation.
   2. Do not use chemical curing agents unless explicitly approved by waterproofing manufacturer.

D. Do not backfill, fill water or liquid holding structures, or apply finish coatings until time period recommended by manufacturer has passed.

**3.04 FIELD QUALITY CONTROL**

A. See Section 01 4000 - Quality Requirements for additional requirements.

B. Flood test waterproofing application by filling water holding structures to capacity and allowing to stand for not less than 24 hours.

C. If any leaks appear, notify Architect and drain.
   1. Repair leaks at no additional cost to Owner.
   2. Repeat flood test until any leakage is eliminated.

**3.05 PROTECTION**

A. Protect from damage by weather; do not cover with vapor impermeable sheathing or films unless air circulation is provided.

B. Touch-up, repair or replace damaged waterproofing after Date of Substantial Completion.

**END OF SECTION**

# SECTION 07 1923
# MASONRY CLEANER AND SILOXANE WATER REPELLENT

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Masonry Cleaner.

B. Water repellants applied to exterior brick surfaces and **existing poured in place concrete walls at Building E main Entry**

### 1.02 RELATED REQUIREMENTS

A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 04 2000 - Unit Masonry.

C. Refer to Demolition Notes on drawings for additional requirements.

### 1.03 REFERENCE STANDARDS

A. ASTM D3960 - Standard Practice for Determining Volatile Organic Compound (VOC) Content of Paints and Related Coatings; 2005 (Reapproved 2013).

B. ASTM D5095 - Standard Test Method for Determination of the Nonvolatile Content in Silanes, Siloxanes, and Silane-Siloxane Blends Used in Masonry Water Repellent Treatments; 1991 (Reapproved 2013).

C. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association; Current Edition.

D. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide product description.

C. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention; cautionary procedures required during application.

D. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

E. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.
   2. Extra Water Repellent Material: Two gallons (9 liters) of the type installed.

### 1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum three years documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum three years experience.

### 1.06 MOCK-UP

A. Test a minimum 4 ft. by 4 ft. area on each type of masonry. Use the manufacturer’s application instructions. Let test area protective treatment cure before inspection. Keep test panels available for comparison throughout the protective treatment project.

### 1.07 FIELD CONDITIONS

A. Protect liquid materials from freezing.

B. Do not apply water repellent when ambient temperature is lower than 50 degrees F (10 degrees C) or higher than 100 degrees F (38 degrees C).

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. Biological and Atmospheric Stain Remover **for masonry walls and Concrete.** :
   1. Product: Prosoco Enviro Klean Reklaim Cleaner.
      a. Liquid cleaner and Activator Neutralize with solution of Sure Klean Limestone and Masonry after wash duluted 1:1 with clean water.
   2. ReKlaim Cleaner:
      a. Form: Clear, light yellow liquid, soap odor.
      b. Specific Gravity: 1.09.
      c. pH: 13.7.
      d. Wt/gal: 9.10 lbs.
      e. Active Content: Not applicable.
      f. Total Solids: Not applicable.
      g. VOC Content: Not applicable.
      h. Flash Point: >200 degrees F (>93 degrees C).
      i. Freeze Point: 14 degrees F (-10 degrees C).
      j. Shelf Life: 1 year in tightly sealed, unopened container.
   3. ReKlaim Activator:
      a. Form: Clear, colorless liquid, slight odor.
      b. Specific Gravity: 1.10.
      c. pH: 2.40.
      d. Wt/gal: 9.57 lbs.
      e. Active Content: Not applicable.
      f. Total solids: Not applicable.
      g. VOC Content: Not applicable.
      h. Flash Point: Not applicable.
      i. Shelf Life: 1 year in tightly sealed, unopened container.
   4. Install per manufacturer's instructions to include but not limited to limitations and saftey instructions.

B. Silane, Siloxane, Silane-Siloxane Blend, and Sillconate Water Repellants **for masonry walls**:
   1. Product: PROSOCO, Inc; Sure Klean Weather Seal P.B: www.prosoco.com, or approved equal.
   2. Form: White milky liquid, water based, odorless.
   3. Specific Gravity: 0.996.
   4. Active Content: 7%.
   5. pH: 4-5.
   6. Wt/gal: 8.29 lbs.
   7. Flash Point: > 212 degrees F (> 100 degrees C) ASTM D 3278.
   8. Freeze Point: 32 degrees F (0 degrees C).
   9. VOC Content: Complies with all known national, state and district AIM VOC regulations.
   10. Shelf Life: 1 year in tightly sealed, unopened container.
   11. Substitutions: See Section 01 6000 - Product Requirements.

C. Heavy-duty, highly concentrated, water-reducible, alkaline detergent for **existing poured-in-place concrete knee walls**:
   1. Product: Great Lakes Laboratories, Extra Muscle Cleaner, greatlakeslaboratories.com, or approved equal.
   2. Form: Green liquid, slight mild odor.
   3. Specific Gravity: 01.02
   4. Solubility: Complete in water.
   5. pH: 7-13
   6. Flash Point: > 212 degrees F (> 100 degrees C) ASTM D 3278.
   7. Freeze Point: 32 degrees F (0 degrees C).
   8. VOC Content: Complies with all known national, state and district AIM VOC regulations.
   9. Shelf Life: Indefinite
   10. Substitutions: See Section01 6000-Product Requirements.

## 2.02 MATERIALS

A. Water Repellent: Non-glossy, colorless, penetrating, water-vapor-permeable, non-yellowing sealer, that dries invisibly leaving appearance of substrate unchanged.
   1. Applications: Vertical masonry and cast stone masonry surfaces. Apply water repellent full height of landscape, dumpster and mechanical enclosures.
   2. Number of Coats: Two.
   3. Moisture Absorption When Applied to Masonry: 5 percent, maximum, when tested in accordance with ASTM C140/C140M using masonry sample completely coated with water repellent.

# PART 3 EXECUTION

## 3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify joint sealants are installed and cured.

C. Verify surfaces to be coated are dry, clean, and free of efflorescence, oil, or other matter detrimental to application of water repellent.

## 3.02 PREPARATION

A. Protection of Adjacent Work:
   1. Protect adjacent landscaping, property, and vehicles from drips and overspray.
   2. Protect adjacent surfaces not intended to receive water repellent.

B. Prepare surfaces to be coated as recommended by water repellent manufacturer for best results.

C. Remove loose particles and foreign matter.

D. Remove oil and foreign substances with a chemical solvent that will not affect water repellent.

E. Scrub and rinse surfaces with water and let dry.

F. Allow surfaces to dry completely to degree recommended by water repellent manufacturer before starting coating work.

## 3.03 APPLICATION

A. Apply masonry cleaner in accordance with manufacturer's instructions, using procedures and application methods recommended and producing the best results.

B. Apply water repellent in accordance with manufacturer's instructions, using procedures and application methods recommended as producing the best results.

C. Apply at rate recommended by manufacturer, continuously over entire surface.

D. Apply two coats, minimum.

E. Remove water repellent from unintended surfaces immediately by a method instructed by water repellent manufacturer.

**END OF SECTION**

# SECTION 07 2100
# THERMAL INSULATION

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Board insulation at masonry cavity wall construction, and where indicated on the drawings.

B. Sound Batt insulation in cavity of interior stud walls. Refer to Partition Types.

C. Batt Insulation in cavity of Exterior stud walls, provide except where open cell insulation is shown.

D. Rigid Insulation

### 1.02 RELATED REQUIREMENTS

A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 05 4000 - Cold-Formed Metal Framing: Board insulation as wall sheathing.

C. Section 06 1000 - Rough Carpentry: Supporting construction for batt insulation.

D. Section 07 2118 - Spray Foam Insulation - Open Cell

E. Section 07 2726 - Weather Barriers : Separate air barrier and vapor retarder materials.

F. Section 07 8401 - Firestopping: Insulation as part of fire-rated through-penetration assemblies.

G. Section 09 2116 - Gypsum Board Assemblies:

### 1.03 REFERENCE STANDARDS

A. ASTM C552 - Standard Specification for Cellular Glass Thermal Insulation; 2021a.

B. ASTM C578 - Standard Specification for Rigid, Cellular Polystyrene Thermal Insulation; 2019.

C. ASTM C612 - Standard Specification for Mineral Fiber Block and Board Thermal Insulation; 2014 (Reapproved 2019).

D. ASTM C665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing; 2024.

E. ASTM C1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board; 2021.

F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.

G. ASTM E96/E96M - Standard Test Methods for Gravimetric Determination of Water Vapor Transmission Rate of Materials; 2021.

H. ASTM E136 - Standard Test Method for Assessing Combustibility of Materials Using a Vertical Tube Furnace at 750 Degrees C; 2026.

I. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials; National Fire Protection Association; 2006.

J. NFPA 285 - Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components; 2019.

K. UL 723 - Standard for Test for Surface Burning Characteristics of Building Materials; Underwriters Laboratories Inc.; Current Edition, Including All Revisions.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on product characteristics, performance criteria, and product limitations.

C. Manufacturer's Installation Instructions: Include information on special environmental conditions required for installation and installation techniques.

**1.05 FIELD CONDITIONS**

A. Do not install insulation adhesives when temperature or weather conditions are detrimental to successful installation.

**PART 2 PRODUCTS**

**2.01 APPLICATIONS**

A. Rigid Insulation Inside Exterior Masonry Cavity Walls and as shown on drawings: Extruded polystyrene board.

B. Insulation in cavity of interior metal stud walls. Sound Batt insulation unfaced.

C. Insulation in cavity of exterior metal stud walls where shown, Batt Insulation R-19 unfaced.

**2.02 FOAM BOARD INSULATION MATERIALS**

A. Extruded Polystyrene Board Insulation: Extruded polystyrene board; ASTM C578; with either natural skin or cut cell surfaces, equal to Foamlar XPS 250 Type IV, and the following characteristics:
   1. R-Value: provide 1 1/2" thick no less that R-7.5.
      a. provide where new brick faced exterior walls are shown and where new fbric
   2. Board Size: 48 x 96 inch (1220 x 2440 mm).
   3. Board Size as required to coordinate with specified masonry anchor spacings.
   4. Board Edges: Square.
   5. Water Absorption, Maximum: 0.1 percent, by volume.
   6. Manufacturers: Basis of Design Foamular High R CW 1.55 density (25 PSI compressive strength).
   7. Substitutions: See Section 01 6000 - Product Requirements.

**2.03 BATT INSULATION MATERIALS**

A. Sound Attenuation Batt Fiberglass Insulation for interior partitions and as shown on drawings: NFPA 101, Class A rated interior finish. Flexible preformed batt , complying with ASTM C 665; E 136, ASTM 665; Type 1, friction fit. Equal to Owens Corning, Pink Next Gen Sound Attenuation Batt (SAB). Refer to Partition types and other architectural drawings
   1. Flame Spread Index: Less than 25, when tested in accordance with ASTM E84.
   2. Smoke Developed Index: Less than 50, when tested in accordance with ASTM E84.
   3. Combustibility: Non-combustible, when tested in accordance with ASTM E136, except for facing, if any.
   4. Facing: Unfaced.
   5. Provide in thickness as required to fill stud for **interior metal stud walls** continuous from floor to structure above unless specifically noted otherwise. Provide insulated envelope for sound isolation. Coordinate with all trades. Refer to partition types. Provide 6 1/2 inch minimum thick batts in 6 inch stud cavities and 3 1/2 inch thick batts for 3 5/8 inch stud cavities. Refer to drawings.
   6. At staggered stud wall (refer to wall types) in the general location of the Music rooms and various adjacent rooms, provide 2 1/2 inch unfaced, fiberglass batt insulation per UL Design V488. Refer to drawings.

7. At isolated ceiling in the general location of the Music rooms and various adjacent rooms, provide 3 1/2 inch unfaced, fiberglass batt insulation. Refer to drawings.
8. Provide insulation in interior wall cavaties in thickness of cavity for full height of wall.
9. Manufacturers:
   a. CertainTeed Corporation; _____: www.certainteed.com/#sle.
   b. Johns Manville; _____: www.jm.com/#sle.
   c. Owens Corning Corp: www.owenscorning.com. **Basis of Design**, see paragraph 2.03, A.
10. Substitutions: See Section 01 6000 - Product Requirements.

B. Fiber Glass unfaced Batt Insulation , R-21 minimum - 6 " thick, for exterior metal stud wall cavities, equal to Owens Corning Pink Next Gen ASTM 665, Type 1 ,ASTM 136, ASTM 518, ASTM E84, ASTM E96. Refer to drawings for location. Flame spread less that 25 and smoke development less than 50. Provide in all vertical exterior walls. This will also be in the exterior vertical walls that do not receive an interior finish. These batts will be held in by ties specified in accessories.
   1. Substitutions: See Section 01 6000 - Product Requirements

**2.04 ACCESSORIES**

A. Wire Ties:
   1. Provide wire ties or other acceptable applications as required to hold batt insulation in place where gypsum wall board or other materials are not present at assembly. At underside of roof decking attach by methods required to secure batt insulation in place and comply with applicable UL numbers.

B. Wire Mesh: Galvanized steel, hexagonal wire mesh, acceptable if meeting all applicable UL design requirements. Refer to drawings for locations.

C. Adhesive: Type recommended by insulation manufacturer for application.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

A. Verify that substrate, adjacent materials, and insulation materials are dry and that substrates are ready to receive insulation.

B. Verify substrate surfaces are flat, free of honeycomb, fins, irregularities, or materials or substances that may impede adhesive bond.

**3.02 BOARD INSTALLATION AT CAVITY WALLS**

A. Apply adhesive to back of boards:
   1. Three continuous beads per board length.
   2. Full bed 1/8 inch (3 mm) thick.

B. Install boards to fit snugly between wall ties wher applicable.

C. Install boards horizontally on walls.
   1. Place boards to maximize adhesive contact.
   2. Butt edges and ends tightly to adjacent boards and to protrusions.

D. Cut and fit insulation tightly to protrusions or interruptions to the insulation plane.

E. Coordinate work of this section with construction of air barrier seal specified in Section 07 2726.
   1. Coordinate as required to ensure air barrier is installed continuously on top of sheathing prior to installation of masonry anchors.

F. Refer to Section 04 2000 Unit Masonry. Coordinate with masonry and veneer anchors.

### 3.03 BATT INSTALLATION

A. Install insulation in accordance with manufacturer's instructions for all locations specified and specified UL designations and regulations.

B. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

C. Install wire ties or other methods as approved to hold insulation batts in place where - refer to 2.04.

### 3.04 PROTECTION

A. Do not permit installed insulation to be damaged prior to its concealment.

**END OF SECTION**

# SECTION 07 2118
# THERMAL INSULATION - OPEN CELL FOAMED-IN-PLACE INSULATION

**++**

## PART 1 GENERAL

### 2.01 SECTION INCLUDES

A. Spray-in-place semi-rigid open cell ½ pound polyurethane foam insulation in various assemblies, to provide an air barrier and improved thermal resistance.

B. **Provide R-21 minimum specified Open Cell insulation. This will include covering the bottom of sloped brick / metal decking, top of soffit sheathing, and at all locations indicated on drawings. Provide all manufacturers required surface cleaning and preperation, prime all surfaces to receive insulation.**

C. Refer to Drawings for additional requirements.

### 2.02 RELATED SECTIONS

A. Section 03 3000 - Cast in Place Concrete.

B. Section 04 2000 - Unit Masonry

C. Section 05 4000 - Cold - Formed Metal Framing ( Gypsum Sheathing)

D. Section 06 1000 - Rough Carpentry.

E. Section 07 26 00 - Vapor Barrier.

F. Section 09 20 00 - Gypsum Board.

### 2.03 REFERENCES

A. American Society for Testing and Materials (ASTM):

1. ASTM C 423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
2. ASTM C 518 - Standard Test Method for Steady-State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus.
3. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.
4. ASTM E 96 - Standard Test Methods for Water Vapor Transmission of Materials.
5. ASTM E 283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
6. ASTM E 2178: Standard Test Method for Air Permeance of Building Materials
7. ASTM E 413 - Classification for Rating Sound Insulation.
8. ASTM D 1622 Standard Test Method for Apparent Density of Rigid Cellular Plastics
9. ASTM E 119 Standard Test Methods for Fire Tests of Building Construction and Materials
10. ASTM E 970 Standard Test Method for Critical Radiant Flux of Exposed Attic Floor Insulation Using a Radiant Heat Energy Source
11. CAN/ULC S774-09 Standard Laboratory Guide for the Determination of Volatile Organic Compound Emissions from Polyurethane Foam
12. ASTM D 1621 Standard Test Method for Compressive Properties of Rigid Cellular Plastics
13. ASTM D 1623 Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics

14. ASTM D 1929 Standard Test Method for Determining Ignition Temperature of Plastics

B. National Fire Protection Association (NFPA):
   1. NFPA 286 Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth
   2. NFPA 285 Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Wall Assemblies Containing Combustible Components

C. International Code Council – International Residential Code:
   1. Section 103.7 - Alternate Materials and Methods.
   2. 2012, 2015, 2018, 2021 IRC Section R314 - Foam Plastic Insulation.
   3. 2012, 2015, 2018, 2021 IRC Section R316 - Foam Plastic Insulation.
   4. Section 806.4 – Unvented Attic Assemblies.

D. International Code Council – International Building Code:
   1. Section 104.11 Alternative materials, design and methods of construction and equipment.
   2. Section 2603 Foam Plastic Insulation.

## 2.04 SUBMITTALS

A. Submit under provisions of Section 013000.

B. Before commencing work, submit in accordance with local code.
   1. Submit technical data sheets and samples as required by local code officials.
   2. Submit the technical data sheet from the manufacturer showing the test results from the ASTM E84 (Surface Burning Characteristics).

C. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation methods.

## 2.05 QUALITY ASSURANCE

A. Installer Qualifications:
   1. Contractor performing work under this section shall be authorized by HUNTSMAN BUILDING SOLUTIONS or approved equal in the art of applying spray polyurethane foam insulation.
   2. Provide current HUNTSMAN BUILDING SOLUTIONS or approved equal Authorized Contractor Certificate.

B. Mock-Up: Provide a mock-up for evaluation of surface preparation techniques and application workmanship for exterior wall applications.
   1. Finish areas designated by Architect.
   2. Do not proceed with remaining work until installation is approved by Architect.
   3. Rework mock-up area as required to produce acceptable work.

## 2.06 DELIVERY, STORAGE, AND HANDLING

A. Materials shall be delivered in manufacturer’s original containers clearly labelled with manufacturer’s name, product identification, safety information, net weight of contents and expiration date.

B. Material shall be stored in a safe manner and where the temperatures are in the limits specified by the material manufacturer.

C. Empty containers shall be removed from site on a daily basis.

D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

**2.07 PROJECT CONDITIONS**

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

B. Ventilate insulation application area in accordance with the Spray Foam Coalition's Guidance on best practices for the installation of Spray Polyurethane Foam.

C. Protect workers as recommended by the Spray Foam Coalition's Guidance on best practices for the installation of Spray Polyurethane Foam.

D. Protect adjacent surfaces, windows, equipment and site areas from damage of overspray.

**2.08 WARRANTY**

A. Manufacturer's Warranty: HUNTSMAN BUILDING SOLUTIONS or approved equal, warrants spray-in-place urethane foam insulation, when installed by certified contractors using factory-trained applicators and applied in accordance with the Installation Instructions, will perform as stated in the Product Technical Data Sheet.
   1. This warranty is in effect throughout the life of the building provided the original purchaser registers with the Warranty Department of the Manufacturer within thirty days of occupancy.
   2. Manufacturer's sole responsibility under this Limited Lifetime Warranty shall be to repair or replace any defective Product at the cost of the material only.
   3. Manufacturer shall not be responsible for labor cost or any other costs whatsoever related to, or in connection with the removal or installation of either the original or replacement product.
   4. Refer to www.huntsmanbuildingsolutions.com for full warranty terms.

**PART 2 PRODUCTS**

**3.01 ENVIRONNEMENTAL REQUIREMENTS**

A. The product shall have a generic industry Environmental Product Declaration (EPD).

**3.02 MANUFACTURERS**

A. Acceptable Manufacturer:
   HUNTSMAN BUILDING SOLUTIONS
   3315 East Division Street, Arlington, TX 76011
   Phone No: (855) 942-7273
   Email: architect@huntsmanbuilds.com
   Web: http://www.huntsmanbuildingsolutions.com

B. Substitutions: Equivalent as judged by Architect

**3.03 SPRAY FOAM INSULATION**

A. Spray Applied Semi Rigid Polyurethane Foam Insulation System: Open Cell ½ pound Foam Product: ***SEAL*ECTION® 500(Basis of Design)** or approved equal by addendum.
   1. Manufactured by HUNTSMAN BUILDING SOLUTIONS, Arlington, TX.
   2. Product Approval:
      a. International Code Council Evaluation Services Report #1172.
         1) Approved for building types I, II, III, IV, & V

b. Passed NFPA 286 in accordance with IBC 803.1.1

3. Installation:
   a. Application with a prescriptive Thermal barrier:
      1) There is no thickness limitations with a precriptive thermal barrier in floors or ceilings with 1/2 inch gypsum wall board in accordance with IBC 2603.4 or IRC R316.4.
   b. Application without a Thermal or Ignition Barrier (exposed foam) .
      1) Minimum application of 3 inches (76 mm) and up to 13 inches (330 mm) on the underside of the metal decking as shown, in floor assemblies or on vertical surfaces.

4. Physical Properties:

| | | | |
|---|---|---|---|
| Density | ASTM D1622 | 0.45 - 0.5 lb/ft³ | 7.2 - 8 Kg/m³ |
| Thermal Resistance | ASTMC518, at 1'' | R-3.81 | 0,67 |
| Compressive strength | ASTM D1621 | 0.7 psi | 4.8 KPa |
| Tensile strength | ASTM D1623 | 5.6 psi | 38.6 KPa |
| Air Permeance | ASTM E 283 3.5'' @ 75 Pa | 0.001 L/s· m² | |
| Air Permeance | ASTM E 2178-13 3.5'' @ 50 Pa<br>3.5'' @ 100 Pa<br>3.5'' @ 300 Pa | 0.001 L/s· m²<br>0.003 L/s· m²<br>0.008 L/s· m² | |
| VOC | CAN/ULC S774 | 1 day | |
| Spontaneous Ignition Temperature | ASTM D1929 | 560oC | 1040oF |
| Water vapour permeance | ASTM E96 3.5'' | | 362 ng/Pa s.m² |

| | | | |
|---|---|---|---|
| | 5.5'' | 6.33 perms | 231 ng/Pa s.m² |
| | 7'' | 4.03 perms | 181 ng/Pa s.m² |
| | 10'' | 3.17 perms | 126 ng/Pa s.m² |
| | | 2.20 perms | |
| Noise Reduction Coefficient (NRC) | ASTM C423 | 0.75 | |
| Sound Transmission Class (STC) | ASTM E413 | 49 - 51 | |
| Surface Burning Characteristics | ASTM E84 | Class 1 | |
| Flame Spread Index | ASTM E84 | 21 | |
| Smoke Development | ASTM E84 | 216 | |
| Commercial Fire Resistance | ASTM E 119 | 1 hour load bearing | |
| Commercial Fire Resistance | NFPA 285 | Assembly Passed | |
| Attic Floor Uncoated Thickness | ASTM 970 | 14'' | |

5. Equipment used to apply the foam insulation shall have fixed ratio positive displacement pumps and approved by foam manufacturer.
6. Equipment used to apply the Water Based intumescing coating shall be an airless sprayer approved by the manufacturer.

**3.04 ACCESSORY PRODUCTS**

A. Water Based intumescing coating:
   1. DC 315 Distributed by HUNTSMAN BUILDING SOLUTIONS, Manufactured by International Fireproof Technology Inc.
   2. Product: No-Burn® plus XD , Manufactured by No-Burn Inc.
   3. Product: Andek Fireguard, manufactured by Andek Corporation.

B. Primers:
   1. Product: Adbond manufactured by Adfast or Thermo-Prime by HUNTSMAN BUILDING SOLUTIONS:
      a. Application: Follow manufacturer's application recommendations.
      b. Recommended for oily surfaces and galvanized steel like Z-bar, PVC, curtain walls and steel decks.

## PART 3 EXECUTION

### 4.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C. Commencement of work outlined in this section shall be deemed as acceptance of existing work and conditions.

### 4.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Apply only when surfaces and environmental conditions are within limits prescribed by the material manufacturer.

C. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

D. It is recommended to install primer on oily surfaces and galvanized steel

### 4.03 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Apply as recommended by manufacturer to thickness as indicated .
   1. Equipment used to apply the foam insulation shall have fixed ratio positive

C. displacement pumps approved by foam manufacturer.

### 4.04 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Substantial Completion.

**END OF SECTION**

# SECTION 07 2616
# INTEGRALLY-BONDED UNDERSLAB VAPOR RETARDER

## PART 1 — GENERAL

### 1.01 SUMMARY

A. The Work of this Section includes, but is not limited to, underslab vapor retarder/barrier membrane that forms an integral bond to poured concrete for use below slabs on grade.

B. Related sections include, but are not limited to, the following:
   1. Section 033000 – Cast-In-Place Concrete.
      a. The following specification sections with products by GCP Applied Technologies are the Basis of Design:
         1) Section 07 2616 - Integrally Bonded Under Slab Vapor Retarder.
         2) Section 07 2726 - Fluid Applied Membrane Air Barriers.
         3) Section 07 6526 - Self-Adhering Sheet Flashing.

C. A single source manufacturer of all sections and associated products is required for approval.
   1. Proof of products being equal to the Basis of Design and being compatible with all sections/products shall be submitted to the architect prior to the bid. Approved products must be listed in an addendum.
   2. Refer to Specification Section 01 6000 Product Requirements for additional requirements.

### 1.02 SUBMITTALS

A. Submit manufacturer's product data, installation instructions and membrane samples for approval.

B. Manufacturer's Warranty: Ten (10) year Warranty on all Materials: Applicable in state of the project.

### 1.03 REFERENCE STANDARDS

A. The following standards and publications are applicable to the extent referenced in the text.

B. American Society for Testing and Materials (ASTM):
   1. D412 Standard Test Methods for Rubber Properties in Tension.
   2. D903 Standard Test Method for Peel or Stripping Strength of Adhesive Bonds.
   3. D3767 Standard Practice for Rubber - Measurements of Dimensions.
   4. E96 Standard Test Methods for Water Vapor Transmission of Materials.
   5. E154 Standard Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
   6. E1643 Standard Practice for Installation of Water Vapor Retarders Used in Contact with Earth or Granular Fill Under Concrete Slabs.
   7. E1745 Plastic Vapor Retarders Used in Contact with Soil or Granular fill under Concrete Slabs.

C. American Concrete Institute (ACI)
   1. ACI 302.1R-96 Addendum Vapor Retarder Location: For slabs with vapor-sensitive floor coverings, locate retarder in direct contact with the slab (not beneath a layer of granular fill).

### 1.04 QUALITY ASSURANCE

A. Manufacturer: Sheet membrane waterproofing system shall be manufactured and marketed by a firm with a minimum of five (5) years of experience in the production and sales of sheet membrane waterproofing. Manufacturers proposed for use but not named in these specifications shall submit evidence of ability to meet all requirements specified and include a list of projects of similar design and complexity completed within the past five (5) years.

B. Installer: A firm which has at least three (3) years of experience in work of the type required by this section and as certified by the manufacturer.

C. Materials: For each type of material required for the work of this section, provide primary materials which are the products of one manufacturer.
   1. Pre-Installation Conference: An on-site pre-installation conference with manufacturers technical representative present shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work. Agenda for meeting shall include review of special details and flashing.

### 1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials in labeled packages. Store and handle in strict compliance with manufacturer's instructions. Protect from damage from weather, excessive temperature and construction operations. Remove and dispose of damaged material in accordance with applicable regulations.

### 1.06 WARRANTIES

A. Sheet Membrane Waterproofing: Provide written ten (10) year material warranty issued by the membrane manufacturer upon completion of the work.

B. Project Waterproof Warranty: Provide ten (10) year warranty signed by Waterproofing Contractor and General Contractor included in specification section 01 7833 - Special Project Warranties.

## PART 2 — PRODUCTS

### 2.01 MATERIALS

A. Integrally Bonded Vapor Protection: Florprufe® 120 Membrane by GCP Advanced Technologies Construction Products, a 0.5mm (0.021 in) nominal thickness composite sheet membrane comprising 0.4 mm (0.016 in.) of polyolefin film, and layers of specially formulated synthetic adhesive layers. Approved equal manufacturers:
   1. Polyguard Underslab TRM
   2. Americover VaporBlock Plus
   3. WR Meadows

B. The membrane shall form an integral and permanent bond to poured concrete to prevent vapor migration at the interface of the membrane and structural concrete. Provide membrane with the following physical properties:

### 2.02 PHYSICAL PROPERTIES FOR FLORPRUFE® 120 MEMBRANE:

**FLORPRUFE 120 IS A CLASS A VAPOR BARRIER AND EXCEEDS THE REQUIREMENTS AS DEFINED BY ASTM E 1745**

| PROPERTY | TYPICAL VALUE | TEST METHOD |
|---|---|---|
| THICKNESS (NOMINAL) | 0.5MM (0.021 IN) | ASTM D3767 METHOD A |
| WATER VAPOR PERMEANCE | 0.03 PERMS | ASTM E96 METHOD B * |

| | | |
|---|---|---|
| **TENSILE STRENGTH** | **65 LB./IN** | **ASTM E154 *** |
| **ELONGATION** | **300%** | **ASTM D412** |
| **PUNCTURE RESISTANCE** | **3300 GRAMS** | **ASTM D1709 *** |
| **PEEL ADHESION TO CONCRETE** | **>4 LB./IN** | **ASTM D903** |

*** ASTM E 1745 REQUIREMENTS.**

**PART 3 — EXECUTION**

**3.01 EXECUTION**

A. The installer shall examine conditions of substrates and other conditions under which this work is to be performed and notify the Contractor, in writing, of circumstances detrimental to the proper completion of the work. Do not proceed with work until unsatisfactory conditions are corrected.

**3.02 INSTALLATION**

A. Earth and stone substrates shall be well compacted to produce an even, solid substrate. Remove loose aggregate or sharp protrusions. Concrete substrates shall be smooth or broom finished and monolithic. Remove standing water prior to membrane applications.

B. Installation shall be in accordance with manufacturer's instructions and ASTM E 1643–98, including but not limited to the following:
   1. Apply membrane with the HDPE film facing the prepared substrate. Remove the release liner during application.
   2. Apply succeeding sheets by overlapping the previous sheet 50-mm (2 in.) along the marked lap line. End Laps should be staggered to avoid a build up of layers.
      a. Mechanical Fastening Method - To prevent the membrane from moving and gaps opening, the laps should be fastened together at 1.0m (39 in) maximum centers. Fix through the center of the lap area using 12mm (0.5 in) long washer-head self-tapping galvanized screws or similar allowing the head of the screw to bed into the adhesive compound to self-seal. Ensure the membrane lays flat and no openings occur. Additional fastening may be required at corners, details etc.
         OR
      b. Taped Lap Method - For additional security use Preprufe® Tape to secure and seal the overlaps. Overband the lap with the 100mm (4in) wide Preprufe® Tape using the lap line for alignment. Remove plastic release liner to ensure bond to concrete.
   3. Mix and apply GCP Advanced Technologies liquid detailing compound to seal around penetrations such as drainage pipes, etc.

**END OF SECTION**

# SECTION 07 2726
# FLUID-APPLIED MEMBRANE AIR BARRIERS

## PART 1 — GENERAL

### 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

### 1.02 SUMMARY

A. This Section includes the following:
   1. Materials and installation methods for fluid-applied, vapor permeable air barrier membrane system located in the non-accessible part of the wall.
   2. Materials and installation methods to bridge and seal air leakage pathways in roof and foundation junctions, window and door openings, control and expansion joints, masonry ties, piping and other penetrations through the wall assembly.
   3. Liquid Flashing: GCP Perma Barrier Universal Flashing and Sealant, one part moisture curing,STPE Sealant and liquid flashing for Terminations and flashing of rough openings.
   4. The following specification sections with products by GCP Applied Technologies are the Basis of Design:
      a. Section 07 2616 - Intergrally Bonded Underslab Vapor Retarder
      b. Section 07 2726 - Fluid Applied Membrane Air Barriers. ( includes Liquid Flashing)
      c. Section 07 6526 - Self-Adhering Sheet Flashing.
   5. A single source manufacturer of all sections and associated products is required for approval.
   6. Proof of products being equal to the Basis of Design and being compatible with all sections/products shall be submitted to the architect prior to the bid. Approved products must be listed in an addendum.
   7. Refer to Specification Section 01 6000 Product Requirements for additional requirements.

B. Related Sections include the following:
   1. Section 03 3000 – Cast-In-Place Concrete.
   2. Section 04 2000 – Unit Masonry.
   3. Section 05 4000 – Gypsum Sheathing.
   4. Section 07 1113 – Bituminous Dampproofing.
   5. Section 07 1325 – Self-Adhering Sheet Waterproofing.
   6. Section 07 5300 – Elastomeric Membrane Roofing.
   7. Section 07 6200 – Sheet Metal Flashing and Trim.
   8. Section 07 9200 – Joint Sealants.

### 1.03 DEFINITIONS

A. Air Barrier Assembly: The collection of air barrier materials and auxiliary materials applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

## 1.04 PERFORMANCE REQUIREMENTS

A. General: Air barrier shall be capable of performing as a continuous vapor-permeable air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

B. The building envelope shall be designed and constructed with a continuous air barrier to control air leakage into, or out of the conditioned space. An air barrier shall also be provided for interior partitions between conditioned space and space designed to maintain temperature or humidity levels which differ from those in the conditioned space by more than 50% of the difference between the conditioned space and design ambient conditions. The air barrier shall have the following characteristics:
   1. It must be continuous, with all joints made airtight.
   2. It shall have an air permeability not to exceed 0.004 cfm/sq. ft. under a pressure differential of 0.3 in. water (1.57 psf) (equal to 0.02 L/s. x sq. m. @ 75 Pa), when tested in accordance with ASTM E2178.
   3. It shall have an air permeability not to exceed 0.04 cfm/sq. ft. under a pressure differential of 0.3 in. water (1.57 psf) (equal to 0.2 L/s. x sq. m. @ 75 Pa), when tested in accordance with ASTM E2357.
   4. It shall be capable of withstanding positive and negative combined design wind, fan and stack pressures on the envelope without damage or displacement, and shall transfer the load to the structure. It shall not displace adjacent materials under full load.
   5. It shall be durable or maintainable.
   6. The air barrier shall be joined in an airtight and flexible manner to the air barrier material of adjacent systems, allowing for the relative movement of systems due to thermal and moisture variations and creep. Connection shall be made between:
      a. Foundation and walls.
      b. Walls and windows or doors.
      c. Different wall systems.
      d. Wall and roof.
      e. Wall and roof over unconditioned space.
      f. Walls, floor and roof across construction, control and expansion joints.
      g. Walls, floors and roof to utility, pipe and duct penetrations.
   7. All penetrations of the air barrier and paths of air infiltration/exfiltration shall be made airtight.

## 1.05 REFERENCES

A. The following standards and publications are applicable to the extent referenced in the text. The most recent version of these standards is implied unless otherwise stated.

B. American Society for Testing and Materials (ASTM):
   1. ASTM C1193 Guide for Use of Joint Sealants.
   2. ASTM D412 Standard Test Methods for Rubber Properties in Tension.
   3. ASTM D570 Test Method for Water Absorption of Plastics.
   4. ASTM D1004 Test Method for Initial Tear Resistance of Plastic Film and Sheeting.
   5. ASTM D1876 Test Method for Peel Resistance of Adhesives.
   6. ASTM D1938 Test Method for Tear Propagation Resistance of Plastic Film and Sheeting.

7. ASTM D1970 Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used. as Steep Roofing Underlayment for Ice Dam Protection.
8. ASTM D4258 Practice for Surface Cleaning Concrete for Coating.
9. ASTM D4263 Test Method for Indicating Moisture in Concrete by the Plastic Sheet Method.
10. ASTM D4541 Standard Test Method for Pull-Off Strength of Coatings Using Portable Adhesion Testers.
11. ASTM E96 Test Methods for Water Vapor Transmission of Materials.
12. ASTM E154 Test Methods for Water Vapor Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
13. ASTM E1186 Practice for Air Leakage Site Detection in Building Envelopes and Air Retarder Systems.
14. ASTM E2178 Standard Test Method for Air Permeance of Building Materials.
15. ASTM E2357 Standard Test Method for Determining Air Leakage of Air Barrier Assemblies.
16. NPFA 285 Standard Fire Test Method for Evaluation of Fire Propagation Characteristics of Exterior Non-Load-Bearing Wall Assemblies Containing Combustible Components.

## 1.06 SUBMITTALS

A. Product Data: Include manufacturer's written instructions for evaluating, preparing, and treating substrate; technical data; and tested physical and performance properties of air barrier.

B. Shop Drawings: Show locations and extent of air barrier. Include details for substrate joints and cracks, counterflashing strip, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
   1. Include details of interfaces with other materials that form part of air barrier.
   2. Include details of mockups.

C. Samples: Submit representative samples of the following for approval:
   1. Fluid-Applied membrane.
   2. Self-Adhered Transition Membrane.
   3. Self-Adhered Through Wall Flashing.

D. Product Certificates: For air barriers, certifying compatibility of air barrier and accessory materials with Project materials that connect to or that come in contact with the barrier; signed by product manufacturer.

E. Qualification Data: For Applicator.

F. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for air barriers, submit certified test report showing compliance with requirements specified for ASTM E2178.

G. Warranty: Submit a sample warranty identifying the terms and conditions stated in Article 1.10, applicable in state of the project.

## 1.07 QUALITY ASSURANCE

A. Manufacturer: Air barrier systems shall be manufactured and marketed by a firm with a minimum of Five years experience in the production and sales of waterproofing and air barriers. Manufacturers proposed for use, but not named in these specifications shall submit evidence of ability to meet all requirements specified, and include a list of projects of similar design and complexity completed within the past five years.

B. Source Limitations: Obtain primary air-barrier material and through wall flashing through one source from a single manufacturer. Should project require a vapor permeable and a vapor impermeable air barrier on same project, obtain vapor-permeable and vapor impermeable air barrier and through wall flashing from one source from a single manufacturer.

C. Applicator Qualifications: A firm experienced in applying air barrier materials similar in material, design, and extent to those indicated for this Project, whose work has resulted in applications with a record of successful in-service performance.

D. Mockups: Before beginning installation of air barrier, provide air barrier work for exterior wall assembly mockups, incorporating backup wall construction, external cladding, window, door frame and sill, insulation, and flashing to demonstrate surface preparation, crack and joint treatment, and sealing of gaps, terminations, and penetrations of air barrier membrane.

E. Coordinate construction of mockup to permit inspection by Owner's testing agency of air barrier before external insulation and cladding is installed.

F. If Architect determines mockups do not comply with requirements, reconstruct mockups and apply air barrier until mockups are approved.

G. Pre-Installation Conference: A pre-installation conference shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work. Preinstallation conference shall include the Contractor, installer, Architect, and system manufacturer's field representative. Agenda for meeting shall include but not be limited to the following:
   1. Review of submittals.
   2. Review of surface preparation, minimum curing period and installation procedures.
   3. Review of special details and flashings.
   4. Sequence of construction, responsibilities and schedule for subsequent operations.
   5. Review of mock-up requirements.
   6. Review of inspection, testing, protection and repair procedures.

**1.08 DELIVERY, STORAGE, AND HANDLING**

A. Deliver materials and products in labeled packages. Store and handle in strict compliance with manufacturer’s instructions, recommendations and material safety data sheets. Protect from damage from sunlight, weather, excessive temperatures and construction operations. Remove damaged material from the site and dispose of in accordance with applicable regulations.

B. Do not double-stack pallets of fluid applied membrane components on the job site. Provide cover on top and all sides, allowing for adequate ventilation.

C. Protect fluid-applied membrane components from freezing and extreme heat.

D. Sequence deliveries to avoid delays, but minimize on-site storage.

**1.09 PROJECT CONDITIONS**

A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended by air barrier manufacturer. Protect substrates from environmental conditions that affect performance of air barrier. Do not apply air barrier to a wet substrate or during snow, rain, fog, or mist.

**1.10 WARRANTIES**

A. Submit manufacturer's warranty that air barrier and accessories are free of defects at time of delivery and are manufactured to meet manufacturer's published physical properties and material specifications. Refer to Section 01 7833 - Special Project Warranties

B. Warranty Period: Ten years from date of completion of the air barrier membrane installation.

C. Project Waterproofing Warranty: Installer-General Contractor listed at the end of this section.

**PART 2 — PRODUCTS**

**2.01 FLUID-APPLIED, VAPOR PERMEABLE MEMBRANE AIR BARRIER**

A. FLUID-APPLIED AIR BARRIER MEMBRANE: Basis of Design: Perm-A-Barrier® VPL, as manufactured by GCP Applied Technologies, 62 Whittemore Avenue, Cambridge, MA; a fluid-applied, vapor permeable, acrylic membrane that cures to form a resilient, monolithic, fully bonded elastomeric membrane when applied to construction surfaces.
   1. Approved equals:
      a. Sika Sikagard®-535
      b. Tremco EXOAIR® 220
      c. WR Meadows Air Shield LMP

B. The membrane provides superior protection against the damaging effects of air and liquid water ingress on the building structures. Product shall meet the following requirements:

C. Membrane Air Permeance: ASTM E2178: Not to exceed 0.004 cfm/sq. ft. under a pressure differential of 0.3 in. water (1.57 psf) (equal to 0.02 L/s. x sq. m. @ 75 Pa).

D. Assembly Air Permeance: Provide a continuous air barrier assembly that has an air leakage not to exceed 0.04 cfm/sq. ft. of surface area under a pressure differential of 0.3 in. water (1.57 psf) (equal to 0.2 L/s. x sq. m. of surface area at 75 Pa) when tested in accordance with ASTM E2357.

E. Water Vapor Permeance: ASTM E96, Method B: Greater then 10 perms.

F. Pull Adhesion: ASTM D4541: Minimum 20 psi or substrate failure to glass faced wall board, minimum 100 psi to concrete/CMU.

G. Low temperature flexibility: ASTM D1970: Pass at minus 20 degrees Fahrenheit (at minus 29 degrees Celsius).

H. Water resistance of in-place membrane: ASTM E331: Pass. No water penetration after 90 minutes @ 299 Pa (6.24 psf) tested over OSB and gypsum sheathing.

I. Nail sealability: ASTM D1970: Pass UV Exposure Limit: Equal to or greater than 180 calendar days.

J. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.

K. IBC requires exterior walls on Type I-IV construction containing foam plastic insulation to meet NFPA 285 since the 2000 version. IBC 2012 also requires exterior walls that are greater than 40 feet and containing combustible Water Resistive Barrier to meet NFPA 285.
   1. Water Vapor Transmission: ASTM E96, Method B: 0.05 perms (2.9 ng/Pa s. sq. m.) maximum
   2. Air Permeance at 75 Pa (0.3 in. water) pressure difference: 0.0006 L/s. sq. m (0.00012 cfm/ sq. ft.) maximum
   3. Puncture Resistance: ASTM E154: 178 N (40 lbs.) minimum
   4. Lap Adhesion at minus 4 degrees Celsius (25 degrees Fahrenheit): ASTM D1876: 880 N/m (5.0 lbs./in.) of width
   5. Low Temperature Flexibility: ASTM D1970: Unaffected to minus 43 degrees Celsius (minus 45 degrees Fahrenheit)
   6. Tensile Strength: ASTM D412, Die C Modified: minimum 2.7 MPa (400 psi)
   7. Elongation, Ultimate Failure of Rubberized Asphalt: ASTM D412, Die C: minimum 200%

## 2.02 PRIMERS

A. Primer for Self-Adhered Transition Membrane and Flexible Membrane Wall Flashing: Perm-A-Barrier WB Primer manufactured by GCP Applied Technologies; a water-based primer which imparts an aggressive, high tack finish on the treated substrate.
   1. Flash Point: No flash to boiling point.
   2. VOC Content: Not to exceed 10 g/L.
   3. Application Temperature: minus 4 degrees Celsius (25 degrees Fahrenheit) and above.
   4. Freezing point (as packaged): minus 7 degrees Celsius (21 degrees Fahrenheit).

B. Primer for Self-Adhered Transition Membrane and Flexible Membrane Wall Flashing:: Perm-A-Barrier Primer Plus manufactured by GCP Applied Technologies; a water-based primer which imparts an aggressive, high tack finish on the treated substrate. Product shall have the following minimum physical properties:
   1. Color: Milky White (wet), Clear (dry).
   2. Weight: 8.25 lbs./gal.
   3. Solids Content (by weight): 53-57%
   4. Solvent Type: Water.
   5. VOC Content: Not to excess 1 g/L.
   6. Application Temperature: 4 degrees Celsius (40 degrees Fahrenheit) and above.

## 2.03 PENETRATIONS & TERMINATION SEALANT

A. **Fluid Applied Liquid Flashing** Membrane for Details and Terminations and Substrate Patching: Equal to **Perma Barrier Universal Flashing and Sealant by GCP Applied Technologies**
   1. Approved equals:
      a. Tremco Dynomic 100
      b. SikaMembran 540®
      c. WR Meadows Air Shield LMP

B. Sealant for Details, Final Terminations and Sheathing Joint Treatment: S100 Sealant manufactured by GCP Applied Technologies: a one-part, neutral curing, ultra low modulus material designed for use with fluid-applied membranes, self-adhered membrane and tapes. 98 g/L maximum VOC content.

# PART 3 — EXECUTION

## 3.01 EXAMINATION

A. Verify that substrates and conditions are ready to accept the Work of this section. Notify [architect] in writing of any discrepancies. Commencement of the Work or any parts thereof shall mean acceptance of the prepared substrates.

B. All surfaces must be sound, dry, clean and free of oil, grease, dirt, excess mortar or other contaminants detrimental to the adhesion of the membranes. Fill voids, gaps and spalled areas in substrate to provide an even plane. Strike masonry joints full-flush.

C. Curing compounds or release agents used in concrete construction must be resin based without oil, wax or pigments.

### 3.02 SURFACE PREPARATION

A. Refer to manufacturer's literature for requirements for preparation of substrates. Surfaces shall be sound and free of voids, spalled areas, loose aggregate and sharp protrusions. Remove contaminants such as grease, oil and wax from exposed surfaces. Remove dust, dirt, loose stone and debris. Use repair materials and methods that are acceptable to manufacturer of the fluid-applied air barrier assembly.

B. Exterior sheathing panels: Ensure that the boards are sufficiently stabilized with corners and edges fastened with appropriate screws. Pre-treat all board joints with 50 – 75 mm (2-3 in.) wide, manufacturer's recommended mesh-style wallboard tape. Gaps greater than 6 mm (1/4 in.) should be filled with mastic or caulk, allowing sufficient time to fully cure before application of the mesh-style wallboard tape and fluid applied air barrier system.

C. Masonry Substrates: Apply air and vapor barrier over concrete block and brick with smooth trowel-cut mortar joints, struck full and flush. Fill all voids and holes, particularly in the mortar joints, with a lean mortar mix, non-shrinking grout or parge coat.

D. Related Materials: Treat construction joints and install flashing as recommended by manufacturer.

E. Clean, prepare, treat, and seal substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air barrier application.

F. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.

G. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

H. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate patching membrane.

I. Remove excess mortar from masonry ties, shelf angles, and other obstructions.

J. At changes in substrate plane, apply sealant or Bituthene Liquid Membrane at sharp corners and edges to form a smooth transition from one plane to another.

K. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless-steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.

### 3.03 JOINT TREATMENT

A. Concrete and Masonry: Prepare, treat, rout, and fill joints and cracks in substrate according to ASTM C1193 and air barrier manufacturer's written instructions. Remove dust and dirt from joints and cracks complying with ASTM D4258 before coating surfaces.

B. Prime substrate as required.

C. Gypsum Sheathing: Fill joints with S100 Sealant per manufacturer's written instructions.

### 3.04 AIR BARRIER MEMBRANE INSTALLATION

A. Apply air barrier membrane to achieve a continuous air barrier according to air barrier manufacturer's written instructions.

B. Apply air barrier membrane within manufacturer's recommended application temperature ranges.

C. Apply a continuous unbroken air barrier to substrates according to the following minimum thickness. Apply membrane in full contact around protrusions such as masonry ties.

D. Vapor-Permeable Membrane Air Barrier: 70-mil (1.8-mm) wet film thickness, 40-mil (1.0-mm) dry film thickness.

E. Do not cover air barrier until it has been tested and inspected by Owner's testing agency.

F. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air barrier components.

**3.05 FIELD QUALITY CONTROL**

A. Testing Agency: Owner may engage a qualified testing agency to perform tests and inspections and prepare test reports.

B. Inspections: Air barrier materials and installation are subject to inspection for compliance with requirements. Inspections may include the following:

C. Continuity of air barrier system has been achieved throughout the building envelope with no gaps or holes.

D. Continuous structural support of air barrier system has been provided.

E. Masonry and concrete surfaces are smooth, clean and free of cavities, protrusions, and mortar droppings.

F. Site conditions for application temperature and dryness of substrates have been maintained.

G. Maximum exposure time of materials to UV deterioration has not been exceeded.

H. Surfaces have been primed, if applicable.

I. Laps in strips and transition membrane have complied with minimum requirements and have been shingled in the correct direction (or mastic has been applied on exposed edges), with no fish-mouths.

J. Termination sealant has been applied on cut edges.

K. Strips and transition membrane have been firmly adhered to substrate.

L. Compatible materials have been used.

M. Transitions at changes in direction and structural support at gaps have been provided.

N. Connections between assemblies (membrane and sealants) have complied with requirements for cleanliness, preparation and priming of surfaces, structural support, integrity, and continuity of seal.

O. All penetrations have been sealed.

P. Tests: Testing to be performed will be determined by Owner's testing agency from among the following tests:

Q. Qualitative Testing: Air barrier assemblies will be tested for evidence of air leakage according to ASTM E1186.

R. Remove and replace deficient air barrier components and retest as specified above.

**3.06 CLEANING AND PROTECTION**

A. Protect air barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.

B. Protect air barrier from exposure to UV light and harmful weather exposure as required by manufacturer. Remove and replace main air barrier material exposed for more than 180 days.

C. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended by manufacturer of affected construction.

D. Remove masking materials after installation.

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# SECTION 07 4293
# FLAT METAL SOFFIT & WALL PANELS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. **Profile, concealed fastener, lap-seam metal soffit and wall panels with related metal trim and accessories. Refer to drawings for additional Requirements.**

### 1.02 RELATED REQUIREMENTS

A. Division 01 Section "Sustainable Design Requirements" for related LEED general requirements.

B. Division 05 Section "Structural Steel Framing" for steel framing supporting metal panels.

C. Division 05 Section "Cold-Formed Metal Framing" for cold-formed metal framing supporting metal panels.

D. Division 07 Section "Thermal Insulation" for thermal insulation installed under metal panels.

E. Division 07 Section "Air Barriers" for air barriers within metal panel assembly and adjacent to metal panel assembly.

F. Division 07 Section "Metal Roof Panels" for metal roof panels installed with metal soffit and liner panels.

G. Division 07 Section "Metal Wall Panels" for metal wall panels installed with metal soffit and liner panels.

H. Division 07 Section "Sheet Metal Flashing and Trim" for sheet metal flashing items in addition to items specified in this Section.

I. Section 07 2100 - Thermal Protection

J. Division 13 Section "Metal Building Systems" for steel framing supporting metal panels.

### 1.03 REFERENCES

A. American Architectural Manufacturer's Association (AAMA): www.aamanet.org:
   1. AAMA 621 - Voluntary Specifications for High Performance Organic Coatings on Coil Coated Architectural Hot Dipped Galvanized (HDG) & Zinc-Aluminum Coated Steel Substrates.
   2. AAMA 809.2 Voluntary Specification Non-Drying Sealants.

B. American Society of Civil Engineers (ASCE): www.asce.org/codes-standards:
   1. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.

C. ASTM International (ASTM): www.astm.org:
   1. ASTM A755 - Specification for Steel Sheet, Metallic Coated by the Hot-Dip Process and Prepainted by the Coil-Coating Process for Exterior Exposed Building Products.
   2. ASTM A792/A792M - Standard Specification for Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by the Hot-Dip Process.
   3. ASTM C920 - Specification for Elastomeric Joint Sealants.
   4. ASTM D2244 - Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
   5. ASTM D4214 - Test Methods for Evaluating Degree of Chalking of Exterior Paint Films.
   6. ASTM E1592 - Standard Test Method for Structural Performance of Sheet Metal Roof and Siding Systems by Uniform Static Air Pressure Difference.

D. International Accreditation Service (IAS):

1. IAS AC472 Accreditation Criteria for Inspection Programs for Manufacturers of Metal Building Systems, Part B.

E. US Green Building Council (USGBC): www.usgbc.org:
1. Leadership in Energy and Environmental Design (LEED) Green Building Rating System.

**1.04 QUALITY ASSURANCE**

A. Manufacturer/Source: Provide metal panel assemblies and accessories from a single manufacturer accredited under IAS AC472, Part B.

B. Installer Qualifications: Experienced Installer [certified by metal panel manufacturer] with minimum of five years experience with successfully completed projects of a similar nature and scope.
1. Installer's Field Supervisor: Experienced mechanic [certified by metal panel manufacturer] supervising work on site whenever work is underway.

C. Buy American Compliance: Materials provided under work of this Section shall comply with the following requirements:
1. Buy American Act of 1933 BAA-41 U.S.C §§ 10a – 10d.
2. Buy American provisions of Section 1605 of the American Recovery and Reinvestment Act of 2009 (ARRA).

D. Steel Construction Publications: Comply with published recommendations in the following, unless more stringent requirements are indicated.
1. American Institute of Steel Construction (AISC): "Steel Construction Manual."
2. American Iron and Steel Institute (AISI): "Cold Formed Steel Design Manual."

E. Contractor and Roofing Sub-contractor shall cooperate with Owner's professional roofing consultant, attend and participate in all related roofing consultant meetings and inspections, and correct all roofing deficiencies reported by the Owner's roofing consultant at no additional cost to the Owner.

**1.05 ADMINISTRATIVE REQUIREMENTS**

A. Preinstallation Meeting: Prior to erection of framing, conduct preinstallation meeting at site attended by Owner, Architect, metal panel installer, metal panel manufacturer's technical representative, inspection agency and related trade contractors.
1. Coordinate building framing in relation to metal panel system.
2. Coordinate openings and penetrations of metal panel system.
3. Coordinate work of Division 07 Sections "Roof Specialties" and "Roof Accessories" and openings and penetrations and manufacturer's accessories with installation of metal panels.

**1.06 ACTION SUBMITTALS**

A. Product Data: Manufacturer’s data sheets for specified products. Include data indicating compliance with performance requirements.

B. Shop Drawings: Show layouts of metal panels. Include details of each condition of installation, panel profiles, and attachment to building. Provide details at a minimum scale 1-1/2-inch per foot of edge conditions, joints, fastener and sealant placement, flashings, openings, penetrations, and special details. Make distinctions between factory and field assembled work.
1. Indicate points of supporting structure that must coordinate with metal panel system installation.
2. Include structural data indicating compliance with performance requirements and requirements of local authorities having jurisdiction.

C. Samples for Initial Selection: For each exposed product specified including sealants. Provide representative color charts of manufacturer's full range of colors.

D. Samples for Verification: Provide 12-inch- (305 mm-) long section of each metal panel profile. Provide color chip verifying color selection.

**1.07 INFORMATIONAL SUBMITTALS**

A. Product Test Reports: Indicating compliance of products with requirements.

B. Qualification Information: For Installer firm and Installer's field supervisor.

C. IAS Accreditation Certificate: Indicating that manufacturer is accredited under provisions of IAS AC472 Part B.

D. Buy American Certification: Manufacturers' letters of compliance acceptable to authorities having jurisdiction, indicating that products comply with requirements.

E. Manufacturer's warranty: Unexecuted sample copy of manufacturer's warranty.

**1.08 CLOSEOUT SUBMITTALS**

A. Maintenance data.

B. Manufacturer's Warranty: Executed copy of manufacturer's warranty.

**1.09 DELIVERY, STORAGE, AND HANDLING**

A. Protect products of metal panel system during shipping, handling, and storage to prevent staining, denting, deterioration of components or other damage. Protect panels and trim bundles during shipping.
   1. Deliver, unload, store, and erect metal panels and accessory items without misshaping panels or exposing panels to surface damage from weather or construction operations.
   2. Store in accordance with Manufacturer's written instruction. Provide wood collars for stacking and handling in the field.
   3. Shield foam insulated metal panels from direct sunlight until installation.

**1.10 WARRANTY**

A. Special Manufacturer's Warranty: On manufacturer's standard form, in which manufacturer agrees to repair or replace metal panel assemblies that fail in materials and workmanship within Five (5) year from date of Substantial Completion.

B. Special Panel Finish Warranty: On Manufacturer's standard form, in which Manufacturer agrees to repair or replace metal panels that evidence deterioration of factory-applied finish within the warranty period, as follows:
   1. Fluoropolymer Two-Coat System:
      a. Basis of Design System: MBCI, Signature 300.
      b. Color fading in excess of 5 Hunter units per ASTM D2244.
      c. Chalking in excess of No. 8 rating per ASTM D4214.
      d. Failure of adhesion, peeling, checking, or cracking.
      e. Warranty Period: 40 years from date of Substantial Completion.

**PART 2 PRODUCTS**

**2.01 MANUFACTURER**

A. Basis of Design Manufacturer: MBCI Metal Roof and Wall Systems, Division of NCI Group, Inc.; Houston TX. Tel: (877)713-6224; Email: info@ecoficientseries.com; Web: www.mbci.com.
   1. Provide basis of design product, or comparable product approved by Architect prior to bid.

## 2.02 PERFORMANCE REQUIREMENTS

A. General: Provide metal panel system meeting performance requirements as determined by application of specified tests by a qualified testing facility on manufacturer's standard assemblies.

B. Structural Performance: Provide metal panel assemblies capable of withstanding the effects of indicated loads and stresses within limits and under conditions indicated, as determined by ASTM E1592:
   1. Wind Loads: Determine loads based on uniform pressure, importance factor, exposure category, and basic wind speed indicated on drawings.
      a. Wind Negative Pressure: Certify capacity of metal panels by actual testing of proposed assembly.
   2. Deflection Limits: Withstand inward and outward wind-load design pressures in accordance with applicable building code with maximum deflection of 1/120 of the span with no evidence of failure.
   3. Seismic Performance: Comply with ASCE 7 Sections 9, "Earthquake Loads."

C. Thermal Movements: Allow for thermal movements from variations in both ambient and internal temperatures. Accommodate movement of support structure caused by thermal expansion and contraction. Allow for deflection and design for thermal stresses caused by temperature differences from one side of the panel to the other.

## 2.03 FORMED METAL SOFFIT AND LINER PANELS

A. Flush-Profile, Concealed Fastener Metal Soffit Panels: Metal panels consisting of formed metal sheet with vertical panel edges, with flush joints between panels, field assembled with nested lapped edges, and attached to supports using concealed fasteners.
   1. **Basis of Design: MBCI, L12 - 0**, **flush panel**.
   2. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A792/A792M, structural quality, Grade 50, Coating Class AZ50 (Grade 340, Coating Class AZM150), prepainted by the coil-coating process per ASTM A755/A755M.
      a. Nominal Thickness: 24 gage coated thickness, with surface.
         1) Exterior Finish: Fluoropolymer two-coat system.
         2) Color: Match Architect's sample
      b. Panel Width: 12 inches, flush panel.
      c. Panel Thickness: 1 Inch.

## 2.04 MISCELLANEOUS MATERIALS

A. General: Provide complete metal panel assemblies incorporating trim, fasciae, and miscellaneous flashings. Provide required fasteners, closure strips, and sealants as indicated in manufacturer's written instructions.

B. Flashing and Trim: Match material, thickness, and finish of metal panels.

C. Fasteners: Self-tapping screws and other acceptable fasteners recommended by metal panel manufacturer. Where exposed fasteners cannot be avoided, supply corrosion-resistant fasteners with heads matching color of metal panels by means of factory-applied coating, with weathertight resilient washers.

## 2.05 FABRICATION

A. General: Provide factory fabricated and finished metal panels, trim, and accessories meeting performance requirements, indicated profiles, and structural requirements.

B. Sheet Metal Flashing and Trim: Fabricate flashing and trim to comply with manufacturer's written instructions, approved shop drawings, and project drawings.

**2.06 FINISHES**

A. Finishes, General: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

B. Fluoropolymer Two-Coat System: 0.2 – 0.3 mil primer with top coat 1.0 mils minimum fluoropolymer color coat, AAMA 621.
   a. Basis of Design: MBCI, Signature 300, AAMA 2605, 70% PVDF equal to Kynar 500, Haylar 5000.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

A. Examine metal panel system substrate with Installer present. Inspect for erection tolerances and other conditions that would adversely affect installation of metal panels.
   1. Inspect framing that will support insulated metal panels to determine if support components are installed as indicated on approved shop drawings and are within tolerances acceptable to metal panel manufacturer and installer. Confirm presence of acceptable framing members at recommended spacing to match installation requirements of metal panels.

B. Correct out-of-tolerance work and other deficient conditions prior to proceeding with insulated metal panel installation.

**3.02 METAL PANEL INSTALLATION**

A. Concealed-Fastener Formed Metal Soffit and vertical wall Panels: Install metal panel system in accordance with manufacturer's written instructions, approved shop drawings, project drawings, and referenced publications. Install metal panels in orientation, sizes, and locations indicated. Anchor panels and other components securely in place. Provide for thermal and structural movement.

B. Fasten metal panels to supports with fasteners at each location indicated on approved shop drawings, at spacing and with fasteners recommended by manufacturer. Fasten panel to support structure through leading panel flange. Fit back flange of subsequent panel into secured flange of previous panel.
   1. Cut panels in field where required using manufacturer's recommended methods.
   2. Dissimilar Materials: Where elements of metal panel system will come into contact with dissimilar materials, treat faces and edges in contact with dissimilar materials as recommended by metal panel manufacturer.

C. Attach panel flashing trim pieces to supports using recommended fasteners.

**3.03 ACCESSORY INSTALLATION**

A. General: Install metal panel accessories with positive anchorage to building and weather tight mounting; provide for thermal expansion. Coordinate installation with flashings and other components.
   1. Install components required for a complete metal panel assembly, including trim, flashings, sealants, closure strips, and similar items.
   2. Comply with details of assemblies utilized to establish compliance with performance requirements and manufacturer's written installation instructions.
   3. Set units true to line and level as indicated. Install work with laps, joints, and seams that will be permanently weather resistant.

### 3.04 FIELD QUALITY CONTROL

A. The contractor shall have panel installation performed by an installer that is sanctioned by the manufacturer and have a manufacture's representative make an inspection during the installation.

### 3.05 CLEANING AND PROTECTION

A. Clean finished surfaces as recommended by metal panel manufacturer.

B. Replace damaged panels and accessories that cannot be repaired to the satisfaction of the Architect.

**END OF SECTION**

# SECTION 07 5520
# COLD-APPLIED SBS-MODIFIED BITUMINOUS MEMBRANE ROOFING

## PART 1 GENERAL

### 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### SUMMARY

A. The extent of Modified Bitumen roofing is indicated on the drawings and by provisions of this section, and is defined to include the following:

B. Section Includes:
   1. Cold-applied roofing system.
   2. Cover Board.
   3. Insulation.
   4. Substrate Board.

C. Related Sections include the following:
   1. Division 07 Section "Sheet Metal Flashing and Trim" for roof flashings, and trim.

### DEFINITIONS

A. Roofing Terminology: Refer to ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.

B. Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems," before multiplication by a safety factor.

C. Factored Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems," after multiplication by a safety factor.

### PERFORMANCE REQUIREMENTS

A. General: Provide installed roofing membrane and base flashings that remain watertight; do not permit the passage of water; and resist specified uplift pressures, thermally induced movement, and exposure to weather without failure.

B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by roofing manufacturer based on testing and field experience.
   1. C. WIND UPLIFT RESISTANCE:
      a. Performance testing shall be in accordance with ANSI/FM 4474, FM 4450, FM 4470, UL 580 or UL 1897.
      b. Roof System Design Pressures: Calculated in accordance with ASCE 7, or applicable standard, for the specified roof system attachment requirements.
      c. System Testing and Qualification
         1) A tested assembly is required to meet the pressures for each roof zone. Prescriptive enhancements will not be allowed per IBC.

C. FIRE CLASSIFICATION:
   1. 1. Performance testing shall be in accordance with UL 790, ASTM E108, FM 4450 or FM 4470 to meet the 1/4:12 roof slope requirement.

1) Meets requirements of UL Class A or FM Class A.
(a) Performance testing shall be in accordance with UL 1256, FM 4450 or FM 4470 to meet the specified requirements for interior flame spread and fuel contribution.
2) Meets requirements of UL 1256, or FM Class 1.

2. E. ROOF SLOPE:
a. 1. Roof slope for SBS modified bitumen surfaces shall be 1/4 inch (6.35 mm) per foot minimum roof drainage unless more slope is required. Note the contractor shall verify if the existing roof structure has any slope and that with a new roof system slope must result in a new minimum roof slope min.1/4" slope per foot and counter-slopes min. 1/2“ or greater where indicated.

D. IMPACT RESISTANCE:
a. Performance testing for impact resistance shall be in accordance with FM 4450, FM 4470, ASTM D3746 or CGSB 37-GP 56M to meet the specified impact resistance requirements.
1) Meets requirements for FM-SH (Severe Hail), ASTM D3746, or CGSB 37-GP 56M.

E. G. CYCLIC FATIGUE:
1. The roof system shall pass ASTM D5849 Standard Test Method for Evaluating Resistance of Modified Bituminous Roofing Membrane to Cyclic Fatigue (Joint Displacement). Passing results shall show no signs of cracking, splitting or tearing over the joint.
1) Roof system shall pass Test Condition 5, tested at -4ºF (-20ºC) in accordance with ASTM D5849. (polyester reinforced membranes).

**SUBMITTALS**

A. Product Data: For each type of product indicated.

B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other Work.
1. Base flashings, cants and membrane terminations.
2. Crickets, saddles and tapered edge strips, including slopes.
3. Base sheet fastening patterns for corner, perimeter, and field-of-roof locations.

C. Installer Certificates: Signed by roofing system manufacturer certifying that Installer is a Master Contractor or a Tier 1 Contractor for the past five (5) consecutive years.

D. The Contractor shall provide signed certification from the Roofing Manufacturer that the roof design provided for this project complies with the performance requirements as set forth by applicable applications in IBC Chapter 15, Section 1504.
1. The certification shall be attached to the Roof Warranty provided at the close out of the project.

E. Manufacturer Certificates: Signed by roofing manufacturer certifying that roofing system complies with requirements specified in "Performance Requirements" and "Quality Assurance" Articles.
1. Submit evidence of meeting performance requirements.

F. Qualification Data: For Installer and manufacturer.

G. Maintenance Data: For roofing system to be included in maintenance manuals.

H. Research/Evaluation Reports: For components of membrane roofing system.

I. Warranties: Special warranties specified in this Section.

J. Inspection Report: Copy of roofing system manufacturer's inspection report of completed roofing installation.

**QUALITY ASSURANCE**

A. The Owner reserves the right to allow the Roofing Consultant to direct the roofing contractor to take test cuts and/or cores to review the application of the newly installed new roof system, waterproofing assembly, or protective membrane/barrier on a weekly basis for the propose of quality assurance and compliance with material installation and application requirements of the system as specified in this specification. The roofing contractor will be required to repair all test cuts and/or cores in accordance with the roof system manufacturer's instruction for warranty purposes.

B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by membrane roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty. The contractor shall currently hold Master or Tier 1 status with the manufacturer and shall have maintained that status for a minimum period of three (3) years. A single Installer ("Roofer") shall perform the roofing work of this Project and shall be a firm with not less than ten (10) years of successful experience in installation of Modified Bituminous roofing systems similar to that required for this project. Installer shall have a minimum five (5) years of successful installation with the same approved roofing manufacturer. Also, contractor/ installer/sub-contractor ("Roofer") is to have been in business under the same name and organization for the past five (5) consecutive years. Second or third tier sub-contractors will not be allowed.

C. Contractor Field Supervision: Contractor is to maintain a full-time Project Superintendent on job site at all times that any work is being performed under this contract. Any work performed during times when the Project Superintendent is not on-site is subject to rejection. The Project Superintendent who began the project will continue in that capacity for the duration of the project unless a change is request by the Owner Representative or Architect/Consultant.
   1. Project Superintendent must have ten (10) years successful installations of roofing systems similar to type(s) and scope required for this Project.
   2. Provide Project Superintendent's resume including references with Proposal Form.

D. Manufacturer Qualifications: A qualified manufacturer that has UL listing FMG approval for membrane roofing system identical to that used for this Project. Manufacturer shall have a minimum ten (10) years of successful manufacture of membrane using the same formula.
   1. Obtain components for roofing system from or approved by roofing system manufacturer Provide primary products, including each type of roofing sheet, bitumen, composition flashings, and vapor barrier (if any), produced by a single manufacturer. Provide secondary products only as recommended and approved by the manufacturer of primary products for use with roofing system specified.
   2. Factory-Authorized Technical Representative Qualifications: An authorized representative of manufacturer who is trained and approved by manufacturer to inspect installation of manufacturer's products that are similar in material, design and extent to those indicated for this Project.
      a. The factory-authorized representative is to provide a minimum three (3) inspections of field-assembled components and equipment installation. One inspection at start-up, one interim and one final. Provide report results in writing to Architect within three (3) days following each inspection.

E. Source Limitations: Obtain components for roofing system from or approved by roofing system manufacturer. Provide primary products, including each type of roofing sheet, bitumen, composition flashings, and vapor barrier (if any), produced by a single manufacturer. Provide secondary products only as recommenced by the manufacturer of primary products for use with roofing system specified.

F. Fire-Test-Response Characteristics: Provide roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.
   1. Exterior Fire-Test Exposure: Class A; ASTM E 108, for application and roof slopes indicated.
   2. Fire-Resistance Ratings: ASTM E 119, for fire-resistance-rated roof assemblies of which roofing system is a part.

G. PRE-ROOF APPLICATION CONFERENCE: Approximately ten days prior to scheduled commencement of the modified bitumen roofing installation and associated work, meet at project site with Installer, installer of each component of associated work, installers of deck or substrate construction to receive roofing work, installers of roof-top units and/or other work in and around roofing which must precede or follow roofing work (including mechanical work if any), Owner, State of Alabama Department of Construction Management Inspector, Architect / Consultant, Roof Installer, Roof Systems Manufacturer's Representative, and other representatives directly concerned with performance of the work including (where applicable) Owner's insurers, test agencies, and governing authorities. ATTENDANCE OF THE ROOF INSTALLER'S PROJECT FOREMAN IS MANITORY.

H. The pre-roofing conference is intended to clarify demolition (for renovation or re-roofing projects) and application requirements for work to be completed before roofing operations can begin. This would include a detailed review of the specifications, roof plans, roof deck information, flashing details, and approved shop drawings, submittal data, and samples. If conflict exists between the specifications and the Manufacturer's requirements, this shall be resolved.

I. If this pre-roofing conference cannot be satisfactorily concluded without further inspection and investigation by any means of the parties present, it shall be reconvened at the earliest possible time to avoid delay of the work. In no case should work proceed without inspection of all roof deck areas and substantial agreement on all points.

J. The Architect/Consultant shall prepare a written report indicating actions taken and decisions made at this pre-roofing conference. This report shall be made a part of the project record and copies furnished the Contractor, the Owner.

K. The following are to be accomplished during the conference.
   1. Review all Factory Mutual and Underwriters Laboratories requirements listed in the specifications and resolve any questions or conflicts that may arise.
   2. Establish trade-related job schedules, including the installation of roof-mounted mechanical equipment.
   3. Establish roofing schedule and work methods that will prevent roof damage.
   4. Require that all roof penetrations and walls be in place prior to installing the roof.
   5. Establish those areas on the job site that will be designed as work and storage areas for roofing operations.
   6. Establish weather and working temperature conditions to which all parties must agree.

7. Establish acceptable methods of protecting the finished roof if any trades must travel across or work on or above any areas of the finished roof.
8. Review foreseeable methods and procedure related to roofing work, including but not necessarily limited to the following:
    a. Tour representative areas of roofing substrates (decks), inspect and discuss condition of substrate, roof drains, curbs, penetrations and other preparatory work performed by other trades.
    b. Review structural loading limitations of decks and inspect decks for loss of flatness and for required mechanical fastening.
    c. Review roofing system requirements (drawings, specifications and other contract documents).
    d. Review required submittals, both completed and yet to be completed.
    e. Review and finalize construction schedule related to roofing work and verify availability of materials, Installer's personnel, equipment and facilities needed to make progress and avoid delays.
    f. Review required inspection, testing, certifying and material usage accounting procedures.
    g. Review weather and forecast' weather conditions, and procedures for coping with unfavorable conditions, including possibility of temporary roofing (if not a mandatory requirement).
    h. Review roof application procedures, technique, details and roof specifics, e.g. review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
    i. Review job specific safety requirements, safety barriers, street blacking, haul routes, building access, site contact, facilities, security, etc.

**DELIVERY, STORAGE, AND HANDLING**

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storage.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
    1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

D. Store and handle roofing roll goods and rigid insulation boards in a manner which will ensure that there is no possibility of significant moisture pick-up.

E. All material must be protected from the weather by protective tarps. Manufacturer's plastic covers are not acceptable means of protection.

F. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

**PROJECT CONDITIONS**

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

B. At the end of each days work temporary cut-offs and tie-ins shall be made weathertight, no exceptions.

C. At the end of the days work all materials stored materials are to be recovered, tied and weighted down.

**WARRANTY**

A. The Contractor is to provide a Manufacturer's Roof System 20-Year TOTAL SYSTEM "No Dollar Limit" (NDL) or "Without Monetary Limitations" Warranty, covering all materials and installations for a period of Twenty (20) years from date of completion from the manufacturer of primary roofing materials.
   1. NOTE: Standard manufacturer's roofing guarantees which contain language regarding the governing of the guarantee by any state other than the State of Alabama, must be amended to exclude such language, and substituting the requirement that the laws of the State of Alabama shall govern all such guarantees.

B. Manufacturer's Warranty: Manufacturer's TOTAL SYSTEM WARRANTY, "No Dollar Limit" (NDL) "Without Monetary Limitations", in which manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period. Failure includes roof leaks.
   1. Special warranty includes roofing membrane, base flashings, roofing membrane accessories, roof insulation, fasteners, cover boards, substrate boards, walkway products and other components of roofing system.
   2. The Contractor shall provide signed certification from the Roofing Manufacturer that the roof design provided for this project complies with the performance requirements as set forth by applicable applications in IBC Chapter 15, Section 1504.
      a. The certification shall be attached to the Roof Warranty provided at the close out of the project.
   3. Warranty Period: Twenty (20) years from date of Substantial Completion.

C. All roof and related warranties shall be provided to the Architect/Consultant for review and approval with the Contractors request for Final Inspection to obtain Substantial Completion.

D. Contractor shall submit a copy of his Manufacturer's Warranty Notification prior to purchase of materials and start of work.

**PART 2 PRODUCTS**

**10.01 MANUFACTURERS**

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. SBS-Modified Bituminous Membrane Roofing:
      a. GAF
      b. SR Products
      c. Soprema

B. In other Part 2 articles where titles below introduce lists, the following requirements apply for product selection:

1. Products: Subject to compliance with requirements, provide one of the products specified.
2. Manufacturers: Subject to compliance with requirements, provide products by the manufacturers specified.
    a. SBS-MODIFIED MEMBRANE CAP SHEET

C. Roofing Membrane Cap Sheet: ASTM D 6164, Grade G, Type II, polyester-reinforced 250 gram fire rated (FR) SBS-modified asphalt sheet; granular surfaced; suitable for application method specified.
1. Granule Color: White.
    a. SBS-MODIFIED PLY MATERIALS

D. Base-Sheet Ply: ASTM D 6164, Grade S, Type I or II, Maximum one (1) square roll, polyester-reinforced, SBS-modified asphalt sheet; smooth surfaced; suitable for application method specified. Manufacturers acceptable for this type membrane are GAF and Johns Manville.
1. 1-ply application.
    a. SBS-MODIFIED MEMBRANE BASE FLASHING MATERIALS

E. Flashing Membrane Sheet (2nd layer): ASTM D 6164, Grade G, Type II, polyester-reinforced 250 gram fire rated (FR) SBS-modified asphalt sheet; granular surfaced; suitable for application.
1. Granule Color: White

F. Flashing Membrane Sheet (1st layer): ASTM D 6164, Grade S, Type I or II, minimum one (1) square roll, polyester-reinforced, SBS-modified asphalt sheet; smooth surfaced; suitable for application method specified, and as follows:
    a. 1-ply application, Cold Applied or Torch Grade.

G. Flashing Membrane Sheet: Optional manufacturer's standard 2-ply modified base flashing systems may be used for roof system specified and warranty requirements.

H. Glass-Fiber Fabric: Woven glass-fiber cloth, treated with asphalt, complying with ASTM D 1668, Type I, at all base flashing lap joints and corners.
    a. AUXILIARY ROOFING MEMBRANE MATERIALS

I. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing membrane.

J. Cant Strip: 1½" x 4" factory fabricated from frigid perlite insulation board, cut at angles to provide a true 45 degree angle between horizontal and vertical surfaces and meeting a flame spread rating of 35.

K. Asphalt Primer: ASTM D 41.

L. Cold Application Adhesive: ASTM D 3019 Type III and ASTM D 4479 Type I, asbestos free Roofing system manufacturer's standard asphalt-based, cold applied adhesive specially formulated for compatibility and use with modified bituminous membrane roofing and flashings.

M. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required by roofing system manufacturer for application.

N. Mesh Roof Fabric;
1. Width: 6 inches (152.4 mm)

O. Mastic Sealant: Polyisobutylene, plain or modified bitumen, non-hardening, non-migrating, non-skinning, and non-drying.

P. Nailers and Curbs: Wood nailers and curbs are specified in Section 061053 "Miscellaneous Rough Carpentry".

Q. Metal Flashing Sheet: Metal flashing sheet is specified in Division 07 Section "Sheet Metal Flashing and Trim."

R. Roofing Granules: Ceramic-coated roofing granules, No. 11 screen size with 100 percent passing No. 8 sieve and 98 percent of mass retained on No. 40 sieve, color to match roofing membrane.

S. Miscellaneous Accessories: Provide miscellaneous accessories recommended by roofing system manufacturer.
    a. ROOF INSULATION

T. General: Provide preformed roof insulation boards that comply with requirements and referenced standards, selected from manufacturer's standard sizes and of thicknesses indicated.

U. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2 20 psi (137.90 kPa), glass-fiber mat facer on both major surfaces.
    1. Thickness: As indicated.

V. Tapered Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2 20 psi (137.90 kPa), glass-fiber mat facer on both major surfaces.
    1. Start Thickness: As indicated.

W. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes of ½-inch per 12-inches unless otherwise indicated.
    a. INSULATION ACCESSORIES

X. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatible with membrane roofing.

Y. Insulation/Coverboard Adhesive: Bead-Applied Roofing Adhesive: Bead-applied low-rise one- or multi-component urethane adhesive formulated to attach cover board to substrate or to insulation layer.
    1. Product / Manufacturer:
        a. "OlyBond" by OMG Roofing Products.
        b. Primary roofing materials manufacturer approved equal.

Z. Metal Deck Insulation Fasteners: Factory-coated steel fasteners and metal plates meeting corrosion-resistance provisions in FMG 4470designed for fastening roofing membrane components to substrate, tested by manufacturer for required pullout strength, and acceptable to roofing system manufacturer. Meeting or exceeding FM 1A-90 uplift requirements.
    1. 1. Metal Deck Fasteners: Extra Heavy Duty #15 by OMG Roofing Products or approved equal. NOTE: Top flange deck attachment only. Fasteners shall not penetrate the deck more that 1½-inches.
        a. SUBSTRATE BOARD

AA. Substrate Board: ASTM C 1177/C 1177M, glass-mat facing front and back, water-resistant gypsum core.
    1. Product "Securock by USG".
    2. Thickness: ⅝-inch Fire Rated Type X.

BB. Substrate Board Fasteners: Factory-coated steel fasteners and metal plates meeting corrosion-resistance provisions in FMG 4470designed for fastening roofing membrane components to substrate, tested by manufacturer for required pullout strength, and acceptable to roofing system manufacturer. Meeting or exceeding FM 1A-90 uplift requirements.
   1. 1. Substrate Board Fasteners: Extra Heavy Duty #15 by OMG Roofing Products or approved equal.
      a. COVER BOARD

CC. Cover Board: ASTM C 1278/C 1278M, Gypsum-Fiber roof board.
   1. Product:
      a. Securock Gypsum-Fiber Roof Board by USG.
      b. Approved equal.
      c. Thickness: ½-inch.

DD. Cover Board Adhesive: Bead-Applied Roofing Adhesive: Bead-applied low-rise one- or multi-component urethane adhesive formulated to attach cover board to substrate or to insulation layer.
   1. Product / Manufacturer:
      a. "OlyBond" by OMG Roofing Products.
      b. Primary roofing materials manufacturer approved equal.
      c. AUXILIARY MATERIALS AND ACCESSORIES

EE. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with roofing membrane.

FF. Sheet Metal Accessories: See Division 07 Section "Sheet Metal Flashing and Trim" for roof penetration flashings, flashings and counterflashings.
   1. Penetration Pitch Pocket Sealer: 1-part polyurethane pourable sealer designed for filling penetration pockets in conjunction with the roofing system manufacturer's recommendation.
   2. Pipe flashings: 4 lb. sheet of common desilverized pig lead.

**PART 3 EXECUTION**

**11.01 DEMOLITION, GENERAL**

A. Refer to Division 07 Section "Preparation for Re-Roofing" for demolition and removal of the existing roof system and existing roof deck preparation.

B. No roofing materials will be removed or installed under adverse weather conditions. All work shall be scheduled and executed without exposing interior building areas to the effects of inclement weather. The existing building and its contents shall be protected against all reasonable risks.

C. Only as much existing roofing shall be removed and new roofing installed as can be made weather-tight each day. This includes all flashing work.

D. All existing roofing materials torn-off shall be immediately removed from the site to a dumping area authorized to receive such debris.

E. Any unusual or concealed conditions discovered during the course of the work that may adversely affect the performance of the new roof system must be immediately reported to the Architect/Consultant. All work shall be halted until the Architect/Consultant has responded with a solution to the problem.

F. Any substrate to receive new membrane or flashing shall be thoroughly dry. Existing wet materials must be removed prior to the application of the new membrane system. Should surface moisture occur on the decking, the contractor shall provide adequate equipment to dry the substrate.

G. Temporary waterstops shall be installed at the end of each work day and if inclement weather conditions dictate during the course of day's work. These temporary waterstops shall be removed at the start of the next work day and disposed of properly. No temporary waterstops shall be made so as to obstruct water flow on the completed system (i.e. crickets, drain sumps, etc.). Polyethylene is not considered a temporary covering.
    a. EXAMINATION

H. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:
    1. Verify that roof openings and penetrations are in place, set and braced.
    2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and nailers match thicknesses of insulation.
    3. Proceed with installation only after unsatisfactory conditions have been corrected

**PREPARATION**

A. Clean and prepare substrate according to manufacturer's written recommendations. Provide clean, dust-free, and dry substrate for roofing application.

B. Mask off adjoining surfaces not receiving roofing to prevent spillage from affecting other construction.

C. Protect roof drains and other deck penetrations to prevent spillage and migration of roofing fluids.

D. Remove grease, oil, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

E. Remove fins, ridges, and other projections and fill honeycomb, aggregate pockets, and other voids.
    a. ROOFING MEMBRANE INSTALLATION
        1) Install roofing membrane system according to roofing system manufacturer's written instructions and applicable recommendations of ARMA/NRCA's "Quality Control Guidelines for the Application of Polymer Modified Bitumen Roofing."
        2) Cooperate with testing and inspecting agencies engaged or required to perform services for installing roofing system.

F. On decks with a slope up to ½-inch per foot, the roofing felts and modified bitumen sheet may be installed either perpendicular or parallel to the deck incline. Roll an 18-inch wide piece of the base plys into a full coating of cold applied adhesive. The remaining base plys are to be applied full width, in the same manner. Use a hot air gun or torch on 3-inch side and 6-inch end laps. All laps must be rolled with a 3-inch rounded edge roller. A ⅛-inch to ⅜-inch bleedout of SBS compound shall be visible at the edge of all seams. All laps must be checked for good adhesion.

G. Apply a full width piece of cap sheet into a full coating of cold applied adhesive. Subsequest sheets are to be applied in the same manner, with 4-inch side and 6-inch end laps over the preceding sheets.

H. Prepare the 6-inch end lap by removing all loose granular. Heat and embed all remaining granular with a hot air gun or torch. Apply heat to the 4-inch side and 6-inch end lap making sure both have a good compound flow to adhere to the two surfaces. All Laps must be rolled with a 3-inch rounded edge roller. A ⅛-inch to ⅜-inch bleedout of SBS compound shall be visible at the edge of all seams. All laps must be checked for good adhesion.

I. Coordinate installing roofing system so insulation and other components of the roofing membrane system not permanently exposed are not subjected to precipitation or left uncovered at the end of the workday or when rain is forecast.
   1. Provide tie-offs to the existing roof system at end of each day's work to cover exposed roofing membrane sheets and insulation with two course of coated felt set in roofing cement with joints and edges sealed.
   2. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system.
   3. Remove and discard temporary seals before beginning work on adjoining roofing.
      a. ROOF EDGE FLASHING INSTALLATION

J. Place primed metal edging over roofing membrane in a bed of cement. Strip the metal edge flashing with an 8-inch wide piece of ASTM D 6162, Type II, Grade S, set in a bed of cement, followed by roof membrane sheet.
      a. FIELD QUALITY CONTROL

K. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion and submit report to Architect/Consultant. Notify Architect/Consultant 48 hours in advance of date and time of inspection.
   1. Notify Architect/Consultant or Owner 48 hours in advance of date and time of inspection.

L. Repair or remove and replace components of roofing system where test results or inspections indicate that they do not comply with specified requirements.

M. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
      a. PROTECTING AND CLEANING

N. Protect roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect / Consultant and Owner.

O. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

**END OF SECTION**

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# SECTION 07 6200
# SHEET METAL FLASHING AND TRIM

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Fabricated sheet metal items, including flashings and counterflashings.

B. Sealants for joints within sheet metal fabrications. See Section 07 9200 sealants for types.

### 1.02 RELATED REQUIREMENTS

A. Section 07 4293- Flat Metal Soffit and Wall Panels

B. Section 06 1000 - Rough Carpentry: Wood nailers for sheet metal work.

C. Section 07 9200 - Joint Sealants: Sealing non-lap joints between sheet metal fabrications and adjacent construction.

D. Section 08 4313 - Aluminum Framed Storefront

### 1.03 REFERENCE STANDARDS

A. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2026.

B. ASTM D4479/D4479M - Standard Specification for Asphalt Roof Coatings - Asbestos-Free; 2007 (Reapproved 2024).

C. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007 (Reapproved 2018).

D. CDA A4050 - Copper in Architecture - Handbook; Current Edition.

E. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

### 1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week before starting work of this section.

### 1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate material profile, jointing pattern, jointing details, fastening methods, flashings, terminations, and installation details.

C. Samples: Submit two samples ____by____ inch (____by____ mm) in size illustrating metal finish color.

### 1.06 QUALITY ASSURANCE

A. Perform work in accordance with SMACNA (ASMM) and CDA A4050 requirements and standard details, except as otherwise indicated.

B. Maintain one copy of each document on site.

C. Fabricator and Installer Qualifications: Company specializing in sheet metal work with ____ years of documented experience.

D. The contractor shall be responsible for coordinating and holding a pre-installation conference. The required attendees shall be the Contractor, all related sub-contractors, the waterproofing subcontractor, project manager, and superintendent, and the waterproofing manufacturer's representative, the Owner, and Architect. Topics to be discussed include, but are not limited to delivery dates, specialty contractor skill sets and capabilities, work schedules, and approved submittals.

**1.07 MOCK UP**

A. Refer to 01 4000 Quality Requirements.

**1.08 DELIVERY, STORAGE, AND HANDLING**

A. Stack material to prevent twisting, bending, and abrasion, and to provide ventilation. Slope metal sheets to ensure drainage.

B. Prevent contact with materials that could cause discoloration or staining.

**1.09 WARRANTIES:**

A. Manufacturer's finish warranty:
   1. Covering bare metal against rupture, structural failure and perforation due to normal atmospheric corrosion exposure.
   2. Covering panel finish against cracking, checking, blistering, peeling, flaking, chipping, chalking and fading.
   3. Duration: twenty (20) years on PVDF coated metal.

B. Refer to 07 7833 - Special Project Warranties - 10 year warranty

**PART 2 PRODUCTS**

**2.01 SHEET MATERIALS**

A. Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24 gage, (0.0239) inch (0.61 mm) thick base metal, shop pre-coated with PVDF coating. Unless noted otherwise.
   1. New sheet metal **22 gauge** lintel covers over exising Steel Lintels PVDF finish equal to Kyner 500 2 coat . Coordinate installation with soffit, storefront and existing conditions. . Provide samples and shop drawings for architects approval. Illustrate how covers will be fastened. Field verify all existing dimensions and conditions prior to fabication.

B. Provide 304 Stainless steel termination bars at wall flashing. Refer to Section 07 6526 Self Adhering Sheet Flashing.

**2.02 ACCESSORIES**

A. Fasteners: Same material and finish as flashing metal, with soft neoprene washers.

B. Underlayment: High Temperture Self Adhered Underlayment Equal to Grace Ultra

C. Primer: As recommended by manufacturer for application and specified finish.

D. Protective Backing Paint: Asphaltic mastic, ASTM D 4479 Type I.

E. Plastic Cement: ASTM D4586, Type I.

**2.03 FABRICATION**

A. Form sections true to shape, accurate in size, square, and free from distortion or defects.

B. Fabricate cleats of same material as sheet, minimum 1 inches (____ mm) wide, interlocking with sheet. Provide continuous cleats where indicated on drawings and/or recommended by SMACNA.

C. Form pieces in longest possible lengths.

D. Hem exposed edges on underside 1/2 inch (13 mm); miter and seam corners.

E. Form material with flat lock seams, except where otherwise indicated; at moving joints, use sealed lapped, bayonet-type or interlocking hooked seams.

F. Fabricate corners from one piece with minimum 18 inch (450 mm) long legs; seam for rigidity, seal with sealant.

G. Fabricate vertical faces with bottom edge formed outward 1/4 inch (6 mm) and hemmed to form drip.

H. Fabricate flashings to allow toe to extend 2 inches (50 mm) over roofing gravel. Return and brake edges.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify roof openings, curbs, pipes, sleeves, ducts, and vents through roof are solidly set, reglets in place, and nailing strips located.

B. Verify roofing termination and base flashings are in place, sealed, and secure.

### 3.02 PREPARATION

A. Install starter and edge strips, and cleats before starting installation.

B. Back paint concealed metal surfaces with protective backing paint to a minimum dry film thickness of 15 mil (0.4 mm).

### 3.03 INSTALLATION

A. Secure flashings in place using concealed fasteners, and use exposed fasteners only where permitted..

B. Fit flashings tight in place; make corners square, surfaces true and straight in planes, and lines accurate to profiles.

C. Seal metal joints watertight.

### 3.04 FIELD QUALITY CONTROL

A. See Section 01 4000 - Quality Requirements, for field inspection requirements.

B. Inspection will involve surveillance of work during installation to ascertain compliance with specified requirements.

**END OF SECTION**

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# SECTION 07 6200
# SHEET METAL FLASHING AND TRIM

## PART 1 GENERAL

### 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.02 SUMMARY

A. Section Includes:
   1. Formed roof-drainage sheet metal fabrications and metal wall panels.

B. Related Requirements:
   1. Division 06 Section "Miscellaneous Rough Carpentry" for wood nailers, curbs, and blocking.
   2. Division 07 Section "Preparation for Re-roofing & Restoration" for demolition procedure and roof deck preparation.
   3. Division 07 Section "Standing-Seam Metal Roof Panels" for installation of Standing-Seam Roofing and accessories.
   4. Division 07 Section "Joint Sealers" for field-applied sealants not otherwise specified in the Section

### 1.03 COORDINATION

A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.

B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leak-proof, secure, and noncorrosive installation.

### 1.04 PRE-INSTALLATION MEETINGS

A. Pre-installation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination".
   1. Review construction schedule. Verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   2. Review special roof details, roof drainage, roof-penetration flashing, equipment curbs, and condition of other construction that affect sheet metal flashing and trim.
   3. Review requirements for insurance and certificates if applicable.
   4. Review sheet metal flashing observation and repair procedures after flashing installation.
   5. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
   6. Document proceeding, including corrective measures and actions required, and furnish copy of record to each participant.

### 1.05 ACTION SUBMITTALS

A. Product Data: For each type of product.
   1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

B. Shop Drawings: For sheet metal flashing and trim.
   1. Include plans, elevations, sections, and attachment details.
   2. Detail fabrication and installation layouts, expansion-joint locations, and keyed details.

3. Include identification of material, thickness, weight, and finish for each item and location in Project.
4. Include details for forming, including profiles, shapes, seams, and dimensions.
5. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
6. Include details of termination points and assemblies.
7. Include details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction from fixed points.
8. Include details of roof-penetration flashing.
9. Include details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counter-flashings as applicable.
10. Include details of special conditions.
11. Include details of connections to adjoining work.
12. Revise subparagraph below to suit Project. Delete if manufacturer's product data are adequate. Sheet metal flashing and trim fabricators do not custom form all accessory types.
13. Detail formed flashing and trim at scale of not less than 1-1/2-inches per 12-inches.

C. Samples for Initial Selection: For each type of sheet metal and accessory indicated with factory-applied finishes.

D. Samples for Verification: For each type of exposed finish.
1. Sheet Metal Flashing: 12-inches (300-mm) long by actual width of unit, including finished seam and in required profile. Include fasteners, cleats, clips, closures, and other attachments.
2. Trim, Metal Closures, Expansion Joints, Joint Intersections, and Miscellaneous Fabrications: 12-inches (300-mm) long and in required profile. Include fasteners and other exposed accessories.
3. Unit-Type Accessories and Miscellaneous Materials: Full-size Sample.

## 1.06 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator.
1. 1. Fabrication Shop Certification Data: ANSI/SPRI-ES-1 Certification.

B. Product Test Reports: For each product, for tests performed by a qualified testing agency.

C. Sample Warranty: For special warranty.

## 1.07 CLOSEOUT SUBMITTALS

A. Maintenance Data: For sheet metal flashing and trim, and its accessories, to include in maintenance manuals.

## 1.08 QUALITY ASSURANCE

A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

## 1.09 DELIVERY, STORAGE, AND HANDLING

A. Deliver sheet metal flashing materials and fabrications undamaged. Protect sheet metal flashing and trim materials and fabrications during transportation and handling.

B. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

C. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

### 1.10 WARRANTY

A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
   1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
      a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
      b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
      c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
   2. Finish Warranty Period: 20 years from date of Substantial Completion.

## PART 2 PRODUCTS

### 2.01 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

C. FM Approvals Listing: Manufacture and install copings and roof edge flashings that are listed in FM Approvals' "RoofNav" and approved for windstorm classification. Identify materials with name of fabricator and design approved by FM Approvals.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
   1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

### 2.02 SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.

B. Aluminum-Zinc alloy-coated steel sheet (Galvalume); produced according to ASTM Specification A792/A792M-97a "Steel Sheet, 55% Aluminum-Zinc Alloy-Coated by Hot-Dip Process." Structural quality, AZ50 or 0.50 oz/sq. ft. (150 g/sq. m.) architectural Galvalume. Colors shall consist of 70% PVDF Kynar/Hylar. Manufacturer shall offer colors that provide reflectivity and emissivity standards, in accordance with Energy Star Ratings, DOE and LEED criteria. Colors shall provide for an SRI rating of minimum 29 @ slopes of 2:12 or greater. All colors shall be identified as LEED qualified and "COOL" colors to meet Energy Star compliance, 24 gauge.
   1. Color: As selected by Architect/Consultant from manufacturer's full range.

### 2.03 SELF-ADHERING UNDERLAYMENT SHEET

A. General: A Self-Adhering Sheet Underlayment meeting ASTM D 1970, minimum of 40-mil composite consisting of 35 mils (0.889 mm) of self-adhering rubberized asphalt laminated to a 5-mil woven polypropylene film and a one-piece silicone poly release liner.
   1. Product: VapAir Seal 725 TR
   2. Manufacturer: Carlisle Syntec Systems, www.csrlislesyntec.com

### 2.04 METAL FASCIA PANELS

A. Fascia panels shall be an integral batten seam system fabricated from high-grade aluminum and coated with premium Kynar 500 PVDF resin-based finish to resist UV degradation, and chalking. Panel shall be No. 250 Fascia/Soffit Panel System.
   1. 1. Manufacturer: Cheney Flashing; info@cheneyflashing.com.
   2. 2. Phone 301-931-2556.

### 2.05 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.

B. Fasteners: Wood screws, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.
   1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
      a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
      b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
   2. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
   3. Fasteners for Zinc-Coated (Galvanized) Aluminum-Zinc Alloy-Coated Steel Sheet: Series 300 stainless.
   4. Fasteners for attachment of wood nailers and blocking: Series 300 Stainless steel screws.

C. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, non-sag, nontoxic, non-staining tape ½-inch (13-mm) wide and 1/8 inch (3.18 mm) thick.

D. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

E. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

### 2.06 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashings and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
   1. Fabricate sheet metal flashings and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.

2. Obtain field measurements for accurate fit before shop fabrication.
3. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of ¼-inch in 20-feet (6-mm in 6-m) on slope and location lines indicated on Drawings and within ⅛-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
1. Use lapped expansion joint unless otherwise shown.
2. Form expansion joints of intermeshing hooked flanges, not less than 1-inch (25-mm) deep, filled with butyl sealant concealed within joints as indicated on the drawings.

D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.

E. Fabricate cleats and attachment devices from galvanized steel.
1. 1. Thickness: As indicated, minimum 20-gauge, or as required for ANSI-SPRI ES-1.

F. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use, rivet joints where necessary for strength.

G. Do not use graphite pencils to mark metal surfaces.

## 2.07 ROOF-DRAINAGE SHEET METAL FABRICATIONS

A. Conductor Head: Fabricate to cross section indicated.
1. Conductor Head: SMACNA designation as indicated.
2. Fabricate from the following materials:
a. Pre-Finished Aluminum-Zinc Alloy-Coated Steel: 24-gauge, minimum.

B. Downspouts: Fabricate rectangular downspouts complete with mitered elbows. Furnish with metal hangers, from same material as downspouts, and anchors.
1. Fabricated Hanger Style: SMACNA figure designation as indicated.
2. Fabricate from the following materials:
a. Pre-Finished Aluminum-Zinc Alloy-Coated Steel: 24-gauge, minimum.
1) LOW-SLOPE ROOF SHEET METAL FABRICATIONS

C. Fascia Cladding: Fabricate from the following materials:
1. Pre-Finished Aluminum-Zinc Alloy-Coated Steel: 24-gauge, minimum.

D. Counter Flashing: Fabricate from the following materials:
1. Pre-Finished Aluminum-Zinc Alloy-Coated Steel: 24-gauge, minimum.

E. Standing Seam Copping: Fabricate from the following materials:
1. Pre-Finished Aluminum-Zinc Alloy-Coated Steel: 24-gauge, minimum.

F. Expansion Joint: Fabricate from the following materials:
1. Pre-Finished Aluminum-Zinc Alloy-Coated Steel: 24-gauge, minimum.
a. Scupper Liner: Fabricate from the following materials:
2. Stainless Steel: 0.15 gauge, minimum.
3. Scupper Trim: Pre-Finished Aluminum-Zinc Alloy-Coated Steel: 24-gauge, minimum.

G. Bent Plate: Fabricate from the following materials:
   1. Steel Plate: 12-gauge. Minimum.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.
   1. Verify compliance with requirements for installation tolerances of substrates.
   2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.02 UNDERLAYMENT INSTALLATION**

A. Install underlayment as indicated on the drawings.

B. Sheet Underlayment: Install underlayment, under sheet metal flashings and trim as indicated. Apply in shingle fashion to shed water, with lapped and taped joints of not less than 2-inches.

**3.03 INSTALLATION, GENERAL**

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
   1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
   2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
   3. Install continuous cleats spaced not more than 1-inch apart. Anchor each cleat with fasteners through the vertical leg face at 12-inches on center.
   4. Install exposed sheet metal flashing and trim without excessive oil canning, and free of buckling and tool marks.
   5. Torch cutting of sheet metal flashing and trim is not permitted.
   6. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
   1. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet of polyvinyl chloride (PVC) underlayment.
   2. Bed flanges in approved sealant where required for waterproof performance.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10-feet with no joints allowed within 24-inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges not less than 1-inch deep, filled with elastomeric sealant concealed within the joints.

D. Fasteners: Use fastener sizes that penetrate wood blocking or sheathing not less than 1¼-inches for wood screws
   1. 1. Galvanized or Aluminum-Zinc Alloy-coated steel: Use stainless-steel fasteners
   2. 2. Stainless Steel: Use stainless steel fasteners.

E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

F. Seal joints as required for watertight construction.
   1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1- inch (25-mm) into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F (4 deg C).
   2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."

**3.04 ROOF FLASHING INSTALLATION**

A. General: Install sheet metal flashing and trim to comply with performance requirements, NRCA's "Roofing and Waterproofing Manual" and "SMACNA's Manual.". Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for FM Approvals' listing for required windstorm classification but not less than 4-inch centers in staggered pattern.

C. Pipe or Post Counter-flashing: Install counter-flashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4-inches (100-mm) over base flashing. Install stainless-steel draw band and tighten.

D. Counter-flashing: Coordinate installation of counter-flashing with installation of base flashing. Insert counter-flashing in reglets or receivers and fit tightly to base flashing. Extend counter-flashing 4-inches (100-mm) over base flashing. Lap counter-flashing joints minimum of 4-inches (100-mm). Secure in waterproof manner by means of snap-in installation and sealant or lead wedges and sealant; interlocking folded seam or blind rivets and sealant as indicated.

E. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Install roof penetration flashings as indicated and in compliance with the primary manufacturer's written installations. Seal with sealant and clamp flashing to pipes that penetrate roof.

**3.05 MISCELLANEOUS FLASHING INSTALLATION**

A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Seal flashing with elastomeric sealant to equipment support member.

**3.06 ROOF-DRAINAGE SYSTEM INSTALLATION**

A. General: Install sheet metal roof-drainage items to produce complete roof-drainage system according to cited sheet metal standard unless otherwise indicated. Coordinate installation of roof perimeter flashing with installation of roof-drainage system.

B. Downspouts: Join sections with 1½-inch (38-mm) telescoping joints.

1. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately 60-inches 59.06 inch (1500 mm) o.c.
2. Provide elbows at base of downspout to direct water away from building.
3. Connect downspouts to underground drainage system as indicated.
    a. 3.7 ERECTION TOLERANCES

C. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of ¼-inch in 20-feet (6-mm in 6-m) on slope and location lines indicated on Drawings and within ⅛-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.
    1) CLEANING AND PROTECTION

D. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

E. Clean and neutralize flux materials. Clean off excess solder.

F. Clean off excess sealants.

G. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturers' written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.

H. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

**END OF SECTION**

# SECTION 07 6526
# SELF-ADHERING SHEET FLASHING

## PART 1 — GENERAL

### 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

B. Section 042000 – Unit Masonry.

### 1.02 SUMMARY

A. Section provides for a flexible rubberized asphalt, self-sealing through-wall flashing and wall flashing accessories.

B. The following specification sections with products by GCP Applied Technologies are the Basis of Design:
   1. Section 07 2650 - Integrally Bonded Under Slab Vapor Protection
   2. Section 07 2726 - Fluid Applied Membrane Air Barriers, Vapor Permeable.
   3. Section 07 6526 - Self-Adhering Sheet Flashing.

C. A single source manufacturer of all sections and associated products is required for approval.
   1. Proof of products being equal to the Basis of Design and being compatible with all sections/products shall be submitted to the architect prior to the bid. Approved products must be listed in an addendum.
   2. Refer to Specification Section 016000 Product Requirements for additional requirements.

### 1.03 REFERENCES

A. American Society for Testing and Materials
   1. ASTM E96 – Test Methods for Water Vapor Transmission of Materials.
   2. ASTM D570 – Test Method for Water Absorption of Plastics.
   3. ASTM E154 – Test Method for Water Vapor Retarders used in contact with Earth Under Concrete Slabs, on Walls or as Ground Cover.
   4. ASTM D1004 – Test Method for Initial Tear Resistance of Plastic Film and Sheeting.
   5. ASTM D1938 – Test Method for Tear Propagation Resistance of Plastic Film and Thin Sheeting by a Single-Tear Method.
   6. ASTM D1876 – Test Method for Peel Resistance of Adhesives.
   7. ASTM D1970 – Standard Specifications for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
   8. D412 – Test Methods for Vulcanized Rubber & Thermoplastic Rubbers and Thermoplastic Elastomers – Tension.

### 1.04 SUBMITTALS

A. Product Data and Shop Drawings: Submit for each product; Spec-Data®/Data Sheets, details and installation procedures.

B. Test Reports: Indicating compliance with the performance requirements of this section.

C. Samples of flashing.

D. Manufacturer’s Warranty: Applicable in the state of the project.

### 1.05 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer’s recommendations for storage and handling of each product.

### 1.06 WARRANTY

A. Standard Product Warranty:
   1. Submit manufacturer's warranty that flashing and accessories are free of defects at time of delivery, and are manufactured to meet manufacturer's published physical properties and material specifications.
   2. Warranty Period: Ten (10) years from date of completion of the substantial completion.
   3. Installer to warrant that flashing and accessories have been installed in accordance with manufacturer's recommendations.
   4. Refer to Section 07 7833 - Special Project Warranties. - 10 year warranty

### 1.07 QUALITY ASSURANCE

A. Manufacturer: Sheet membrane waterproofing system shall be manufactured and marketed by a firm with a minimum of five (5) years of experience in the production and sales of sheet membrane waterproofing. Manufacturers proposed for use but not named in these specifications shall submit evidence of ability to meet all requirements specified and include a list of projects of similar design and complexity completed within the past five (5) years.

B. Installer: A firm which has at least three (3) years of experience in work of the type required by this section and as certified by the manufacturer.

C. Materials: For each type of material required for the work of this section, provide primary materials which are the products of one manufacturer.

D. Pre-Installation Conference: An on-site pre-installation conference with manufacturers technical representative present shall be held prior to commencement of field operations to establish procedures to maintain optimum working conditions and to coordinate this work with related and adjacent work. Agenda for meeting shall include review of special details and flashing.

## PART 2 — PRODUCTS

### 2.01 MATERIALS

A. **Flashing Description: 0.8 mm (32 mils) of self-adhesive rubberized asphalt integrally bonded to 0.2 mm (8 mils) of cross-laminated, high-density polyethylene film to provide a min. 1.0 mm (40 mil) thick membrane. Membrane shall be interleaved with disposable silicone-coated release paper until installed.**

B. Performance Requirements:
   1. Water Vapor Transmission: ASTM E96, Method B – 2.9 ng/m2sPa (0.05 perms) maximum
   2. Water Absorption: ASTM D570 – Max. 0.1% by weight
   3. Puncture Resistance: ASTM E154 – 356 N (80 lbs)
   4. Tear Resistance:
      a. Initiation – ASTM D1004 – min. 58 N (13.0 lbs) M.D.
      b. Propagation – ASTM D1938 – min. 40 N (9.0 lbs) M.D.
   5. Lap Adhesion at -4ºC (25ºF): ASTM D1876 – 880 N/M (5.0 lbs/in.) of width
   6. Low Temperature Flexibility – ASTM D1970 – Unaffected to -43ºC (-45ºF)
   7. Tensile Strength: ASTM D412, Die C Modified – Min. 5.5 MPa (800 psi)
   8. Elongation, Ultimate Failure of Rubberized Asphalt: ASTM D412, Die C – Min. 200%

C. Product: **Perm-A-Barrier VPL** ® Wall Flashing manufactured by GCP Advanced Technologies Construction Products.**or approved equal**.

D. Wall Flashing Accessories:

1. Primer:
   a. Description: Water-based primer which imparts an aggressive, high tack finish on the treated substrate.
      1) Flash Point: No flash to boiling point
      2) Solvent Type: Water
      3) VOC Content: Not to exceed 10 g/L
      4) Application Temperature: -4ºC (25ºF) and above
      5) Freezing point (as packaged): -7ºC (21ºF)
   b. Product: Perm-A-Barrier WB Primer manufactured by GCP Advanced Technologies Construction Products.
2. Termination Mastic:
   a. Description: Rubberized asphalt-based mastic with 200 g/L max. VOC Content.
   b. Product: Bituthene® Mastic manufactured by GCP Advanced Technologies Construction Products.
3. Optional Primer:
   a. Description: Water-based primer which imparts an aggressive, high tack finish on the treated substrate. 1 g/l max. VOC content.
   b. Product: Perm-A-Barrier Primer Plus by GCP Advanced Technologies Construction Products.
   c. Description: High tack low VOC solvent based primer. 200 g/l max. VOC content.
   d. Product: Bituthene Primer B2 LVC manufactured by GCP Advanced Technologies Construction Products.
4. Joint Sealant: Per manufacturer's recommendations.
5. Weep Vents and Mortar Nets: Refer to Section 04 2000 - Unit Masonry for materials and additional installation requirements.
6. Termination Bar
   a. Single Lip 26 gauge x 1-1/4 inches, Type 304 Stainless Steel Stainless Steel termination bar with ½" lip at 45° and pre-drilled holes spaced at 16" inches on center for attachment. Refer to drawings for additional information.
7. SS Drip Edge: Provide stainless steel drip edge at all locations where wall flashing terminates at the exterior face of brick, cast stone veneers and at locations shown on drawings.
   a. 26 gauge, Type 304 Stainless Steel
   b. Size and configuration as detailed on drawings.
   c. Install in accordance with manufacturer's written instructions and as detailed on drawings. Flashing shall not be exposed to ultraviolet light when properly installed.
   d. Include drip edge in project mock up. Also, mock up drip edge conditions at outside and inside corners for approval prior to proceeding.

## PART 3 — EXECUTION

### 3.01 EXAMINATION

A. Examine conditions, with installer present, for compliance with requirements for installation, tolerances and other specific conditions affecting performance of flashing. Remove all deleterious materials from surfaces to be flashed.

### 3.02 INSTALLATION

A. General: Install flashing to dry surfaces at air and surface temperatures of -4ºC (25ºF) and above in accordance with manufacturer's recommendations at locations indicated on Construction Documents.

B. Flexible Wall Flashing:
   1. Precut pieces of flashing to easily handled lengths for each location.
   2. Remove silicone-coated release paper and position flashing carefully before placing it against the surface.
   3. When properly positioned, place against surface by pressing firmly into place by hand roller. Fully adhere flashing to substrate to prevent water from migrating under flashing.
   4. Overlap adjacent pieces 50 mm (2 in.) and roll all seams with a steel hand roller.
   5. Trim bottom edge 13 mm (1⁄2 in.) back from exposed face of the wall. Flashing shall not be permanently exposed to sunlight.
   6. At heads, sills and all flashing terminations turn up ends a minimum of 50 mm (2 in.) and make careful folds to form an end dam, with the seams sealed.
   7. Do not allow the rubberized asphalt surface of the flashing membrane to come in contact with polysulfide sealants, creosote, uncured coal tar products or EPDM.
   8. Do not expose flashing membrane to sunlight for more than thirty days prior to enclosure.
   9. Install Perma-A-Barrier Liquid Flashing per manufacturer's instructions at all head, jamb, and sill of exterior wall penetrations and as shown on the drawings.

C. Accessories:
   1. When required by dirty or dusty site conditions or by surfaces having irregular or rough texture, apply Perm-A-Barrier Primer Plus by air spray, brush or roller or apply Perm-A-Barrier WB Primer by brush or roller at the rate recommended by manufacturer, prior to flashing installation. Allow the primer to dry completely before flashing application.
   2. Apply a bead or trowel coat of mastic along flashing top edge, seams, cuts, and penetrations.
   3. Apply primer by brush or heavy nap, natural-material roller at rate recommended by manufacturer prior to flashing installation. Allow primer to dry completely before flashing application.

# SECTION 07 8401
# FIRESTOPPING

## PART 1 – GENERAL

**THIS SPECIFICATION IS WRITTEN USING HILTI AS A SPECIFICATION AND DESIGN BASIS. IT IS NOT INTENDED TO LIMIT MANUFACTURERS. THE FOLLOWING MANUFACTURERS: 3M, TREMCO AND S.T.I. ARE APPROVED FOR BIDDING PURPOSES, HOWEVER MUST SUBMIT FOR APPROVAL SYSTEMS AND PRODUCTS THAT ARE EQUAL TO THE SPECIFIED HILTI PRODUCTS. THESE SUBMITTALS MUST BE APPROVED BY THE GENERAL CONTRACTOR'S FIRESTOPPING CONSULTANT, THE GENERAL CONTRACTOR AND THE ARCHITECT PRIOR TO INCORPORATION INTO THE PROJECT.**

### 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Section, apply to work specified in this section.

### 1.02 DEFINITIONS

A. Firestopping: Material or combination of materials used to retain integrity of fire-rated construction by maintaining an effective barrier against the spread of flame, smoke, and hot gases through penetrations in/ joints between fire rated wall and floor assemblies.

### 1.03 GENERAL DESCRIPTION OF THE WORK OF THIS SECTION

Only tested firestop systems shall be used in specific locations as follows:

A. Penetrations for the passage of duct, cable, cable tray, conduit, piping, electrical busways and raceways through fire-rated vertical barriers (walls and partitions), horizontal barriers (floor/ceiling assemblies), and vertical service shaft walls and partitions.

B. Safing slot gaps between edge of floor slabs and curtain walls.

C. Openings between structurally separate sections of wall or floors.

D. Gaps between the top of walls and ceilings or roof assemblies.

E. Expansion joints in walls and floors.

F. Openings and penetrations in fire-rated partitions or walls containing fire doors.

G. Openings around structural members which penetrate floors or walls.

### 1.04 RELATED WORK OF OTHER SECTIONS

A. Coordinate work of this section with work of other sections as required to properly execute the work and as necessary to maintain satisfactory progress of the work of other sections, including:

### 2.01 SECTION 03 3000 - CAST-IN-PLACE CONCRETE

A. Section 07 9005 - Joint Sealants

B. Section 09 2116 - Gypsum Board Assemblies

C. Division 22 - Plumbing

D. Division 23 - HVAC

E. Division 26 - Electrical

F. REFERENCES

1. Test Requirements: ASTM E-814, "Standard Method of Fire Tests of Through Penetration Fire Stops"
2. Test Requirements:UL 1479, “Fire Tests of Through-Penetration Firestops”
3. Test Requirements:UL 2079, “Tests for Fire Resistance of Building Joint Systems”
4. Underwriters Laboratories (UL) of Northbrook, IL publishes tested systems in their “FIRE RESISTANCE DIRECTORY" that is updated annually.
    a. UL Fire Resistance Directory:
        1) Firestop Devices (XHJI)
        2) Fire Resistance Ratings (BXRH)
        3) Through-Penetration Firestop Systems (XHEZ)
        4) Fill, Voids, or Cavity Material (XHHW)
            (a) Forming Materials (XHKU)
            (b) Joint Systems (XHBN)
            (c) Perimeter Fire Containment Systems (XHDG)
    b. Alternate Systems: “Omega Point Laboratories Directory” (updated annually).
    c. Test Requirements: ASTM E 1966-01, “Standard test method for Fire Resistive Joint Systems”
    d. Test Requirements: ASTM E 2307, “Standard Test Method for Determining Fire Resistance of Perimeter Fire Barrier Systems Using Intermediate-Scale, Multi-story Test Apparatus”.
    e. Inspection Requirements: ASTM E 2174, “Standard Practice for On-site Inspection of Installed Fire Stops.”
    f. ASTM E-84, “Standard Test Method for Surface Burning Characteristics of Building Materials”.
    g. ASTM G 21, “Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi”.
    h. International Firestop Council Guidelines for Evaluating Firestop Systems Engineering Judgments.
    i. All applicable building codes: But not limited to the following: IBC.
    j. NFPA 101 - Life Safety Code.
    k. NFPA 70 - National Electric Code.

THROUGH-PENETRATION UL CLASSIFICATION SYSTEM

FIRE STOPPING SYSTEMS

No Penetrating Items:
Metallic Pipes, Conduit or Tubing:
Non-Metallic Pipe, Conduit or Tubing:
Electric Cables:
Cable, Trays with Electric Cables:
Insulated Pipes:
Electrical Busduct Penetrations:
Mechanical Ductwork Penetrations:
Multiple Penetrations Through Common Openings:

**Construction Penetration**

F- Floor Penetration
W- Wall Penetration
C - Floor or Wall Penetration

**Type of Construction**

A - Concrete floors equal to or less than 5 inches thick

B - Concrete floors greater than 5 inches thick
J - Concrete or masonry walls equal to or less than 8 inches thick
K - Concrete or masonry walls greater than 8 inches thick
L - Framed Walls

CONSTRUCTION JOINT UL CLASSIFICATION SYSTEM

| FIRE-RESISTANT JOINT SYSTEMS | | | UL CLASSIFICATION SYSTEM |
|---|---|---|---|
| Joint System | Movement Capability | Joint Width | |
| Floor-to-Floor | FF | D | 0000-0999 |
| Wall-to-Wall | WW | D | 0000-0999 |
| Floor-to-Wall | FW | D | 0000-0999 |
| Head of Wall | HW | D | 0000-0999 |

MOVEMENT CAPABILITY
D= Dynamic S= Static

JOINT WIDTH
0000-0999 Less than or equal to 2 inches
1000-1999 Greater than 2 inches less than or equal to 6 inches
2000-2999 Greater than 6 inches less than or equal to 12 inches

G. QUALITY ASSURANCE
1. Fire-Test Response Characteristics: Provide through-penetration fire stop systems and fire resistive joint systems that comply with specified requirements of tested systems.
2. Firestop System installation must meet requirements of ASTM E-814, UL 1479 or UL 2079 tested assemblies that provide a fire rating equal to that of construction being penetrated.
3. Proposed firestop materials and methods shall conform to applicable governing codes having local jurisdiction.
4. Firestop Systems do not reestablish the structural integrity of load bearing partitions/assemblies, or support live loads and traffic. Installer shall provide and consult with an Alabama licensed structural engineer prior to penetrating any load bearing assembly.
5. For those firestop applications that exist for which no qualified tested system is available through a manufacturer, an engineering judgment derived from similar qualified system designs or other tests will be submitted to local authorities having jurisdiction for their review and approval prior to installation. Engineering judgment drawings must follow requirements set forth by the International Firestop Council.

H. SUBMITTALS
1. Submit Product Data: Manufacturer's specifications and technical data for each material including the composition and limitations, documentation of qualified tested firestop systems to be used and manufacturer's installation instructions to comply with Section 01 3000.
2. Manufacturer's engineering judgment identification number and document details when no qualified tested system is available for an application. Engineering judgment must include both project name and contractor’s name who will install firestop system as described in document.
3. Submit material safety data sheets and certificates of compliance provided with product delivered to job-site.
4. VOC Content Limitations: For firestop system products, submit documentation of conformance with LEED EQ Credit 4.1 “Low-Emitting Materials, Adhesives and Sealants”.

I. INSTALLER QUALIFICATIONS
   1. Engage an experienced Installer who is certified, licensed, or otherwise qualified by the firestopping manufacturer as having been provided the necessary training to install manufacturer's products per specified requirements. A supplier's willingness to sell its firestopping products to the Contractor or to an Installer engaged by the Contractor does not in itself confer qualification on the buyer.
   2. Installation Responsibility: Assign installation of through-penetration firestop systems and fire-resistive joint systems in project to a single firestop specialty contractor.

J. FIELD SERVICES
   1. Contractor shall provide field services as described below. Field services shall be provided by one of the following groups or entities:
      a. Firestopping Manufacturer's Field Representative
      b. Third Party Firestopping Consultant approved by the firestopping manufacturer to review and approve firestopping installations.
   2. Description of Field Services:
      a. During initial installation, firestop manufacturer should be present to assure proper installation/application.
      b. Upon completion of all firestopping installation, firestop manufacturer shall review firestopping installed on site and provide written verification to the Architect and Owner that all firestopping materials, systems, and installations are in accordance with manufacturer's recommendations and are appropriate for the type of penetration being sealed and the rating of wall in which the penetrations occur.
         1) Manufacturer's representative shall be present at the project above ceiling inspection. Provide written verification of firestopping installations to Architect within 7 days of above ceiling inspection.

K. SOLE SOURCE REQUIREMENTS
   1. All fire stopping materials shall be provided from a single manufacturer for all trades.
   2. All firestopping installers shall be approved by the manufacturer as a certified applicator of firestopping materials.

L. DELIVERY, STORAGE, AND HANDLING
   1. Deliver materials undamaged in manufacturer's clearly labeled, unopened containers, identified with brand, type, and UL label where applicable.
   2. Coordinate delivery of materials with scheduled installation date to allow minimum storage time at job-site.
   3. Store materials under cover and protect from weather and damage in compliance with manufacturer's requirements, including temperature restrictions.
   4. Comply with recommended procedures, precautions or remedies described in material safety data sheets as applicable.
   5. Do not use damaged or expired materials.

M. PROJECT CONDITIONS
   1. Do not use materials that contain flammable solvents.
   2. Schedule installation of firestopping after completion of penetrating item installation but prior to covering or concealing of openings.
   3. Verify existing conditions and substrates before starting work. Correct unsatisfactory conditions before proceeding.

4. Weather conditions: Do not proceed with installation of firestop materials when temperatures exceed the manufacturer's recommended limitations for installation printed on product label and product data sheet. For non-water resistant firestop materials, protect from exposure to water- firestop materials that are water resistant shall be protected until fully cured.
5. During installation, provide masking and drop cloths to prevent firestopping materials from contaminating any adjacent surfaces.

## PART 2 - PRODUCTS

### 3.01 FIRESTOPPING, GENERAL

A. Provide firestopping composed of components that are compatible with each other, the substrates forming openings, and the items, if any, penetrating the firestopping under conditions of service and application, as demonstrated by the firestopping manufacturer based on testing and field experience.

B. Provide components for each firestopping system that are needed to install fill material. Use only components specified by the firestopping manufacturer and approved by the qualified testing agency for the designated fire-resistance-rated systems.

C. Firestopping Materials are either “cast-in-place” (integral with concrete placement) or “post installed.” Provide cast-in-place firestop devices prior to concrete placement.

### 3.02 ACCEPTABLE MANUFACTURERS

A. Subject to compliance with through penetration firestop systems (XHEZ), joint systems (XHBN) and perimeter firestop systems (XHDG) listed in Volume 2 of the URL Fire Resistance Directory; provide products of the following manufacturers as identified below:
   1. Hilti, Inc., Tulsa, Oklahoma (Basis of Design)
      a. 800-879-8000
   2. 3M
   3. Tremco
   4. STI

### 3.03 MATERIALS

A. Use only firestop products that have been UL 1479, ASTM E-814, or UL 2079, ASTM E 1966, ASTM E 2307 tested for specific fire-rated construction conditions conforming to construction assembly type, penetrating item type, annular space requirements, and fire-rating involved for each separate instance.

B. Pre-installed firestop devices for use with non-combustible and/or combustible plastic pipe (closed and open systems), conduit, and/or cable bundles penetrating concrete floors, the following products are acceptable:
   1. Hilti CP 680P or CP 680M Cast-In Place Firestop Devices:
      a. Add Aerator adaptor when used in conjunction with aerator (“sovent” ) system.
      b. Add metal deck adapter kit if utilizing CP 680P or M on corrugated metal deck.
      c. Add height extension if utilizing CP 680P or M in concrete slabs thicker than 8”.
      d. Add Hilti Water Module (2” up to 6”) to achieve UL W-Rating
      e. Add Hilti TOP SEAL (1/2” up to 2”) to achieve UL W-Rating
   2. Hilti Toilet Flange for use with floor outlet water closets.
   3. Hilti coupling sleeve for use with floor or general purpose drains.

C. Pre-installed firestop devices containing built-in self-sealing intumescent inserts for use with data and communication cabling which allow for cable adds or changes without the need to remove or replace any firestop materials, the following product is acceptable:

1. Hilti CP 653 Speed Sleeve

D. Sealants, caulking materials, or foams for use with non-combustible items including steel pipe, copper pipe, rigid steel conduit and electrical metallic tubing (EMT), the following products are acceptable:
   1. Hilti FS-ONE Intumescent Firestop Sealant
   2. Hilti CP 604 Self-leveling Firestop Sealant
   3. Hilti CP 620 Fire Foam
   4. Hilti CP 606 Flexible Firestop Sealant
   5. Hilti CP 601S Elastomeric Firestop Sealant

E. Sealants or caulking materials for use with sheet metal ducts, the following products are acceptable:
   1. Hilti CP 601S Elastomeric Firestop Sealant
   2. Hilti CP 606 Flexible Firestop Sealant
   3. Hilti FS-ONE Intumescent Firestop Sealant

F. Sealants, caulking or spray materials for use with fire-rated construction joints and other gaps, the following products are acceptable:
   1. Hilti CP 672 Speed Spray
   2. Hilti CP 672 FC “FAST CURE” Speed Spray
   3. Hilti CP 601S Elastomeric Firestop Sealant
   4. Hilti CP 606 Flexible Firestop Sealant
   5. Hilti CP 604 Self-leveling Firestop Sealant

G. Pre-formed mineral wool designed to fit flutes of metal profile deck and gap between top of wall and metal profile deck; as a backer for spray material. The following products are acceptable:
   1. Hilti CP 677 Speed Plugs
   2. Hilti CP 767 Speed Strips

H. Intumescent sealants, caulking materials for use with combustible items (penetrants consumed by high heat and flame) including insulated metal pipe, PVC jacketed, flexible cable or cable bundles and plastic pipe, the following products are acceptable:
   1. Hilti FS-ONE Intumescent Firestop Sealant

I. Foams, intumescent sealants, or caulking materials for use with flexible cable or cable bundles, the following products are acceptable:
   1. Hilti FS-ONE Intumescent Firestop Sealant
   2. Hilti CP 620 Fire Foam
   3. Hilti CP 601S Elastomeric Firestop Sealant
   4. Hilti CP 606 Flexible Firestop Sealant

J. Non curing, re-penetrable intumescent putty or foam materials for use with flexible cable or cable bundles, the following products are acceptable:
   1. Hilti CP 618 Firestop Putty Stick
   2. Hilti CP 658T Firestop Plug

K. Non curing, re-penetrable intumescent putty or foam materials for use with flexible cable or cable bundles, the following products are acceptable:
   1. Hilti CP 618 Firestop Putty Stick
   2. Hilti CP 658T Firestop Plug

L. Wall opening protective materials for use with U.L. listed metallic and specified nonmetallic outlet boxes, the following products are acceptable:
   1. Hilti CP 617 Firestop Putty Pad

2. Hilti Firestop Box Insert
3. Hilti FS 657 FIRE BLOCK

M. Firestop collar or wrap devices attached to assembly around combustible plastic pipe (closed and open piping systems), the following products are acceptable:
1. Hilti CP 643 N Firestop Collar
2. Hilti CP 644 Firestop Collar
3. Hilti CP 648E Endless Wrap Strips
4. Hilti CP 648S Single Wrap Strips

N. Materials used for large openings and complex penetrations made to accommodate cable trays and bundles, multiple steel and copper pipes, electrical busways in raceways, the following products are acceptable:
1. Hilti CP 637 Firestop Mortar
2. Hilti FS 657 FIRE BLOCK
3. Hilti CP 620 Fire Foam
4. Hilti CP 675T Firestop Board

O. Non curing, re-penetrable materials used for large size/complex penetrations made to accommodate cable trays and bundles, multiple steel and copper pipes, electrical busways in raceways, the following products are acceptable:
1. Hilti FS 657 FIRE BLOCK
2. Hilti CP 675T Firestop Board

P. Sealants or caulking materials used for openings between structurally separate sections of wall and floors, the following products are acceptable:
1. Hilti CP 672 Speed Spray
2. Hilti CP 601S Elastomeric Firestop Sealant
3. Hilti CP 606 Flexible Firestop Sealant
4. Hilti CP 604 Self-Leveling Firestop Sealant

Q. For blank openings made in fire-rated wall or floor assemblies, where future penetration of pipes, conduits or cables is expected, the following products are acceptable:
1. Hilti FS 657 FIRE BLOCK
2. Hilti CP 658T Firestop Plug

R. Provide a firestop system with a "F" Rating as determined by UL 1479 or ASTM E814 which is equal to the time rating of construction being penetrated.

S. Provide a firestop system with an Assembly Rating as determined by UL 2079 or ASTM E 1966 which is equal to the time rating of construction joint assembly.

## PART 3 - EXECUTION

### 4.01 PREPARATION

A. Verification of Conditions: Examine areas and conditions under which work is to be performed and identify conditions detrimental to proper or timely completion.
1. Verify penetrations are properly sized and in suitable condition for application of materials.
2. Surfaces to which firestop materials will be applied shall be free of dirt, grease, oil, rust, laitance, release agents, water repellents, and any other substances that may affect proper adhesion.
3. Provide masking and temporary covering to prevent soiling of adjacent surfaces by firestopping materials.
4. Comply with manufacturer's recommendations for temperature and humidity conditions before, during and after installation of firestopping.

5. Do not proceed until unsatisfactory conditions have been corrected.

**4.02 COORDINATION**

A. Coordinate construction of openings, penetrations and construction joints to ensure that the firestop systems are installed according to specified requirements.

B. Coordinate sizing of sleeves, openings, core-drilled holes or cut openings to accommodate through-penetration fire stop systems. Coordinate construction and sizing of joints to ensure that fire resistive joint systems are installed according to specified requirements.

C. Coordinate firestopping with other trades so that obstructions are not placed in the way prior to the installation of the firestop systems.

D. Do not cover up through-penetration and joint firestop system installations that will become concealed behind other construction until each installation has been examined by the building inspector, per requirements of Section 109, IBC 2000.

**4.03 INSTALLATION**

A. Regulatory Requirements: Install firestop materials in accordance with UL or Intertek approved systems.

B. Manufacturer's Instructions: Comply with manufacturer's instructions for installation of through-penetration and construction joint materials.
   1. Seal all holes or voids made by penetrations to ensure an air and water resistant seal.
   2. Consult with mechanical engineer, project manager, and damper manufacturer prior to installation of UL firestop systems that might hamper the performance of fire dampers as it pertains to duct work.
   3. Protect materials from damage on surfaces subjected to traffic.
   4. Pre-Installation Meeting: Conduct a pre-installation meeting with General Contractor, Architect, Owner’s Representative, Alabama Division of Construction Management or other governing authority, Fire-Specialty Contractor, General Contractor’s Fireproofing Consultant and all major subcontractors (mechanical, plumbing, electrical, fire protection, drywall, etc). The General Contractor shall take notes and distribute to all parties.

**4.04 FIELD QUALITY CONTROL**

A. Examine sealed penetration areas to ensure proper installation before concealing or enclosing areas.

B. Keep areas of work accessible until inspection by applicable code authorities.

C. Inspection of through-penetration firestopping shall be performed in accordance with ASTM E 2174, “Standard Practice for On-Site Inspection of Installed Fire Stops” or other recognized standard.

D. Perform under this section patching and repairing of firestopping caused by cutting or penetrating of existing firestop systems already installed by other trades.

E. Manufacturer’s Field Services: During initial installation, firestop manufacturer should be present to assure proper installation/application.

**4.05 IDENTIFICATION AND DOCUMENTATION**

A. The firestop contractor is to supply documentation in the form of the Hilti FTP “Firestop Tracking Process”

B. The FTP is to include:
   1. Architectural details
   2. Firestop Affidavit

3. Firestop System snapshot
4. Installation log
5. Firestop systems
6. IFC Guidelines for Engineering Judgements
7. Product Information of utilized products
8. All other relevant documentation
9. Building code excerpts
10. Copies (electronic) of the FTP are to be provided to the General Contractor, Architect, Inspector and Owner at the completion of the project.
11. Identify through-penetration firestop systems with self-adhesive, preprinted labels. Attach labels permanently to surfaces of penetrated construction on both sides of each firestop system installation where labels will be visible to anyone seeking to remove penetrating items or firestop systems. Include the following information on labels:
    a. Installer/Contractor's name, address and phone number.
    b. Date of installation.
    c. Through-Penetration firestop system and manufacturer name.

**4.06 ADJUSTING AND CLEANING**

A. Remove equipment, materials and debris, leaving area in undamaged, clean condition.

B. Clean all surfaces adjacent to sealed holes and joints to be free of excess firestop materials and soiling as work progresses.

**4.07 LABOR USE TO INSTALL FIRESTOP SYSTEMS**

A. To ensure complete harmony on the project site, the installation of each scope of work is to be performed jurisdictional correct per existing trade agreements.

**END OF SECTION 07840**

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# SECTION 07 9005
# JOINT SEALERS

## PART 1 GENERAL

### 1.01 RELATED REQUIREMENTS

A. Section 07 2726 - Fluid Applied Membrane Air Barriers.

B. Section 07 6200 - Sheet Matal Flashing and Trim

C. Section 07 6526 - Self Adhering Sheet Flashing

D. Section 07 8401 - Firestopping: Firestopping Sealants.

E. Division 8 - Doors, storefront and louvers

F. Section : Glazing sealants and accessories.

G. Section 09 2116 - Gypsum Board Assemblies

### 1.02 REFERENCE STANDARDS

A. ASTM C834 - Standard Specification for Latex Sealants; 2017.

B. ASTM C919 - Standard Practice for Use of Sealants in Acoustical Applications; 2019.

C. ASTM C1193 - Standard Guide for Use of Joint Sealants; 2016.

D. SCAQMD 1168 - Adhesive and Sealant Applications; 1989, with Amendment (2022).

### 1.03 SUBMITTALS

A. See Section , for submittal procedures.

B. Manufacturer's Installation Instructions: Indicate .

### 1.04 QUALITY ASSURANCE

A. Maintain of referenced document covering installation requirements on site.

B. Manufacturer Qualifications: Company specializing in manufacturing the Products specified in this section with minimum years experience.

C. Applicator Qualifications: Company specializing in performing the work of this section .

### 1.05 MOCK-UP

A. Provide mock-up of sealant joints in conjunction with under provisions of Section .

B. Refer to 01 4000 and 01 1000

### 1.06 FIELD CONDITIONS

A. Maintain temperature and humidity recommended by the sealant manufacturer during and after installation.

### 1.07 WARRANTY

A. See Section , for additional warranty requirements.

B. Correct defective work within a the specified warranty periods.
   1. Unless noted otherwise, provide manufacturer's standard 10 year material warranty.
   2. Provide additional manufacturer's warranties listed for specific products.

C. Provide General Contractor's Project Joint Sealant Warranty at the back of this specification section. Warranty to be signed by the Joint Sealant Contractor and General Contractor.

D. Warranty: Include coverage for installed sealants and accessories which fail to achieve airtight seal, exhibit loss of adhesion or cohesion, or do not cure.

E. Refer to sealant types for additional warranty requirements.

F. Refer to 01 7833 Special Project warranties for additional requirements.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. Silicone Sealants:
   1. Dow Corning: www.dowcorning.com
   2. Pecora Corporation: www.pecora.com.
   3. Tremco: www.tremcosealants.com

B. Polyurethane Sealants:
   1. Pecora; www.pecora.com
   2. Sonneborn; www.chemrex.com
   3. Tremco; www.tremcosealants.com

C. Acrylic Emulsion Latex Sealants:
   1. Pecora Corporation: www.pecora.com.
   2. Sonneborn; www.chemrex.com
   3. Tremco; www.tremcosealants.com

### 2.02 SEALANTS

A. Sealants and Primers - General: Provide only products having lower volatile organic compound (VOC) content than required by South Coast Air Quality Management District Rule No.1168.

B. Type I - General Purpose Exterior Sealant: Silicone ; ASTM C 920, Grade NS, Class 25, Uses M ; single component, ultra low-mod.
   1. Color: To be selected by Architect from manufacturer's full range.
   2. Product:
      a. Dow 790
      b. Pecora 890
      c. Tremco Spectrem-1
   3. Applications: Use for:
      a. Vertical and horizontal construction joints between masonry/concrete/stone to masonry/concrete/stone.
   4. Warranties: In addition to manufacturer's standard product warranties, Provide manufacturer's 20 year Non-Staining and 20 year Structural Adhesion limited warranties. Provide manufacturer's compatibility testing as required.

C. Type II - General Purpose Exterior Sealant: Silicone ; ASTM C 920, Grade NS, Class 25, Uses M, G, and A; single component, structural
   1. Color: To be selected by Architect from manufacturer's range.
   2. Product;
      a. Dow 795
      b. Pecora 895
      c. Tremco Spectrum -2
   3. Applications: Use for:
      a. All other vertical and horizontal construction joints not listed in sealant type I & III.
   4. Warranties: In addition to manufacturer's standard product warranties, Provide manufacturer's 20 year Non-Staining and 20 year Structural Adhesion limited warranties. Provide manufacturer's compatibility testing as required.

D. Exterior Expansion Joint Sealer: Precompressed foam sealer; urethane with water-repellent;

1. Color: To be selected by Architect from manufacturer's standard range.
2. Product: Equal to Backerseal by Emseal
3. Size as required to provide seal when installed.
4. Applications: Use for:
    a. Exterior wall expansion joints used in conjunction with Dow 790

E. Type IV - General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C 834, Type S, single component, paintable.
1. Color: To be selected by Architect from manufacturer's standard range.
2. Product:
    a. Pecora AC-20
    b. Tremco Tremflex 834
    c. Sonneborn Sonolac
3. Applications: Use for:
    a. Interior wall and ceiling control joints.
    b. Other interior joints for which no other type of sealant is indicated.

F. Type V - General Purpose Interior Sealant: Medium Modulas silicone sealant
1. Color: To be selected by Architect from manufacturer's range.
2. Products:
    a. Dow 795
    b. Percora 895
    c. Tremco Spectrem-2
3. Applications: Use for:
    a. Joints between aluminum door and window frames and adjacent wall surfaces.

G. Bathtub/Tile Sealant: White silicone; ASTM C920, Uses M and A; single component, mildew resistant.
1. Product:
    a. Dow 786
    b. Tremco Tremsil 200
    c. Pecora 898
2. Applications: Use for:
    a. Joints between plumbing fixtures and floor and wall surfaces.
    b. Joints between kitchen and bath countertops and wall surfaces.

H. Type VII - Interior Floor Joint Sealant: Polyurethane, self-leveling; ASTM C 920, Grade P, Class 25, Uses T, M and A; multi- component, type M
1. Color: To be selected by Architect from manufacturer's range.
2. Product:
    a. Tremco THC 900/901
    b. Pecora NR-200
    c. Sonneborn- SL-2
3. Applications: Use for:
    a. Expansion joints in floors.
    b. .

I. Type VIII - Concrete Joint Sealant: Polyurethane; ASTM C 920, Class 25, Uses T, and M; multi- component (type M), Grade NS vertical and horizontal
1. Color: To be selected by Architect from manufacturer's standard range.
2. Product:

a. Sonneborn NP-2
b. Pecora Dynatrol-II
c. Tremco Dymeric 240 FC

3. Applications: Use for:
a. Joints in sidewalks and curb and gutters
b. Joints in concrete walls

**2.03 ACCESSORIES**

A. Primer: Non-staining type, recommended by sealant manufacturer to suit application, and compatible with joint substrates.

B. Joint Cleaner: Non-corrosive and non-staining type, recommended by sealant manufacturer; compatible with joint forming materials.

C. Sealant Backer Rod: Bi- Cellular Polyolefin foam rod equal to SOF ROD/ Nomaco and or Open cell Polyurethane foam equal to Foam Pak II/Nomaco. All backer rods shall be as recommended by sealant manufacture for specific use. Provide size and shape of rod to control joint depth, break bond at the bottom of joint, form optimum shape of bead on back side, and minimize the possibility of extrusion when joint is compressed.

D. Joint Backing: Round foam rod compatible with sealant; oversized 25 percent larger than joint width.

E. Tooling Agent: Agent recommended by material manufacturer to ensure contact of material with inner joint faces.

F. Bond Breaker: Pressure sensitive tape recommended by sealant manufacturer to suit application. Provide self adhering tape where applicable.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

A. Verify that are ready to receive work.

B. Verify that joint backing and release tapes are compatible with sealant.

**3.02 PREPARATION**

A. Remove loose materials and foreign matter that could impair adhesion of sealant.

B. Clean and prime joints in accordance with manufacturer's instructions.

C. Perform preparation in accordance with manufacturer's instructions and ASTM C1193.

D. Protect elements surrounding the work of this section from damage or disfigurement.

**3.03 INSTALLATION**

A. Perform work in accordance with sealant manufacturer's requirements for preparation of surfaces and material installation instructions.

B. Perform installation in accordance with ASTM C1193.

C. Measure joint dimensions and size joint backers to achieve width-to-depth ratio, neck dimension, and surface bond area as recommended by manufacturer.

D. Install bond breaker where joint backing is not used.

E. Install sealant free of air pockets, foreign embedded matter, ridges, and sags.

F. Apply sealant within recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.

G. Tool joints .

H. Precompressed Foam Sealant: Do not stretch; avoid joints except at corners, ends, and intersections; install with face below adjoining surface.

**3.04 CLEANING**

A. Clean adjacent soiled surfaces.

**3.05 PROTECTION**

A. Protect sealants until cured.

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# SECTION 08 1113
# HOLLOW METAL DOORS AND FRAMES

## PART 1 GENERAL

### 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.02 SUMMARY

A. Section Includes:
   1. Standard and custom hollow metal doors and frames.
   2. Steel sidelight, borrowed lite and transom frames.
   3. Light frames and glazing installed in hollow metal doors.

B. Related Sections:
   1. Division 04 Section "Unit Masonry" for embedding anchors for hollow metal work into masonry construction.
   2. Division 08 Section “Flush Wood Doors”.
   3. Division 08 Section "Glazing" for glass view panels in hollow metal doors.
   4. Division 08 Section "Door Hardware".
   5. Division 08 Section "Access Control Hardware".
   6. Section 09 2116 - Gypsum Board Assemblies
   7. Division 09 Sections "Exterior Painting" and "Interior Painting" for field painting hollow metal doors and frames.
   8. Division 13 3419 - Metal Building Systems

C. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
   1. ANSI/SDI A250.8 - Recommended Specifications for Standard Steel Doors and Frames.
   2. ANSI/SDI A250.4 - Test Procedure and Acceptance Criteria for Physical Endurance for Steel Doors, Frames, Frames Anchors and Hardware Reinforcing.
   3. ANSI/SDI A250.6 - Recommended Practice for Hardware Reinforcing on Standard Steel Doors and Frames.
   4. ANSI/SDI A250.10 - Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.
   5. ANSI/SDI A250.11 - Recommended Erection Instructions for Steel Frames.
   6. ANSI/SDI A250.13 - Testing and Rating of Severe Windstorm Resistant Components for Swing Door Assemblies.
   7. ASTM A1008 - Standard Specification for Steel Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy and High-Strength Low-Alloy with Improved Formability.
   8. ASTM A653 - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
   9. ASTM A924 - Standard Specification for General Requirements for Steel Sheet, Metallic-Coated by the Hot-Dip Process.
   10. ASTM C 1363 - Standard Test Method for Thermal Performance of Building Assemblies by Means of a Hot Box Apparatus.
   11. ASTM E283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Doors Under Specified Pressure Differences Across the Specimens.
   12. ASTM E330 - Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

13. ASTM E1886 - Test Method for Performance of Exterior Windows, Curtin Walls, Doors and Shutters Impacted by Missiles and Exposed to Cyclic Pressure Differentials.
14. ASTM E1996 - Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors and Storm Shutters Impacted by Windborne Debris in Hurricanes.
15. ANSI/BHMA A156.115 - Hardware Preparation in Steel Doors and Frames.
16. ANSI/SDI 122 - Installation and Troubleshooting Guide for Standard Steel Doors and Frames.
17. ANSI/NFPA 80 - Standard for Fire Doors and Fire Windows; National Fire Protection Association.
18. ANSI/NFPA 105: Standard for the Installation of Smoke Door Assemblies.
19. FEMA 361 2008 – Design and Construction Guidance for Community Safe Rooms.
20. ICC 500 - ICC/NSSA Standard for the Design and Construction of Storm Shelters.
21. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; National Fire Protection Association.
22. TAS-201-94 - Impact Test Procedures.
23. TAS-202-94 - Criteria for Testing Impact and Non-Impact Resistant Building Envelope Components using Uniform Static Air Pressure.
24. TAS-203-94 - Criteria for Testing Products Subject to Cyclic Wind Pressure Loading.
25. UL 10C - Positive Pressure Fire Tests of Door Assemblies.
26. UL 1784 - Standard for Air Leakage Tests of Door Assemblies.

**1.03 SUBMITTALS**

A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, hardware reinforcements, profiles, anchors, fire-resistance rating, and finishes.

B. Door hardware supplier is to furnish templates, template reference number and/or physical hardware to the steel door and frame supplier in order to prepare the doors and frames to receive the finish hardware items.

C. Shop Drawings: Include the following:
   1. Elevations of each door design.
   2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
   3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
   4. Locations of reinforcement and preparations for hardware.
   5. Details of anchorages, joints, field splices, and connections.
   6. Details of accessories.
   7. Details of moldings, removable stops, and glazing.
   8. Details of conduit and preparations for power, signal, and control systems.

D. Samples for Verification:
   1. Samples are only required by request of the architect and for manufacturers that are not current members of the Steel Door Institute.

**1.04 QUALITY ASSURANCE**

A. Source Limitations: Obtain hollow metal doors and frames through one source from a single manufacturer wherever possible.

B. Quality Standard: In addition to requirements specified, comply with ANSI/SDI A250.8, latest edition, "Recommended Specifications for Standard Steel Doors and Frames".

C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 (neutral pressure at 40” above sill) or UL 10C.
   1. Oversize Fire-Rated Door Assemblies Construction: For units exceeding sizes of tested assemblies, attach construction label certifying doors are built to standard construction requirements for tested and labeled fire rated door assemblies except for size.
   2. Temperature-Rise Limit: Where indicated and at vertical exit enclosures (stairwell openings) and exit passageways, provide doors that have a maximum transmitted temperature end point of not more than 450 deg F (250 deg C) above ambient after 30 minutes of standard fire-test exposure.
   3. Smoke Control Door Assemblies: Comply with NFPA 105.
      a. Smoke "S" Label: Doors to bear “S” label, and include smoke and draft control gasketing applied to frame and on meeting stiles of pair doors.

D. Fire-Rated, Borrowed-Light Frame Assemblies: Assemblies complying with NFPA 80 that are listed and labeled, by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 257. Provide labeled glazing material.

E. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and procedures for installing hollow metal doors and frames and to verify installation of electrical knockout boxes and conduit at frames with electrified or access control hardware.

## 1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project site storage. Do not use non-vented plastic.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch high wood blocking. Do not store in a manner that traps excess humidity.
   1. Provide minimum 1/4-inch space between each stacked door to permit air circulation. Door and frames to be stacked in a vertical upright position.

## 1.06 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings and wall thickness by field measurements before fabrication.

## 1.07 COORDINATION

A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

## 1.08 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace doors that fail in materials or workmanship within specified warranty period.

B. Warranty includes installation and finishing that may be required due to repair or replacement of defective doors.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. CECO Door Products.
   2. Curries Company.
   3. Steelcraft.
   4. Mesker

### 2.02 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

C. Frame Anchors: ASTM A 653/A 653M, Commercial Steel (CS), Commercial Steel (CS), Type B; with minimum G60 (Z180) or A60 (ZF180) metallic coating.

### 2.03 HOLLOW METAL DOORS (HEAVY DUTY)

A. General: Provide 1-3/4 inch doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8.

B. **Exterior Doors**: Face sheets fabricated of commercial quality **hot-dipped zinc coated steel** that complies with ASTM A 653/A 653M, Coating Designation A60. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
   1. Design: **Flush panel. Heavy Duty Level 2 Sixteen (16) gauge.**
   2. Core Construction: Manufacturer's standard polystyrene. Provide doors fabricated as thermal-rated assemblies with a minimum R-value of 2.8 or better.
   3. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet. Doors with an inverted top channel to include a steel closure channel, screw attached, with the web of the channel flush with the face sheets of the door. Plastic or composite channel fillers are not acceptable.
   4. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
   5. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

C. **Interior Doors**: Face sheets fabricated of commercial quality cold rolled steel that complies with ASTM A 1008/A 1008M. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:
   1. Design: **Flush panel. Heavy Duty Level 2 Eighteen (18) gauge.**
   2. Core Construction: Manufacturer's standard kraft-paper honeycomb, or one-piece polystyrene core, securely bonded to both faces.
      a. Fire Door Core: As required to provide fire-protection and temperature-rise ratings indicated.

3. Top and Bottom Edges: Reinforce tops and bottoms of doors with a continuous steel channel not less than 16 gauge, extending the full width of the door and welded to the face sheet.
4. Hinge Reinforcement: Minimum 7 gauge (3/16") plate 1-1/4" x 9" or minimum 14 gauge continuous channel with pierced holes, drilled and tapped.
5. Hardware Reinforcements: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

D. Manufacturers Basis of Design:
1. CECO Door Products Legion Series.
2. Curries Company 707 Series.
3. Mesker

**2.04 STANDARD HOLLOW METAL FRAMES**

A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.

B. **Exterior Frames:** Fabricated of hot-dipped zinc coated steel that complies with ASTM A 653/A 653M, Coating Designation A60.
1. Fabricate frames with mitered or coped corners.
2. Fabricate frames, with the exception of knock down types, with "closed and tight" miter seams continuously welded on face, finished smooth with no visible seam unless otherwise indicated.
3. F**rames for Level 3 Extra Heavy Duty Steel Doors (up to 48 inches in width): Minimum 14 gauge (0.067-inch -1.7-mm) thick steel sheet.**
4. Frames for Level 3 Steel Doors (48 inches and up in width): Minimum 12 gauge (0.081-inch -2.7-mm) thick steel sheet.
5. Frames for Level 2 Steel Doors (up to 36 inches in width): Minimum 16 gauge (0.053-inch -1.3-mm) thick steel sheet.
6. Manufacturers Basis of Design:
   a. Curries Company CM Series.
   b. Mesker

C. **Interior Frames**: Fabricated from cold-rolled steel sheet that complies with ASTM A 1008/A 1008M.
1. Fabricate frames with mitered or coped corners.
2. Fabricate frames with "closed and tight" miter seams continuously welded on face, finished smooth with no visible seam unless otherwise indicated.
3. **Frames for Steel Doors: Minimum 16 gauge** (0.053-inch -1.3-mm) thick steel sheet.
4. **Frames for openings up to 48 inches in width: Minimum 16 gauge** (0.053-inch -1.3-mm) thick steel sheet.]
5. Frames for openings 48 inches and wider in width: Minimum 14 gauge (0.067-inch -1.7-mm) thick steel sheet.]
6. Frames for Wood Doors: Minimum 16 gauge (0.053-inch-1.3-mm-) thick steel sheet.
7. Frames for Borrowed Lights: Minimum 16 gauge (0.053-inch-1.3-mm-) thick steel sheet.
8. Manufacturers Basis of Design:
   a. Curries Company CM Series (Drywall Profile).Welded corners and double turn back bend to prevent cutting into wall board.

D. Fire rated frames: Fabricate frames in accordance with NFPA 80, listed and labeled by a qualified testing agency, for fire-protection ratings indicated.

E. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 Table 4 with reinforcement plates from same material as frames.

F. Minimum STC Rating of 43. Refer to Door Schedule.

## 2.05 FRAME ANCHORS

A. Jamb Anchors:
   1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, formed from A60 metallic coated material, not less than 0.042 inch thick, with corrugated or perforated straps not less than 2 inches wide by 10 inches long; or wire anchors not less than 0.177 inch thick.
   2. Stud Wall Type: Designed to engage stud and not less than 0.042 inch thick.
   3. Windstorm Opening Anchors: Types as tested and required for indicated wall types to meet specified wind load design criteria.

B. Floor Anchors: Floor anchors to be provided at each jamb, formed from A60 metallic coated material, not less than 0.042 inches thick.

C. Mortar Guards: Formed from same material as frames, not less than 0.016 inches thick.

## 2.06 HOLLOW METAL PANELS

A. Provide hollow metal panels of same materials, construction, and finish as specified for adjoining hollow metal work.

## 2.07 LOUVERS

A. Metal Louvers: Door manufacturer's standard metal louvers unless otherwise indicated.
   1. Blade Type: Vision proof inverted V or inverted Y.
   2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.

B. Louvers for Fire Rated Doors: Metal louvers with fusible link and closing device, listed and labeled for use in doors with fire protection rating of 1-1/2 hours and less.
   1. Manufacturers: Subject to compliance with requirements, provide door manufacturers standard louver to meet rating indicated.
   2. Metal and Finish: Galvanized steel, 0.040 inch thick, factory primed for paint finish with baked enamel or powder coated finish. Match pre-finished door paint color where applicable.

## 2.08 LIGHT OPENINGS AND GLAZING

A. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints at fabricator’s shop. Fixed and removable stops to allow multiple glazed lites each to be removed independently. Coordinate frame rabbet widths between fixed and removable stops with the type of glazing and installation indicated.

B. Moldings for Glazed Lites in Doors and Loose Stops for Glazed Lites in Frames: Minimum 20 gauge thick, fabricated from same material as door face sheet in which they are installed.

C. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch (16 mm) high unless otherwise indicated. Provide fixed frame moldings and stops on outside of exterior and on secure side of interior doors and frames

D. Preformed Metal Frames for Light Openings: Manufacturer's standard frame formed of 0.048-inch-thick, cold rolled steel sheet; with baked enamel or powder coated finish; and approved for use in doors of fire protection rating indicated. Match pre-finished door paint color where applicable.

E. Glazing: Comply with requirements in Division 08 Section "Glazing" and with the hollow metal door manufacturer's written instructions.
   1. Factory Glazing: Factory install glazing in doors as indicated. Doors with factory installed glass to include all of the required glazing material.

**2.09 ACCESSORIES**

A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

B. Grout Guards: Formed from same material as frames, not less than 0.016 inches thick.

**2.10 FABRICATION**

A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. When shipping limitations so dictate, frames for large openings are to be fabricated in sections for splicing or splining in the field by others.

B. Tolerances: Fabricate hollow metal work to tolerances indicated in ANSI/SDI A250.8.

C. Hollow Metal Doors:
   1. Exterior Doors: Provide optional weep-hole openings in bottom of exterior doors to permit moisture to escape where specified.
   2. Glazed Lites: Factory cut openings in doors with applied trim or kits to fit. Factory install glazing where indicated.
   3. Astragals: Provide overlapping astragals as noted in door hardware sets in Division 08 Section "Door Hardware" on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.
   4. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge strap for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".

D. Hollow Metal Frames:
   1. Shipping Limitations: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.
   2. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible.
      a. Welded frames are to be provided with two steel spreaders temporarily attached to the bottom of both jambs to serve as a brace during shipping and handling. Spreader bars are for bracing only and are not to be used to size the frame opening.
   3. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
   4. High Frequency Hinge Reinforcement: Provide high frequency hinge reinforcements at door openings 48-inches and wider with mortise butt type hinges at top hinge locations.
   5. Continuous Hinge Reinforcement: Provide welded continuous 12 gauge straps for continuous hinges specified in hardware sets in Division 08 Section "Door Hardware".
   6. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated for removable stops, provide security screws at exterior locations.
   7. Mortar Guards: Provide guard boxes at back of hardware mortises in frames at all hinges and strike preps regardless of grouting requirements.

8. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
9. Jamb Anchors: Provide number and spacing of anchors as follows:
    a. Masonry Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
        1) Two anchors per jamb up to 60 inches high.
        2) Three anchors per jamb from 60 to 90 inches high.
        3) Four anchors per jamb from 90 to 120 inches high.
        4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 120 inches high.
    b. Stud Wall Type: Locate anchors not more than 18 inches from top and bottom of frame. Space anchors not more than 32 inches o.c. and as follows:
        1) Three anchors per jamb up to 60 inches high.
        2) Four anchors per jamb from 60 to 90 inches high.
        3) Five anchors per jamb from 90 to 96 inches high.
        4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches or fraction thereof above 96 inches high.
        5) Two anchors per head for frames above 42 inches wide and mounted in metal stud partitions.
10. Door Silencers: Except on weatherstripped or gasketed doors, drill stops to receive door silencers. Silencers to be supplied by frame manufacturer regardless if specified in Division 08 Section "Door Hardware".

E. Hardware Preparation: Factory prepare hollow metal work to receive template mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."
1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.
2. Reinforce doors and frames to receive non-template, mortised and surface mounted door hardware.
3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

### 2.11 STEEL FINISHES

A. Prime Finishes: Doors and frames to be cleaned, and chemically treated to insure maximum finish paint adhesion. Surfaces of the door and frame exposed to view to receive a factory applied coat of rust inhibiting shop primer.
1. Shop Primer: Manufacturer's standard, fast-curing, lead and chromate free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; and compatible with substrate and field-applied coatings.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. General Contractor to verify the accuracy of dimensions given to the steel door and frame manufacturer for existing openings or existing frames (strike height, hinge spacing, hinge back set, etc.).

C. Proceed with installation only after unsatisfactory conditions have been corrected.

**3.02 PREPARATION**

A. Remove welded in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness.

C. Tolerances shall comply with SDI-117 "Manufacturing Tolerances Standard Steel Doors and Frames."

D. Drill and tap doors and frames to receive non-template, mortised, and surface-mounted door hardware.

**3.03 INSTALLATION**

A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11 and NFPA 80 at fire rated openings.
   1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete and frames properly set and secured, remove temporary braces, leaving surfaces smooth and undamaged. Shim as necessary to comply with installation tolerances.
   2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with post-installed expansion anchors.
   3. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with mortar.
   4. Grout Requirements: Do not grout head of frames unless reinforcing has been installed in head of frame. Do not grout vertical or horizontal closed mullion members.

C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.
   1. Non-Fire-Rated Standard Steel Doors:
      a. Jambs and Head: 1/8 inch plus or minus 1/16 inch.
      b. Between Edges of Pairs of Doors: 1/8 inch plus or minus 1/16 inch.
      c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch.
      d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch.
   2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.

D. Field Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.

**3.04 ADJUSTING AND CLEANING**

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow metal work immediately after installation.

C. Prime-Coat and Painted Finish Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat, or painted finishes, and apply touchup of compatible air drying, rust-inhibitive primer, zinc rich primer (exterior and galvanized openings) or finish paint.

**END OF SECTION**

# SECTION 08 1416
# FLUSH WOOD DOORS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Flush wood plastic laminate doors; flush and flush glazed configuration; fire-rated and non-rated.

### 1.02 RELATED REQUIREMENTS

A. Section 08 1113 - Hollow Metal Doors and Frames.

B. Section 08 4314 - Aluminum Framed Storefront

C. Section 08 3473 - Wood Sound Control Assemblies.

D. Section 08 7100 - Door Hardware.

E. Section 08 8000 - Glazing.

### 1.03 REFERENCE STANDARDS

A. ASTM E413 - Classification for Rating Sound Insulation; 2022.

B. AWI (QCP) - Quality Certification Program; Current Edition.

C. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).

D. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.

E. ITS (DIR) - Directory of Listed Products; Intertek Testing Services NA, Inc.; current edition.

F. NEMA LD 3 - High-Pressure Decorative Laminates; 2005.

G. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2025, with Amendment (2024).

H. UL (BMD) - Building Materials Directory; Underwriters Laboratories Inc.; current edition.

I. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

J. WDMA I.S. 1A - Interior Architectural Wood Flush Doors; 2013.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Indicate door core materials and construction; veneer species, type and characteristics.

C. Shop Drawings: Show doors and frames, elevations, sizes, types, swings, undercuts, beveling, blocking for hardware, factory machining, factory finishing, cutouts for glazing and other details.

D. Samples: Submit two samples of door veneer, 6 by 6 inch (____ by ____ mm) in size illustrating plastic laminate pattern and color.

E. Manufacturer's Installation Instructions: Indicate special installation instructions.

F. Warranty, executed in Owner's name.

### 1.05 QUALITY ASSURANCE

A. Maintain one copy of the specified door quality standard on site for review during installation and finishing.

B. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section, with not less than three years of documented experience.

C. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.

D. Fire Rated Door and Transom Panel Assembly: Conform to NFPA 80 for fire rated class as indicated.

### 1.06 DELIVERY, STORAGE, AND HANDLING

A. Package, deliver and store doors in accordance with specified quality standard.

B. Accept doors on site in manufacturer's packaging. Inspect for damage.

C. Protect doors with resilient packaging sealed with heat shrunk plastic. Do not store in damp or wet areas; or in areas where sunlight might bleach veneer. Seal top and bottom edges with tinted sealer if stored more than one week. Break seal on site to permit ventilation.

### 1.07 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Interior Doors: Provide manufacturer's warranty for the life of the installation.

C. Include coverage for warping beyond specified installation tolerances, defective materials, and telegraphing core construction.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. High Pressure Decorative Laminate (HPDL) Faced Doors:
   1. Oshkosh; www.oshkoshdoor.com
   2. Ampco Products, Inc; ____: www.ampco.com/#sle.
      a. Oregon Door; Architectural Series: www.oregondoor.com/#sle.
   3. Poncraft Door Co; ____: www.poncraft.com/#sle.
   4. VT Industries, Inc; ____: www.vtindustries.com/#sle.
   5. Substitutions: See Section 01 6000 - Product Requirements.

### 2.02 DOORS AND PANELS

A. Doors: Refer to drawings for locations and additional requirements.
   1. Quality Standard: Custom Grade, Heavy Duty performance, in accordance with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS), unless noted otherwise.
   2. High Pressure Decorative Laminate (HPDL) Faced Doors: 5-ply unless otherwise indicated. Refer to finish schedule for plastic laminate colors.

B. Interior Doors: 1-3/4 inches (44 mm) thick unless otherwise indicated; flush construction.
   1. Provide solid core doors at all locations _____.
   2. Fire Rated Doors: Tested to ratings indicated on drawings in accordance with UL 10C - Positive Pressure; Underwriters Laboratories Inc (UL) or Intertek/Warnock Hersey (WHI) labeled without any visible seals when door is open.
   3. High pressure decorative laminate (HPDL) finish as indicated on drawings. See finish Schedule.

### 2.03 DOOR AND PANEL CORES

A. Non-Rated Solid Core and 20 Minute Rated Doors: Type particleboard core (PC), plies and faces as indicated above.

B. Fire-Rated Doors: Mineral core type, with fire resistant composite core (FD), plies and faces as indicated above; with core blocking as required to provide adequate anchorage of hardware without through-bolting.

**2.04 DOOR FACINGS AND EDGES**

A. High Pressure Decorative Laminate (HPDL) Facing for Fire Doors: NEMA LD 3, SGF; ____ color; textured, low gloss finish.See Finish Schedule.

B. High Pressure Decorative Laminate (HPDL) Facing for Non-Fire-Rated Doors: NEMA LD 3, HGS; ____ color; textured, low gloss finish.

C. Facing Adhesive: Type I - waterproof. **Provide a ten year warranty for labor and material for replacement of any doors that delaminate within a ten year period from the date of substantial completion.**

D. Plastic Laminate: Refer to finish schedule for additional color and pattern requirements.

**2.05 DOOR CONSTRUCTION**

A. Fabricate doors in accordance with door quality standard specified.

B. Glazed Openings Lite Kites: Non-removable stops on non-secure side; sizes and configurations as indicated on drawings. Provide in the same fire rating as the door and frame where applicable. Custom color as selected by architect.

C. Factory machine doors for hardware other than surface-mounted hardware, in accordance with hardware requirements and dimensions.

D. Factory fit doors for frame opening dimensions identified on shop drawings, with edge clearances in accordance with specified quality standard.

E. Provide edge clearances in accordance with the quality standard specified.

**2.06 ACCESSORIES**

A. Hollow Metal Door Frames: As specified in Section 08 1113.

B. Metal Louvers: Refer to Drawings for Location
   1. Material and Finish: Roll formed steel; pre-painted finish to match metal door frame color.
   2. In Fire-Rated Doors: UL (DIR) or ITS (DIR) listed fusible link louver, same rating as door.

C. Glazing: As specified in Section 08 8000.

D. Glazing Stops: Wood, of same species as door facing, butted corners; prepared for countersink style tamper proof screws.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

A. Verify existing conditions before starting work.

B. Verify that opening sizes and tolerances are acceptable.

C. Do not install doors in frame openings that are not plumb or are out-of-tolerance for size or alignment.

**3.02 INSTALLATION**

A. Install doors in accordance with manufacturer's instructions and specified quality standard.
   1. Install fire-rated doors in accordance with NFPA 80 requirements.

B. Factory-Finished Doors: Do not field cut or trim; if fit or clearance is not correct, replace door.

C. Use machine tools to cut or drill for hardware.

D. Coordinate installation of doors with installation of frames and hardware.

E. Coordinate installation of glazing.

**3.03 TOLERANCES**

A. Conform to specified quality standard for fit and clearance tolerances.

B. Conform to specified quality standard for telegraphing, warp, and squareness.

**3.04 ADJUSTING**

A. Adjust doors for smooth and balanced door movement.

B. Adjust closers for full closure.

**END OF SECTION**

# SECTION 08 3100
# ACCESS DOORS AND PANELS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Wall and ceiling access door and frame units.

### 1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry

B. Section 09 2116 - Gypsum Board Assemblies

C. Section 09 9123 - Interior Painting: Field paint finish.

D. Section _____: Mechanical ,plumbing, electrical components requiring access.

### 1.03 REFERENCE STANDARDS

A. ITS (DIR) - Directory of Listed Products; Current Edition.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide sizes, types, finishes, hardware, scheduled locations, and details of adjoining work.

C. Shop Drawings: Indicate exact position of each access door and/or panel unit.

D. Manufacturer's Installation Instructions: Indicate installation requirements and rough-in dimensions.

### 1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years documented experience.

## PART 2 PRODUCTS

### 2.01 ACCESS DOORS AND PANELS ASSEMBLIES

A. Ceiling and Wall Mounted Units:
   1. Location: As Required.
   2. Material: Steel.
   3. Size in Ceilings: as indicated or as required inches (____ mm), unless otherwise indicated.
   4. Door/Panel: Flush, Hinged, standard duty, with tool-operated spring or cam lock and no handle. Perforated door flange when located in Drywall
   5. Tool-operated spring or cam lock; no handle.
   6. Fire rating as required.

### 2.02 MANUFACTURERS

A. Wall and Ceiling Access Doors:
   1. Acudor Products Inc: www.acudor.com., Basis of Design
   2. Karp Associates, Inc: www.karpinc.com.
   3. Milcor by Commercial Products Group of Hart & Cooley, Inc: www.milcorinc.com.
   4. Substitutions: See Section 01 6000 - Product Requirements.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify that rough openings are correctly sized and located.

B. Verify with mechanical requirement.

### 3.02 PREPARATION

A. Clean surfaces thoroughly prior to proceeding with this work.

B. Prepare surfaces using methods recommended by manufacturer for applicable substrates in accordance with project conditions.

### 3.03 INSTALLATION

A. Install units in accordance with manufacturer's instructions.

B. Install frames plumb and level in openings, and secure units rigidly in place.

C. Position units to provide convenient access to concealed equipment when necessary.

**END OF SECTION**

# SECTION 08 3303
# OVERHEAD COILING INSULATED EXTERIOR DOOR

## PART 1 GENERAL

### 1.01 SUMMARY

A. Section Includes:Manual operated overhead insulated rolling doors with emergency manual chain hoist.

B. Related Sections:
   1. 05 50 00 Metal Fabrications. Door opening jamb and head members.
   2. 06 10 00 Rough Carpentry. Door opening jamb and head members.

### 1.02 SYSTEM DESCRIPTION

A. Design Requirements:
   1. Air Infiltration to Comply With:
      a. ASHRAE® (American Society of Heating, Refrigeration, and Air-Conditioning Engineers) Standard 90.1-2007, 2010 & 2013 requirements of less than .3 CFM/FT2.
      b. IECC® (International Energy Conservation Code) 2012 requirements of less than 1.0 CFM/FT2.
   2. Cycle Life:
      a. Design doors of standard construction for normal use of up to 20 cycles per day maximum, and an overall maximum of 50,000 operating cycles for the life of the door.
   3. Insulated Door Slat Material Requirements:
      a. Flame Spread Index of 0 and a Smoke Developed Index of 10 as tested per ASTM E84.
      b. Sound Transmission Class (STC) rating up to 30 for the curtain and up to 22 for the entire assembly. If an STC of 32 is desired, additional options are required. All configurations are evaluated per ASTM E90 and based on testing a complete, operable assembly.
      c. Minimum R-value of 8.0 (U-value of 0.125) as calculated using the ASHRAE Handbook of Fundamentals.
      d. Insulation to be CFC Free with an Ozone Depletion Potential (ODP) rating of zero.
   4. Safety:
      a. Chain operated doors shall be designed so that the door immediately stops upward or downward travel and is maintained in a stationary position when the hand chain is released by user.

### 1.03 SUBMITTALS

A. Reference Section 01 33 00 Submittal Procedures; submit the following items:
   1. Product Data.
   2. Shop Drawings: Include special conditions not detailed in Product Data. Show interface with adjacent work.
   3. Quality Assurance/Control Submittals:
      a. Provide manufacturer ISO 9001:2015 registration.
      b. Provide manufacturer and installer qualifications - see below.
      c. Provide manufacturer's installation instruction.
      d. Manufacturer must provide independent testing lab results proving .3 CFM/FT2 or less air infiltration.

**1.04 CLOSEOUT SUBMITTALS:**

A. Operation and Maintenance Manual.

B. Certificate stating that installed materials comply with this specification.

**1.05 QUALITY ASSURANCE**

A. Qualifications:
   1. Manufacturer Qualifications: ISO 9001:2015 registered and a minimum of five years experience in producing doors of the type specified.
   2. Installer Qualifications: Manufacturer's approval

**1.06 DELIVERY STORAGE AND HANDLING**

A. Reference Section 01 66 00 Product Storage and Handling Requirements.

B. Follow manufacturer's instructions.

**1.07 WARRANTY**

A. Standard Warranty: Two years from date of shipment against defects in material and workmanship.

B. Maintenance: Submit for owner’s consideration and acceptance of a maintenance service agreement for installed products.

**PART 2 PRODUCTS**

**2.01 MANUFACTURER**

A. Manufacturer (Basis of Design or Approved Equal):
   1. Cookson -Cornell: Representative Meghan Joseph (727) 318-0929 or (800) 233-8366.

B. Clopay Building Products.

C. Overhead Door Company

**2.02 PRODUCT INFORMATON**

A. Model: ESD30.

**2.03 MATERIALS**

A. Curtain: Air infiltration rate of less than .3 CFM/FT2, as tested per ASTM E283 validated by an independent testing agency. Test report required.
   1. Fabrication:
      a. Slat Material: No. 6F, (Listed Exterior/Interior).
         1) Galvanized Steel/Galvanized Steel: Manufacturer recommended gauge based on performance requirements. Minimum 24/24 gauge, Grade 40, ASTM A 653 galvanized steel zinc coating.

B. Insulation: 7/8 inch (22.22 mm) foamed-in-place, closed cell urethane.- ESD 30 cornell or equal.

C. Total Slat Thickness: 15/16 inch (23.81 mm).

D. Flame Spread Index of 0 and a Smoke Developed Index of 10 as tested per ASTM E84.

E. R-value: 8.0.

F. STC Rating: Sound Transmission Class (STC) rating up to 30 for the curtain and up to 22 for the entire assembly. If an STC of 32 is desired, additional options are required. All configurations are evaluated per ASTM E90 and based on testing a complete, operable assembly.

**2.04 EXTERIOR/INTERIOR SLAT FINISH:**

A. SpectraShield® Coating System (Color Selected by Architect):
   1. ASTM A 653 galvanized base coating treated with dual process rinsing agents in preparation for chemical bonding, gray baked-on base coat and gray baked-on polyester finish coat.
   2. Zirconium treatment followed by baked-on polyester powder coat, with color as selected by Architect from manufacturer's standard color range, ; minimum 2.5 mils 0 inch (0.06 mm) cured film thickness; ASTM D-3363 pencil hardness: H or better.

B. Endlocks: Fabricate interlocking sections with high strength galvanized cast iron endlocks on alternate slats each secured with two ¼” 0.25 inch (6.35 mm) rivets. Provide windlocks as required to meet specified wind load.
   1. Galvanized cast iron: Required if above 21’-5” width (DBG - Distance Between Guides).

C. Bottom Bar:
   1. Structural Steel Angles (Standard above 21’4” opening width).
   2. Finish: To match slats.
   3. Air Infiltration Certification Label: Must be affixed to bottom bar.

D. Guides:
   1. Fabrication:
      a. Thermal break required. Minimum 3/16 inch (4.76 mm) structural steel angles. Provide windlock bars of same material when windlocks are required to meet specified wind load. Top of inner and outer guide angles to be flared outwards to form bellmouth for smooth entry of curtain into guides. Provide removable guide stoppers to prevent over travel of curtain and bottom bar Top 16 ½” (16.5 inch (419.1 mm)) of coil side guide angles to be removable for ease of curtain installation and as needed for future curtain service.
   2. Finish: To match Slats

E. Counterbalance Shaft Assembly:
   1. Barrel: Steel pipe capable of supporting curtain load with maximum deflection of 0.03 inches (0.76 mm) per foot (0.1 inch (2.5 mm) per meter) of width.
   2. Spring Balance: Oil-tempered, heat-treated steel helical torsion spring assembly designed for proper balance of door to ensure that maximum effort to operate will not exceed 25 lbs (110 N). Provide wheel for applying and adjusting spring torque.

F. Brackets:
   1. Fabricate from minimum 3/16 inch (4.76 mm) steel plate with permanently lubricated ball or roller bearings at rotating support points to support counterbalance shaft assembly and form end closures.

G. Hood:
   1. Minimum 24 gauge galvanized steel with reinforced top and bottom edges. Provide minimum 1/4-inch 0.25 inch (6.35 mm) steel intermediate support brackets as required to prevent excessive sag.
      a. Finish: To Match Slats.
      b. Coordinate hood with clear dimension between the masonry opening at head and the bottom of the structure above. Field verify prior to ordering.

**2.05 OPERATION**

A. Manual, chain Hoist

B. Locks - cylinder locks at booth Jambs, coordibnate with finish hardware.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Examine substrates upon which work will be installed and verify conditions are in accordance with approved shop drawings.

B. Coordinate with responsible entity to perform corrective work on unsatisfactory substrates.

C. Commencement of work by installer is acceptance of substrate.

### 3.02 INSTALLATION

A. General: Install door and operating equipment with necessary hardware, anchors, inserts, hangers and supports.

B. Follow manufacturer's installation instructions.

### 3.03 ADJUSTING

A. Following completion of installation, including related work by others, lubricate, test, and adjust doors for ease of operation, free from warp, twist, or distortion.

### 3.04 CLEANING

A. Clean surfaces soiled by work as recommended by manufacturer.

B. Remove surplus materials and debris from the site.

### 3.05 DEMONSTRATION

A. Demonstrate proper operation to Owner's Representative.

B. Instruct Owner's Representative in maintenance procedures.

**END OF SECTION**

# SECTION 08 3474
# WOOD SOUND CONTROL ASSEMBLIES

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Wood acoustical door and frame assemblies where shown on the plans, as specified herein, and as needed for complete and proper installation.

### 1.02 RELATED SECTIONS

A. Section 08 71 00 – Door Hardware.

B. Section 08 80 00 – Glazing

C. Section 09 91 00 – Paints and Coatings.

D. Section 09 2116 - Gypsum Board Assemblies
   1. Refer to this section for other noise control ceiling and wall assemblies.

### 1.03 REFERENCES

A. ANSI/WDMA I.S.1-A. - Wood Flush Doors.

B. ASTM A 1008 - Standard Specification for Steel, Carbon, Cold-Rolled Sheet, Commercial Quality.

C. ASTM A 569 - Standard Specification for Steel, Carbon, (0.15 Maximum Percent), Hot-Rolled Sheet and Strip, Commercial Quality.

D. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot Dip Process.

E. ASTM E 90 - Standard Test Method for Laboratory Measurement of Airborne-Sound Transmission Loss of Building Partitions.

F. ASTM E 336 - Standard Test Method for Measurement of Airborne Sound Insulation in Buildings.

G. ASTM E 413 - Classification for Determination of Sound Transmission Class.

H. HMMA 840 - Installation and Storage of Hollow Metal Doors and Frames; Hollow Metal Manufacturers Association.

I. ISO 4586-2 - High Pressure Decorative Laminates; International Standards Organization.

J. NEMA LD 3-1995 - High Pressure Decorative Laminates; National Electrical Manufacturers Association.

### 1.04 SYSTEM DESCRIPTION

A. Design requirements: Acoustical door assemblies to include doors, frames, and door hardware to include gasketing systems, retainers and retainer covers, automatic or fixed door bottoms, cam-lift hinges, thresholds, and sills, required to achieve specified performance requirements.

B. Performance requirements: Sound Transmission Coefficient rating of STC Insert Sound Transmission Class (STC) requirements (value 53) here for installed assembly, when tested as operable door assembly in accordance with ASTM E 90 and ASTM E 413.

### 1.05 SUBMITTALS

A. Submit under provisions of Section 01300.

B. Product data: Indicate door materials and construction. Provide wood veneers that matches the plastic laminate specified in section 081416, Flush Wood Doors, refer to finish schedule. Provide factory finish sound wood doors. insert species

C. Shop drawings: Indicate door opening criteria, elevations, sizes, types, swings; identify and detail cutouts.
   1. Selection samples: Two (2) sets samples of available door finishes, representing manufacturer's full range. Match architects sample.
   2. Verification samples: Two (2) samples of door construction, 12 inches (304.8 mm) square in size, cut from corner of door. Match architects sample.

D. Quality assurance submittals:
   1. Test Reports:
      a. Acoustical certified laboratory reports, performed in accordance with ASTM E90 and ASTM E 413, from independent testing laboratory qualified under the National Voluntary Laboratory Accreditation Program (NVLAP) supporting compliance of assemblies to specified requirements.
      b. Minimum five (5) field tests, performed in accordance with ASTM E 336 and ASTM E 413 by five separate independent testing agencies, substantiating acoustical performance when installed at no less than four (5) FSTC ratings below the specified STC rating (STC rating of 53).
   2. Certificates:
      a. Contractor's certification that:
         1) Products of this section, as provided, meet or exceed specified requirements.
         2) Manufacturer of products of this section meet specified qualifications.
   3. Manufacturer's instructions: Printed installation instructions for each component.

E. Closeout submittals:
   1. Warranty documents, executed by manufacturer in Owner's name.
   2. Operation and maintenance data for assembly components.
   3. Certified statement of manufacturer's authorized representative, as specified in FIELD QUALITY CONTROL Article of PART 3 of this section.
   4. Certified test reports of independent testing agency, as specified in FIELD QUALITY CONTROL Article of PART 3 of this section.

## 1.06 QUALITY ASSURANCE

A. Qualifications:
   1. Manufacturer: Minimum five (5) years documented experience producing systems specified in this section.
   2. Installer: Minimum (5) years documented experience installing systems specified in this section and approved by the manufacturer.
   3. For all noise control assemblies, the Contractor shall provide testing as recommended by Manufacturers during construction and at project completion to assure specified noise control requirement are met. Any discrepencies shall be corrected by the Contractor at no cost to the Owner.

## 1.07 DELIVERY, STORAGE AND HANDLING

A. Store frames in accordance with requirements of HMMA 840.

B. Store steel doors in accordance with requirements of HMMA 840.

C. Remove wraps or covers from doors and frames upon delivery at the building site; clean and touch-up scratches or disfigurement caused by shipping or handling promptly with rust inhibitive primer.

D. Store units on planks or dunnage in a dry location; store doors in a vertical position spaced by blocking.

E. Store units covered to protect them from damage, but permitting air circulation.

**1.08 SCHEDULING**

A. Furnish manufacturer's mounting templates for door hardware specified in Section 087100 to manufacturer of products of this section in time for factory preparation for door hardware.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

A. Assa Abloy, Model AW53C- Acoustical Door System - Basis of Design

B. Krieger Specialty Products, 4880 Gregg Road, Pico Rivera CA 90660; Telephone 562-695-0645.

C. Overly Door Company, meeting specified STC 53 rating minimum

D. Commercial Doors, Telephone 334-277-4451, Tracy Jordan.

E. Substitutions: As required by project.

F. Unless otherwise specified for an individual product or material, supply all products specified in this section from the same manufacturer.

**2.02 DOOR SYSTEMS**

A. Provide acoustical assemblies complete with door, frame, anchors, sound selas, hinges, and cutouts and reinforcements for hardware items listed or required.

B. Where indicated on the plans or otherwise required, provide factory-installed glazed vision light assembly in dimensions meeting the specified STC rating.

**2.03 DOORS**

A. Materials: doors shall be **1 3/4" thick,** constructed of wood veneer of species indicated with a sound-deadening core of **STC 53.**

B. Construction:
   1. All doors shall be of the types and sizes shown on approved shop drawings and shall have a 1-3/4 thick acoustical core. Doors shall be clad with 3-ply crossband veneer for 5-ply door construction. All adhesives, as well as warp tolerances, shall be in accordance with ANSI / NWWD 1.S.1-A.
   2. Face veneers, stile and rail edges, and appearance features match the doors approved under Section 08 1416. Match wood door plastic laminate.
   3. Factory finish sound control doors to match the control sample approved by the architect. Finish is required on all exposed surfaces of door including top and bottom edges.
   4. Hardware preparation:
      a. Mortise, reinforce, drill, and tap doors at factory for fully templated mortised hardware only, in accordance with approved hardware schedule and supplied templates.
      b. Provide reinforcing plates at surface-mounted or non-templated hardware locations.

C. Acoustical Panels: same materials, construction, and finish as doors; sizes as indicated on Architect-approved shop drawings.

D. Frames: Fabricate in accordance with Architect-approved shop drawings, and as follows:

1. Frames for interior use: Fabricate from stainless steel sheet, minimum 14-gage thickness.
2. Form frame members straight, and of uniform profile through lengths, as welded units with integral trim, of sizes and profiles indicated.
   a. Weld contact edges of joints closed tight.
   b. Miter perimeter trim faces and weld continuously.
3. When shipping limitations so dictate, fabricate frames for large openings in sections designed for assembly in the field; install alignment plates or angles, of same material and gage as frame, at each joint.
4. Hardware preparation:
   a. Mortise, reinforce, drill, and tap frames at factory for fully templated mortised hardware only, in accordance with Architect-approved shop drawings and supplied templates.
   b. Provide reinforcing plates at surface-mounted or non-templated hardware locations.
5. Floor anchors:
   a. Fabricate of same material as frame material; minimum 14 gage.
   b. Weld anchors inside each jamb for floor anchorage.
6. Jamb anchors:
   a. Fabricate of same material as frame material; weld anchors inside each jamb for wall anchorage.
   b. Provide anchor types for indicated adjacent wall construction:
      1) Frames for installation in stud partitions: Continuous 16 gage steel channel to surround stud, welded inside each jamb.
7. Provide welded frames with temporary steel spreader welded to jamb feet for bracing during shipping and handling.

E. Loose stops:
1. Fabricate of minimum 12 ga. steel, with factory drilled and countersunk holes for fasteners.
2. Form stops for mitered corner joints.
3. Supply cadmium-coated or zinc-coated fasteners, size and quantity required for fastener holes.

F. Door hardware:
1. Supply gasketing systems, retainers, retainer covers, fixed door bottoms, cam-lift hinges, thresholds / integral 4-sided plate sills as indicated on Architect-approved shop drawings, or specified in manufacturer's product data for project conditions, to achieve specified performance requirements.
2. All other door hardware to match as applicable per specified in Section 08 7100 to achieve performance requirements of the door assembly.

### 2.04 SILL CONDITION

A. Where indicated on the drawings, furnish a smooth flush stainless steel threshold / sill for the door bottoms to seal against when the door is in the closed position. For openings where carpet extends through the opening, the threshold height shall be 1/8” greater in height than the carpet thickness or as manufacturer requires.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Proper installation is essential to the proper performance of acoustical door and frame assemblies. It shall be the responsibility of the General Contractor to perform the following.

B. Verification of conditions:
   1. Prior to installation, check and correct frames for size, swing, squareness, alignment, twist and plumb.
   2. Verify openings are in accordance with approved shop drawings.

C. Installer's examination:
   1. Have installer of this section examine conditions under which construction activities of this section are to be performed, then submit written notification if such conditions are unacceptable.
   2. Transmit two copies of installer's report to Architect within 24 hours of receipt.
   3. Beginning construction activities of this section before unacceptable conditions have been corrected is prohibited.
   4. Beginning construction activities of this section indicates installer's acceptance of conditions.

D. Solidly grout fill frames where so indicated on the drawings or the approved submittals, eliminating all voids. The flanking path normally found behind the frame must be packed with either 6-12 lb rock wool insulation or grout filled to assure minimum sound transmission.

**3.02 PREPARATION**

A. Remove steel spreaders from welded frames prior to installation; use of spreaders for installation purposes not permitted.

**3.03 INSTALLATION**

A. Install units in accordance with approved shop drawings and manufacturer's printed installation instructions; in addition, install steel components in accordance with HMMA 840.

B. Oversize assemblies: only if applicable.
   1. Weld field joints in accordance with AWS D1.1 and approved shop drawings.
   2. Finish exposed field welds smooth; touch-up with rust inhibitive primer.
   3. Ship knock-down to the jobsite prepared for field attachment by others.

C. Fill voids between concealed side of frame and adjacent wall construction with lightweight gypsum plaster in accordance with approved shop drawings or manufacturer's printed installation instructions.

D. Finish surfaces having abrasion damage smooth; touch-up with rust inhibitive primer.

E. Install gasketing systems, retainers, retainer covers, fixed door bottoms, cam-lift hinges, thresholds and sills in accordance with manufacturer's printed instructions.

F. Installation of all other door hardware is specified in Section 08 71 00.

G. Factory finishing..

H. Site tolerances: Do not exceed the following installation tolerances:
   1. Squareness: Plus or minus 1/16 inch (1.59 mm) measured on a line, 90 degrees from one jamb, at the upper corner of the frame at the other jamb.
   2. Alignment: Plus or minus 1/16 inch (1.59 mm) measured on jambs on a horizontal line parallel to the plane of the wall.
   3. Twist: Plus or minus 1/16 inch (1.59 mm) measured at face corners of jambs on parallel lines perpendicular to the plane of the wall.
   4. Plumb: Plus or minus 1/16 inch (1.59 mm) measured on the jamb at the floor.

### 3.04 FIELD QUALITY CONTROL

A. Engage and pay for the field services of manufacturer's authorized representative to train, supervise and certify installer ahead of time (preferably before labor begins, at setting of 1st frame, hanging of 1st door and ahead of handover, field testing or the like -- or at least:
   1. Inspect completed installation of door and frame assemblies.
   2. Test all components through a minimum of ten complete cycles of operation.
   3. Verify each component is correctly installed.
   4. Direct installer in adjusting components for correct operation.
   5. Issue certified statement of compliance of installed door and frame assemblies to Architect-approved shop drawings.
   6. Instruct Owner's maintenance personnel in correct operation and maintenance procedures for components of door and frame assemblies.

B. Engage and pay for the services of independent testing agency to:
   1. 1Test door and frame assemblies selected by Owner or Architect in accordance with ASTM E 336.
   2. Issue certified report documenting compliance of installed door and frame assemblies to specified acoustical performance requirements.

C. Notify Architect a minimum of four (4) calendar days prior to scheduled testing dates.

### 3.05 MAINTENANCE

A. Instruct the Owner’s Maintenance Personnel regarding the proper operation and maintenance of these doors.

**END OF SECTION**

# SECTION 08 4113
# FIRE-RATED ALUMINUM FRAMED ENTRANCES AND STOREFRONTS

## PART 1 GENERAL

### 1.01 SUMMARY

### 1.02 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.

B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test; 2015 (Reaffirmed 2020).

C. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2026.

D. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2023).

E. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2016.

F. ASTM F588 - Standard Test Methods for Measuring the Forced Entry Resistance of Window Assemblies, Excluding Glazing Impact; 2014.

G. ASTM F2248 - Standard Practice for Specifying an Equivalent 3-Second Duration Design Loading for Blast Resistant Glazing Fabricated with Laminated Glass; 2012.

H. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2025, with Amendment (2024).

I. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2022.

J. NFPA 257 - Standard on Fire Test for Window and Glass Block Assemblies; 2012.

K. NFRC 100 - Procedure for Determining Fenestration Product U-factors; 2014.

L. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence; 2014.

M. UFC 4-010-01 - DoD Minimum Antiterrorism Standards for Buildings; 2012.

N. UL 9 - Standard for Fire Tests of Window Assemblies; Current Edition, Including All Revisions.

O. UL 10B - Standard for Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

P. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

Q. UL 263 - Standard for Fire Tests of Building Construction and Materials; Current Edition, Including All Revisions.

R. UL 752 - Standard for Bullet-Resisting Equipment; Current Edition, Including All Revisions.

### 1.03 SUMMARY

A. Section Includes: Fire resistive framing system.
   1. GPX® Architectural Series Framing fire resistive, temperature rise, framing system with aluminum or decorative cladding for 45-120 minute interior applications.

B. Applications of fire rated framing includes:
   1. Vision lites in fire rated doors, full vision fire rated doors, sidelites, borrowed lites, transoms and transparent walls with fire rating requirement as specified.

### 1.04 RELATED SECTIONS

A. Section 08 8000: Glazing

B. Section 08 8813: Fire-Rated Glazing

C. Section 08 11 13: Hollow Metal Doors and Frames

D. Section 08 4313: Aluminum Doors and Frames

E. Section 08 7100: Door Hardware

F. Section 08 8813: Fire Rated Glazing - 60 minute

### 1.05 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. ASTM E119 Methods for Fire Tests of Building Construction and Materials.
   2. ASTM E152 Methods of Fire Tests of Door Assemblies.
   3. ASTM E163 Methods for Fire Tests of Window Assemblies.
   4. ASTM E2074: Standard Test Method for Fire Tests of Door Assemblies, including Positive Pressure Testing of Side-hinged and Pivoted Swinging Door Assemblies.

B. ASTM E2110-1: Standard Test for Positive Pressure of Fire Tests of Window Assemblies.
   1. ASTM E283-04: Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls and Doors.
   2. ASTM 547-00: Test Method for Water Penetration of Exterior Windows, Curtain Walls and Doors by Cyclic Static Air Pressure Difference.
   3. ASTM E331-00: Standard Test Method for Metal Curtain Walls and Doors by Uniform Static Air Pressure Difference.
   4. ASTM E330-02: Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.

C. ASTM F 588-04: Test Method for Resistance of Window Assemblies to Forced Entry Excluding Glazing.

D. National Fire Protection Association (NFPA):
   1. NFPA 80: Fire Doors and Windows.
   2. NFPA 251: Fire Tests of Building Construction and Materials.
   3. NFPA 252: Fire Tests of Door Assemblies.
   4. NFPA 257: Fire Tests of Window Assemblies.

E. Underwriters Laboratories, Inc. (UL):
   1. UL 9: Standard for Safety of Fire Tests of Window Assemblies.
   2. UL 10B: Standard for Safety of Fire Tests of Door Assemblies.

F. UL 10C: Standard for Safety of Positive Pressure Fire Tests of Door Assemblies.
   1. UL 263: Fire Tests of Building Construction and Materials.
   2. UL 752-2005: Standard for Safety for Bullet-Resisting Equipment.

G. Standard Council of Canada (ULC):
   1. ULC Standard CAN4-S101: Fire Tests of Building Construction and Materials.
   2. ULC Standard CAN4-S104: Fire Tests of Door Assemblies.
   3. ULC Standard CAN4-S106: Fire Tests of Window Assemblies.

H. Consumer Product Safety Commission (CPSC):
   1. CPSC 16 CFR 1201: Safety Standard for Architectural Glazing Materials.

I. American National Standards Institute (ANSI):
   1. ANSI Z97.1: Safety Glazing Materials Used in Buildings - Safety Performance Specifications and Methods of Test.

J. Glass Association of North America (GANA)
   1. GANA – Glazing Manual.
   2. FGMA – Sealant Manual.

K. National Fenestration Rating Council (NFRC)
   1. NFRC 100: Procedure for Determining Fenestration Product U-Factors.
   2. NFRC 200: Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence.

L. American Recovery and Reinvestment Act
   1. Section 1605, Title XVI Buy American Provision]

M. IBC 2024

**1.06 SYSTEM DESCRIPTION**

A. Performance Requirements:
   1. Fire Rating: must meet 60, 90 or 120 minutes as specified see door schedule.
   2. Fire Resistive Wall Assembly Certifications: must meet 60-120 minute fire resistive wall assemblies tested in accordance with ASTM E119, NFPA 251, UL 263 and ULC-S101.
   3. Fire Resistive, Temperature Rise Door Assembly Certifications: must meet 60-90 minute fire resistive temperature rise door assemblies tested in accordance with NFPA 252, UL 10B, UL 10C and CAN4 S104. Must meet 250 degrees F/450 degrees F temperature rise door requirements.
   4. Uniform Load Deflection Test Pressure: up to +/- 50.0 psf
   5. Uniform Load Structural Test Pressure: up to +/- 75.0 psf
   6. Forced Entry Resistance: must meet ASTM F588 Type D
   7. FIRST's NFRC CMAST document for examples of simulations based on available glazing materials in the NFRC CMAST database.
   8. Testing Laboratory: Fire test must be conducted by a nationally recognized independent testing laboratory.
   9. Glazing: Fire resistive glazing in 60-90 minute fire resistance doors and openings up to the maximum size tested. Fire resistive glazing that meets ASTM E-119/UL 263/ULC- S101 up to the max. size tested. All glazing used in doors, sidelites or any hazardous location must meet CPSC Cat. I or II impact safety.
   10. Max. Door Opening Sizes: must meet up to 4'0" wide x 9'0" high for single doors and 8'0" wide by 9'0" high in pair doors. No intermediate rails required.

B. Listings and Labels:
   1. Fire resistive, temperature rise framing system shall be under current follow-up service by a nationally recognized independent laboratory approved by OSHA and maintain a current listing or certification. Assemblies shall be labeled in accordance with limits of listings.

C. Appearance:
   1. Fire rated wall/door assembly shall have a neat finished appearance with minimum joints at decorative cover intersections.

### 1.07 SUBMITTALS

A. Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedure Section.

B. Shop Drawings: Submit detailed shop drawings showing layout, profiles and product components. Provide elevations, head, jamb, and sill details at 1 1/2" = 1'-0" scale.
   1. Samples: Submit samples for finishes, colors and textures.

C. Technical Information: Submit latest edition of manufacturer's product data providing product descriptions, technical data and installation instructions.

### 1.08 DELIVERY, STORAGE AND HANDLING

A. General: Comply with Division1 Product Requirements Sections.

B. Ordering: Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.

C. Delivery: Deliver materials to specified destinations in manufacturer's or distributor's packaging undamaged, complete with installation instructions.

D. Storage and Protection: Store off ground, under cover, protected from weather and construction activities and at temperature conditions recommended by manufacturer.

### 1.09 FABRICATION DIMENSIONS

A. Field Measurements: Verify actual measurements for openings by field measurements before fabrication. Show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

### 1.10 WARRANTY

A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.

B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document. Manufacturer's warranty is not intended to limit other rights that the Owner may have under the Contract Documents.
   1. Warranty Period: 5-year limited warranty from date of substantial completion.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS – FIRE RATED (DOOR) (OPENING) (WALL ASSEMBLY)

A. Manufacturer of Framing System: GPX Architectural Series Framing as manufactured and distributed by SAFTI FIRST® Fire Rated Glazing Solutions.
   1. Contact: 100 N Hill Drive, Suite 12, Brisbane, CA 94005; Telephone 888.653. 3333; email info@safti.co; Web site www.safti.com - basis of design.

B. Manufacturer of Glazing Material: SuperLite® II-XL as manufactured and distributed by SAFTI FIRST® Fire Rated Glazing Solutions.
   1. Type FRG-1 - 60 Minute Glazing
   2. Contact: 100 N Hill Drive, Suite 12, Brisbane, CA 94005; Telephone 888.653. 3333; Fax 888.653.4444; email info@safti.co; Web site www.safti.com

C. Fire rated glass and framing must be provided by a single-source, US manufacturer. Distributors of fire rated glass and framing are not to be considered as manufacturers. Materials for the project should be shipped together in the same shipment on the same truck.

D. Substitutions: No substitutions allowed.

## 2.02 MATERIALS – FRAMING

A. Fire resistive, temperature rise framing system rated for 60 to 120 minutes.

Properties:

1. Window/Wall Frame thickness: **4-1/8" and 5"** as required for installation. **Door profile : 5" Stile and top rail and 10 " high bottom rail.**
2. Fire resistive aluminum door capable of accommodating concealed hardware.
3. Internal framing: Internal tube steel framing shall conform to ASTM A501. Formed steel retainers shall be galvanized conforming to ASTM A527.
4. Insulation: The framing system shall insulate against the effects of fire, smoke and heat transfer from either side. The perimeter of the framing system to the rough opening shall be firmly packed with mineral wool fire stop insulation or appropriately rated intumescent sealant.
5. Fasteners: Type recommended by manufacturer. No exposed fasteners allowed.
6. Glazing accessories: The glazing material perimeter shall be separated from the perimeter framing system with approved flame retardant glazing tape. The SuperLite® glazing panel shall be caulked continuously around the edge to the tube steel frame utilizing neutral cure silicone. Silicone setting blocks recommended.
7. SAFTI FIRST listing allows for doors by others.

## 2.03 MATERIALS – GLASS

A. Assemblies shall be glazed with SuperLite® glazing products. If assembly is required to meet ASTM E 119/UL 263/ULC-S101, SuperLite® II-XL will be used. **Also refer to 08 8813 Fire - Rated Glazing ( 60 Minute)**

B. Properties:

1. Individual Lites shall be permanently identified with a listing mark.
2. Glazing material installed in "Hazardous Locations" (subject to human impact) shall be certified to meet the applicable requirements for fire rated assemblies referenced in ANSI Z97.1 Standard for Safety Glazing Materials Used In Buildings and/or CPSC 16 CFR 1201 Safety Standard for Architectural Glazing Materials.
3. Temperature rise on the unexposed side of glazing material shall be limited to 250 degrees Fahrenheit when required.
4. Visible Transmittance: Varies by glazing type. Must meet:

| | |
|---|---|
| SuperLite ® II-XL 60 Starphire® | 0.877 |
| SuperLite ® II-XL 90 Starphire® | 0.875 |
| SuperLite ® II-XL 120 Starphire® | 0.878 |

5. STC/OITC rating: Varies by glazing type. Must meet:

| | |
|---|---|
| SuperLite® II-XL 60 & SuperLite® II-XL 60 Starphire® | STC 43/OITC 39 |
| SuperLite® II-XL 90 & SuperLite® II-XL 90 Starphire® | STC 44/OITC 40 |
| SuperLite® II-XL 120 & SuperLite® II-XL 120 Starphire® | STC 44/OITC 40 |

6. Pressure glazing is acceptable.

C. Logo: Each piece of fire rated glazing shall be labeled with a permanent logo.

## 2.04 FABRICATION

A. Assemblies shall be furnished [knocked down for field assembly and will be glazed in the field] [assembled (should configurations and job site conditions allow)][unitized (should configurations and job site conditions allow)] .

B. Door assemblies shall be factory prepared for field mounting of hardware.

C. Fabrication Dimensions: Fabricate to approved dimensions. The general contractor shall guarantee dimensions within required tolerance. Obtain approved shop drawings prior to fabrication.

## 2.05 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designing finishes.

B. Covers shall be chemically cleaned and pretreated; then, finished with:
   1. High Performance Coraflon Fluoropolymer Finish by PPG®. Solid color to be selected from SAFTI's Standard Color Chart. Mica, XL, **match storefront color** at no dditional charge.

C. Protect finishes on exposed surfaces from damage by applying strippable, temporary protective covering before shipping.

D. Variations in appearance of abutting or adjacent pieces are acceptable. Noticeable variations in the same piece are not acceptable.

## 2.06 DOOR HARDWARE FOR SINGLE AND PAIRED DOORS

A. Hardware shall be supplied with the fire door. Hardware selection shall be from door manufacturer's standard recommended hardware groups as specified below. Please call manufacturer for custom hardware.

B. Standard operating hardware for single and pair doors.

| QUANTITY | ITEM | DESCRIPTION | MANUFACTURER | FINISH |
|---|---|---|---|---|
| 1 | HINGES | HEAVY-DUTY CONTINUOUS GEARED OKC | PEMKO | ANODIZED |
| 1 | PANIC DEVICE | MODERN TOUCHBAR WITH SURFACE VERTICAL RODS | VON DUPRIN 9827F W/ 996 L-TRIM | US26D |
| 1 | CLOSING DEVICE | HEAVY-DUTY SURFACE APPLIED CLOSER | LCN 4040XP | ALUMINUM |
| 1 | AUTO DOOR BOTTOMS | 420APKL | PEMKO | |

## PART 3 EXECUTION

### 3.01 MANUFACTURER'S INSTRUCTIONS

A. Compliance: Comply with manufacturer's product data including product technical bulletins and installation instructions.

### 3.02 EXAMINATION

A. Site Verification of Conditions: Verify substrate conditions, have been previously installed under other sections, and are acceptable for product installation in accordance with manufacturer's instructions. Openings shall be plumb, square and within allowable tolerances. The Architect/Engineer shall be notified of any conditions that jeopardize the integrity of the proposed fire wall/door framing system. Do not proceed until such conditions are corrected.

### 3.03 INSTALLATION

A. Fire wall/door installation shall be by a licensed contractor and in strict accordance with the approved shop drawings.

### 3.04 CLEANING AND PROTECTION

A. Protect glass from contact with contaminating substances resulting from construction operations. Remove such substances by method approved by manufacturer.

B. Wash glass on both faces not more than four days prior to date schedule for inspections intended to establish date of Substantial Completion. Wash glass by method recommended by glass manufacturer.

C. Remove temporary coverings and protection of adjacent work areas.

D. Remove construction debris from project site and legally dispose of debris.

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# SECTION 08 4313
# ALUMINUM-FRAMED STOREFRONTS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Aluminum-framed storefront, with vision and spandrel glass.

### 1.02 RELATED REQUIREMENTS

A. Section 05 5000 - Metal Fabrications: Steel attachment devices.

B. Section 07 2726: Fluid applied membrane air barriers.

C. Section 07 6200 - Sheet Metal Flashing and Trim

D. Section 08 7100 - Door Hardware

E. Section 07 9005 - Joint Sealers

F. Section 08 8000 - Glazing: Glass and glazing accessories.

G. Section 08 2953 - 08 2954 - 08 2955 Mullion Mate, see index

### 1.03 REFERENCE STANDARDS

A. AAMA 501.2 - Quality Assurance and Diagnostic Water Leakage Field Check of Installed Storefronts, Curtain Walls, and Sloped Glazing Systems; 2025.

B. AAMA 611 - Specification for Anodized Architectural Aluminum; 2026.

C. AAMA 612 - Voluntary Specification, Performance Requirements, and Test Procedures for Combined Coatings of Anodic Oxide and Transparent Organic Coatings on Architectural Aluminum; 2020, with Errata (2022).

D. AAMA 1503 - Voluntary Test Method for Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections; 2009.

E. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2026.

F. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2026.

G. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site; 2026.

H. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

I. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.

J. ASTM E283 - Standard Test Method for Determining the Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2004 (Reapproved 2012).

K. ASTM E330/E330M - Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference; 2014 (Reapproved 2021).

L. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference; 2000 (Reapproved 2023).

M. ASTM E547 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Cyclic Static Air Pressure Difference; 2000 (Reapproved 2024).

N. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference; 2015 (Reapproved 2023).

**1.04 ADMINISTRATIVE REQUIREMENTS**

A. Coordinate with installation of other components that comprise the exterior enclosure.

**1.05 SUBMITTALS**

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, glass and infill, internal drainage details and _____.

C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and field welding required.

D. Samples: Submit two samples 12" x 12" inches (__ mm) in size illustrating finished aluminum surface, glass, infill panels, glazing materials. Provide jamb and head closures and high performance sill and end dams.

E. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.

F. Mock Up: Include a portion of the storefront system in the project mock up.

G. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

**1.06 MOCK UP**

A. Construct a portion of the full size storefront assembly as a mock-up panel sized to illustrate assembly construction, flashings, end dams, sills, and sealants; mock up may be used as final product if accepted by architect. **Head, Jamb, and Sill sealant joints to be as recommended by manufacturer and approved by architect, and Harun Biswas, owner's representative.**

**1.07 QUALITY ASSURANCE**

A. Manufacturer Qualifications: Company specializing in performing work of type specified and with at least three years of documented experience.

B. Comply with Zone 3, Ashrae Standard 90.7 (2013) Table 5.5.3 U Factor .50 Maximum, SHGC .25 Minimum

C. Rating of Fenestration Products
   1. The U-factor, SHGC, and air leakage rate for all manufactured fenestration products shall be determined by a laboratory accredited by a nationally recognized accreditation organization, such as the National Fenestration Rating Council.

D. Labeling of Fenestration Products
   1. All manufactured fenestration products shall have a permanent nameplate, installed by the manufacturer, listing the U-factor, SHGC, and air leakage rate.

**1.08 DELIVERY, STORAGE, AND HANDLING**

A. Handle products of this section in accordance with AAMA CW-10.

B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

### 1.09 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a 10 year period after Date of Substantial Completion.

C. Provide 10 year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

## PART 2 PRODUCTS

### 2.01 BASIS OF DESIGN -- FRAMING FOR INSULATING GLAZING

A. Center-Set Style, Thermally-Broken: **Exterior**.
   1. Basis of Design: Kawneer Trifab VersaGlaze 451T Framing System or Approved Equal.
      a. Vertical Mullion Dimensions: 2 inches wide by 4-1/2 inches deep (50 mm wide by 114 mm deep).

B. Center-Set Style, Not Thermally-Broken (**Interior**):
   1. Basis of Design: Kawneer Trifab VersaGlaze 450 Framing System or Approved Equal.
   2. Vertical Mullion Dimensions: 1-3/4 inches wide by 4-1/2 inches deep (45 mm wide by 114 mm deep).

C. Other Manufacturers: Provide either the product identified as "Basis of Design" or an equivalent product of one of the manufacturers listed below:
   1. YKK AP America Inc; _____: www.ykkap.com/#sle.
   2. Oldcastle Building Envelope.

D. Substitutions: See Section 01 6000 - Product Requirements.
   1. For any product not identified as "Basis of Design", submit information as specified for substitutions.

### 2.02 BASIS OF DESIGN -- SWINGING DOORS

A. Wide Stile, Non-Insulated Glazing: Non-Thermally-Broken (**Interior**):
   1. Basis of Design: Kawneer 500 Standard Entrance or Approved Equal.
   2. Thickness: 1-3/4 inches (43 mm)
   3. Bottom Rail: 10 inches.

B. Wide Stile, Insulating Glazing, (**Exterior)**:
   1. Basis of Design: Kawneer 500 Entrance or Approved Equal.
   2. Thickness: 1-3/4 inches (43 mm).
   3. Bottom Rail: 10 inches.

C. Other Manufacturers: Provide either the product identified as "Basis of Design" or an equivalent product of one of the manufacturers listed below:

D. Substitutions: See Section 01 6000 - Product Requirements.
   1. For any product not identified as "Basis of Design", submit information as specified for substitutions.

E. Provide Mullion Mate Series 40 or equal. Profiles at junctions between walls and window mulls. Match storefront finish. Provide Mullion Mate end cap and verify size.

### 2.03 APPLICATION SCHEDULE

A. Provide thermally broken systems at all exterior applications.

B. Provide non-thermally broken systems at all interior applications.

## 2.04 STOREFRONT

A. Aluminum-Framed Storefront: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
   1. Finish: AAMA 2605 Fluoropolymer Coating. PVDF
      a. Factory finish all surfaces that will be exposed in completed assemblies.
      b. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.
   2. Finish Color: Match architects sample. **The intent is to match bulidings A,B,C, and D on campus.**
   3. Fabrication: Joints and corners flush, hairline, and weatherproof, accurately fitted and secured; prepared to receive anchors and hardware; fasteners and attachments concealed from view; reinforced as required for imposed loads.
   4. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
   5. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
   6. Expansion/Contraction: Provide for expansion and contraction within system components caused by cycling temperature range of 170 degrees F (95 degrees C) over a 12 hour period without causing detrimental effect to system components, anchorages, and other building elements.
   7. Movement: Allow for movement between storefront and adjacent construction, without damage to components or deterioration of seals.
   8. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.

B. Performance Requirements:
   1. Wind Loads: Design and size components to withstand the specified load requirements without damage or permanent set, when tested in accordance with ASTM E330/E330M, using loads 1.5 times the design wind loads and 10 second duration of maximum load.
      a. Design Wind Loads: Comply with requirements of ASCE 7.
      b. Member Deflection: Limit member deflection to flexure limit of glass in any direction, with full recovery of glazing materials.
   2. Water Penetration Resistance: No uncontrolled water on interior face, when tested in accordance with ASTM E331 at pressure differential of 8 psf (390 Pa).
   3. Air Leakage: Maximum of 0.06 cu ft/min sq ft (0.3 L/sec sq m) of wall area, when tested in accordance with ASTM E283 at 6.27 psf (300 Pa) pressure differential across assembly.
   4. Overall U-value Including Glazing for Thermally Broken Application: 0.46 Btu/(hr sq ft deg F) (_____ Btu/(hr sq ft deg F)), maximum.

## 2.05 COMPONENTS

A. Aluminum Framing Members: Tubular aluminum sectionsthermally broken where indicated, drainage holes and internal weep drainage system.
   1. Glazing Stops: Flush.

B. Glazing: As specified in Section 08 8000.

C. Exterior Sill: **Provide high performance flashing sill** equal to Kawneer 451T037 with **manufacturers recommended weep holes**, provide sealed manufacturers end dams. Provide weeps as recommended by the manufacturer.

D. **Exterior Jamb and Head back side manufacturer's aluminum closure components**.

E. Aluminum Sheet Metal: PVDF finish, .040 inch thick, match color of storefront.

**2.06 MATERIALS**

A. Extruded Aluminum: ASTM B221 (ASTM B221M).

B. Fasteners: Stainless steel.

C. Sill Flashing Sealant: Elastomeric, silicone compatible with flashing material.

D. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

E. Glazing Accessories: As specified in Section 08 8000.

**2.07 ACCESSORIES**

A. **Provide .040 inch thick with 80% PVDF finished aluminum Sheet Metal per SMACA to match Storefront, match storefront color as approved by architect. Consult with architect prior to installation.**

**2.08 FINISHES**

A. Superior Performing Organic Coatings System: 2605 -Polyvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF resin, and at least 80 percent of aluminum extrusion and panels surfaces having minimum total dry film thickness (DFT) of 1.2 mils, 0.0012 inch (0.030 mm).
   1. Manufacturers:
      a. PPG Metal Coatings; Duranar: www.ppgmetalcoatings.com/#sle.
      b. Sherwin-Williams Company; SHER-NAR 5000: oem.sherwin-williams.com/#sle.
      c. Valspar; Fluropon: www.valsparcoilextrusion.com/#sle.
      d. _____.

B. Color: As selected by Architect from manufacturer's standard range..

C. Touch-Up Materials: As recommended by coating manufacturer for field application.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

A. Verify dimensions, tolerances, and method of attachment with other work.

B. Verify that wall openings and adjoining air and vapor seal materials are ready to receive work of this section.

**3.02 INSTALLATION**

A. Install wall system in accordance with manufacturer's instructions.

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

C. Provide alignment attachments and shims to permanently fasten system to building structure.

D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

E. Provide thermal isolation where components penetrate or disrupt building insulation.

F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam. Place end dams in full bed of sealant.

G. Where fasteners penetrate sill flashings, make watertight by seating and sealing fastener heads to sill flashing.

H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

I. Jambs and Head shall be installed with a continuous aluminum filler .

J. Install all vertical mullions per manufacturers' instruction and cap each vertical in full bed of sealant.

K. Install all horizontal to vertical intersections (except sills) with water deflectors per manufacturers' instructions.

L. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

M. Install Aluminum Break Metal per SMACNA.

**3.03 TOLERANCES**

A. Maximum Variation from Plumb: 0.06 inches every 3 ft (1.5 mm/m) non-cumulative or 1/16 inches per 10 ft (1.5 mm/3 m), whichever is less.

B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch (0.8 mm).

**3.04 FIELD QUALITY CONTROL**

A. See Section 01 4000 - Quality Requirements, for independent testing and inspection requirements. Inspection will monitor quality of installation and glazing.

B. Test installed storefront for water leakage in accordance with AAMA 501.2 hose test.

C. Test installed storefront for water penetration in accordance with ASTM E1105 with a uniform test pressure difference of 2.86 lbf/sq ft (140 Pa).

**3.05 CLEANING**

A. Remove protective material from pre-finished aluminum surfaces.

B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths. Take care to remove dirt from corners. Wipe surfaces clean.

**3.06 PROTECTION**

A. Protect installed products from damage until Date of Substantial Completion.

**END OF SECTION**

# SECTION 08 4413
# GLAZED ALUMINUM CURTAIN WALLS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Aluminum-framed curtain wall, with vision glazing and spandrel infill panels.

B. Firestopping between curtain wall and edge of floor slab.

### 1.02 RELATED REQUIREMENTS

A. Section 05 1200 - Structural Steel Framing: Steel attachment members.

B. Section 07 8400 - Firestopping: Firestop at system junction with structure.

C. Section 07 9200 - Joint Sealants: Sealing joints between frames and adjacent construction.

D. Section 08 4313 - Aluminum-Framed Storefronts: Entrance framing and doors.

E. Section 08 8000 - Glazing.

F. Section 09 2116 - Gypsum Board Assemblies: Metal stud and gypsum board wall at interior of curtain wall.

### 1.03 REFERENCE STANDARDS

A. AAMA 503 - Voluntary Specification for Field Testing of Newly Installed Storefronts, Curtain Walls and Sloped Glazing Systems; 2024.

B. AAMA 609 & 610 - Cleaning and Maintenance Guide for Architecturally Finished Aluminum; 2025.

C. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2026.

D. AAMA CW-10 - Care and Handling of Architectural Aluminum from Shop to Site; 2026.

E. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2019.

F. ASTM A123/A123M - Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products; 2024.

G. ASTM B209/B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2021a.

H. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

I. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.

J. ASTM E283/E283M - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Skylights, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen; 2026.

K. ASTM E1105 - Standard Test Method for Field Determination of Water Penetration of Installed Exterior Windows, Skylights, Doors, and Curtain Walls, by Uniform or Cyclic Static Air Pressure Difference; 2015 (Reapproved 2023).

L. SSPC-Paint 20 - Zinc-Rich Coating (Type I - Inorganic, and Type II - Organic); 2019.

### 1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate with installation of other components that comprise the exterior enclosure.

B. Preinstallation Meeting: Conduct a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

**1.05 SUBMITTALS**

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Provide component dimensions, describe components within assembly, anchorage and fasteners, internal drainage details, glazing, _____, and infill.

C. Shop Drawings: Indicate system dimensions, framed opening requirements and tolerances, affected related Work, expansion and contraction joint location and details, and field welding required. Include plans, elevations, sections, full-size details, and attachements to other work.
   1. Show connection to and continutiy with adjacent thermal, weather, air, and vapor barriers.

D. Samples: Submit two samples ____by____ inches (____by____ mm) in size illustrating finished aluminum surface, glazing, infill panels, and glazing materials.

E. Delegated-Design Submittal: For glazed aluminum curtain walls, including analysis data signed and sealed by the qualified professional engineer responsible for their preperation.

F. Manufacturer's Certificate: Certify that the products supplied meet or exceed the specified requirements.

G. Field Quality Control Submittals: Report of field testing for water penetration and air leakage.

H. Warranty: Submit manufacturer warranty and ensure forms have been completed in Owner's name and registered with manufacturer.

**1.06 QUALITY ASSURANCE**

A. Designer Qualifications: Design curtain wall and its structural support framing components under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed at the State in which the Project is located.

B. Installer Qualifications: Company specializing in performing work of type specified and with at least _____ five years of documented experience.

**1.07 DELIVERY, STORAGE, AND HANDLING**

A. Handle products of this section in accordance with AAMA CW-10.

B. Protect finished aluminum surfaces with wrapping. Do not use adhesive papers or sprayed coatings that bond to aluminum when exposed to sunlight or weather.

**1.08 FIELD CONDITIONS**

A. Do not install sealants when ambient temperature is less than 40 degrees F (5 degrees C). Maintain this minimum temperature during and 48 hours after installation.

**1.09 WARRANTY**

A. See Section 01 7800 - Closeout Submittals for additional warranty requirements.

B. Correct defective Work within a 10 year period after Date of Substantial Completion.

C. Provide five year manufacturer warranty against failure of glass seal on insulating glass units, including interpane dusting or misting. Include provision for replacement of failed units.

D. Provide 15 year manufacturer warranty against excessive degradation of exterior finish. Include provision for replacement of units with excessive fading, chalking, or flaking.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. Basis of Design: Oldcastle Building Envelope Reliance Series.

B. Kawneer North America; _____: www.kawneer.com

C. YKK AP

### 2.02 SUBSTITUTIONS: SEE SECTION 01 6000 - PRODUCT REQUIREMENTS.

A. For any product not identified as "Basis of Design", submit information as specified for substitutions.

### 2.03 CURTAIN WALL

A. Aluminum-Framed Curtain Wall: Factory fabricated, factory finished aluminum framing members with infill, and related flashings, anchorage and attachment devices.
   1. Fabrication Method: Either shop/factory or field fabricated system.
   2. Finish: High performance organic coatings to match storefront
      a. Factory finish surfaces that will be exposed in completed assemblies.
      b. Touch-up surfaces cut during fabrication so that no natural aluminum is visible in completed assemblies, including joint edges.
      c. Coat concealed metal surfaces that will be in contact with cementitious materials or dissimilar metals with bituminous paint.
   3. Provide flush joints and corners, weathersealed, accurately fitted and secured; prepared to receive anchors; fasteners and attachments concealed from view; reinforced as required for imposed loads.
   4. Construction: Eliminate noises caused by wind and thermal movement, prevent vibration harmonics, and prevent "stack effect" in internal spaces.
   5. System Internal Drainage: Drain to the exterior by means of a weep drainage network any water entering joints, condensation occurring in glazing channel, and migrating moisture occurring within system.
   6. Pressure Caps: Manufacturer's standard aluminum components that mechanically retain glazing.
      a. Include snap-on aluminum trim that conceals fasteners. Trim to provide a deeper profile of at least 1 inch. Intent is to match the storefronts exterior asethitics in regards to mullion exterior face to glazing setback.
   7. Perimeter Clearance: Minimize space between framing members and adjacent construction while allowing expected movement.

B. Structural Performance Requirements: Design and size components as required and reinforced as required to support imposed loads.
   1. Movement: Accommodate the following movement without damage to components or deterioration of seals:
      a. Expansion and contraction caused by 180 degrees F (82 degrees C) surface temperature.
      b. Expansion and contraction caused by cycling temperature range of 170 degrees F (77 degrees C) over a 12 hour period.
      c. Movement of curtain wall relative to perimeter framing.
      d. Deflection of structural support framing, under permanent and dynamic loads.

C. Water Penetration Resistance on Manufactured Assembly: No uncontrolled water on indoor face when tested as follows:
   1. Test Pressure Differential: 10 psf (480 Pa).

D. Air Leakage: 0.06 cfm/sq ft (0.3 L/sec sq m) maximum leakage of wall area when tested in accordance with ASTM E283/E283M at 6.27 psf (300 Pa) pressure difference across assembly.

**2.04 COMPONENTS**

A. Aluminum Framing Members: Tubular aluminum sections, thermally broken with interior section insulated from exterior, drainage holes and internal weep drainage system.

B. Glazing: See Section 08 8000.

**2.05 MATERIALS**

A. Extruded Aluminum: ASTM B221 (ASTM B221M).

B. Sheet Aluminum: ASTM B209/B209M.

C. Structural Steel Sections: ASTM A36/A36M; galvanized in accordance with requirements of ASTM A123/A123M.
   1. Steel Reinforcement Primer: Manufacturer's standard zinc-rich, corrosion-resistant primer complying with SSPC-PS Guide No. 12.00; applied immediately after surface preparation and pretreatment. Select surface preparation methods in accordance with recommendations in SSPC-SP COM, and prepare surfaces in accordance with applicable SSPC standard.

D. Fasteners: Stainless steel; type as required or recommended by curtain wall manufacturer.

E. Exposed Flashings: Aluminum sheet, 20 gauge, 0.032 inch (0.81 mm) minimum thickness; finish to match framing members.

F. Firestopping: See Section 07 8400.

G. Glazing Gaskets: Type to suit application to achieve weather, moisture, and air infiltration requirements.

H. Glazing Accessories: See Section 08 8000.

I. Touch-Up Primer for Galvanized Steel Surfaces: SSPC-Paint 20, zinc rich.

**2.06 FINISHES**

A. Superior Performing Organic Coatings System: Polyvinylidene fluoride (PVDF) multi-coat superior performing organic coatings system complying with AAMA 2605, including at least 70 percent PVDF resin, and at least 80 percent of aluminum extrusion and panels surfaces having minimum total dry film thickness (DFT) of 1.2 mils, 0.0012 inch (0.030 mm).

**2.07 FABRICATION**

A. Form or extrude aluminum shapes before finishing.

B. Weld in concealed locations to greatest extent possible to minimize distortion or discoloration of finish. Remove weld spatter and welding oxides from exposed surfaces by descaling or grinding.

C. Fabricate components that, when assembled, have the following characteristics:
   1. Profiles that are sharp, straight, and free of defects or deformations.
   2. Accurately fitted joints with ends coped or mitered.
   3. Physical and thermal isolation of glazing from framing members.
   4. Accommodations for thermal and mechanical movements of glazing and framing to maintain required glazing edge clearances.

D. Fabricate components to resist water penetration as follows:

1. Internal guttering system or other means to drain water passing joints, condensation occurring within framing members, and moisture migrating within glazed aluminum curtain wall to exterior.
2. Pressure-equalized system or double barrier design with primary air and vapor barrier at interior side of glazed aluminum curtain wall and secondary seal weeped and vented to exterior.

E. Curtain-Wall Framing: Fabricate components for assembly using manufacturer's standard assembly method.

F. Factory-Assembled Frame Units:
1. Rigidly secure nonmovement joints.
2. Prepare surfaces that are in contact with structural sealant in accordance with sealant manufacturer's written instructions, to ensure compatibility and adhesion.
3. Preparation includes, but is not limited to, cleaning and priming surfaces.
4. Seal joints watertight unless otherwise indicated.
5. Install glazing to comply with requirements in Section 088000 "Glazing."

G. After fabrication, clearly mark components to identify their locations in Project in accordance with Shop Drawings.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify dimensions, tolerances, and method of attachment with other related work.

B. Verify that curtain wall openings and adjoining water-resistive and air barrier seal materials are ready to receive work of this section.

C. Verify that anchorage devices have been properly installed and located.

### 3.02 INSTALLATION

A. Install curtain wall system in accordance with manufacturer's instructions.

B. Attach to structure to permit sufficient adjustment to accommodate construction tolerances and other irregularities.

C. Provide alignment attachments and shims to permanently fasten system to building structure.

D. Align assembly plumb and level, free of warp or twist. Maintain assembly dimensional tolerances, aligning with adjacent work.

E. Provide thermal isolation where components penetrate or disrupt building insulation.

F. Install sill flashings. Turn up ends and edges; seal to adjacent work to form water tight dam.

G. Install firestopping at each floor slab edge.

H. Pack fibrous insulation in shim spaces at perimeter of assembly to maintain continuity of thermal barrier.

I. Touch-up minor damage to factory applied finish; replace components that cannot be satisfactorily repaired.

### 3.03 TOLERANCES

A. Maximum Variation from Plumb: 0.06 inches every 3 ft (1.5 mm/m) non-cumulative or 0.5 inches per 100 ft (12 mm/30 m), whichever is less.

B. Maximum Misalignment of Two Adjoining Members Abutting in Plane: 1/32 inch (0.8 mm).

C. Sealant Space Between Curtain Wall Mullions and Adjacent Construction: Maximum of 1/2" inch (____ mm) and minimum of 1/4 inch (6 mm).

**3.04 FIELD QUALITY CONTROL**

A. See Section 01 4000 - Quality Requirements for independent field testing and inspection requirements, and requirements for monitoring quality of specified product installations.

B. Provide field testing of installed curtain wall system by independent laboratory in accordance with AAMA 503 during construction process and before installation of interior finishes.
   1. Perform a minimum of two tests in each designated area as indicated on drawings.
   2. Conduct tests in each area prior to 10 percent and 50 percent completion of this work.
   3. Field test for water penetration in accordance with ASTM E1105 with uniform static air pressure difference (Procedure A) not less than 4.18 psf (200 Pa).
      a. Maximum allowable rate of water penetration in 15-minute test is 0.5 ounce (14 gram) that is not contained in an area with provisions to drain to exterior, or collected on surface of interior horizontal framing member.

C. Repair or replace curtain wall components that have failed designated field testing, and retest to verify performance complies with specified requirements.

**3.05 CLEANING**

A. Remove protective material from pre-finished aluminum surfaces.

B. Wash down surfaces with a solution of mild detergent in warm water, applied with soft, clean wiping cloths, take care to remove dirt from corners, and wipe surfaces clean.

C. Upon completion of installation, thoroughly clean aluminum surfaces in accordance with AAMA 609 & 610.

**3.06 PROTECTION**

A. Protect installed products from damage until Date of Substantial Completion.

**END OF SECTION**

# SECTION 08 7100
# DOOR HARDWARE

## PART 1 GENERAL

### 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

### 1.02 SUMMARY

A. This Section includes commercial door hardware for the following:
   1. Swinging doors.
   2. Sliding doors.
   3. Other doors to the extent indicated.

B. Door hardware includes, but is not necessarily limited to, the following:
   1. Mechanical door hardware.
   2. Electromechanical door hardware.
   3. Cylinders specified for doors in other sections.

C. Related Sections:
   1. Division 01 Section "General Conditions”.
   2. Division 06 Section “Rough Carpentry”.
   3. Division 06 Section “Finish Carpentry”.
   4. Division 08 Section “Operations and Maintenance”.
   5. Division 08 Section “Hollow Metal Doors and Frames”.
   6. Division 08 Section “Flush Wood Doors”.
   7. Division 08 Section “Aluminum-Framed Entrances and Storefronts”.
   8. Division 26 Section "Electrical”

D. Codes and References: Comply with the version adopted by the Authority Having Jurisdiction.
   1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
   2. ICC/IBC - International Building Code.
   3. NFPA 70 - National Electrical Code.
   4. NFPA 80 - Fire Doors and Windows.
   5. NFPA 101 - Life Safety Code.
   6. NFPA 105 - Installation of Smoke Door Assemblies.
   7. State Building Codes, Local Amendments.

E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:
   1. ANSI/BHMA Certified Product Standards - A156 Series.
   2. UL10C - Positive Pressure Fire Tests of Door Assemblies.
   3. ANSI/UL 294 - Access Control System Units.
   4. UL 305 - Panic Hardware.
   5. ANSI/UL 437- Key Locks.

### 1.03 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing, fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
   1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
   2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
   3. Content: Include the following information:
      a. Type, style, function, size, label, hand, and finish of each door hardware item.
      b. Manufacturer of each item.
      c. Fastenings and other pertinent information.
      d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
      e. Explanation of abbreviations, symbols, and codes contained in schedule.
      f. Mounting locations for door hardware.
      g. Door and frame sizes and materials.
      h. Warranty information for each product.
   4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.

C. Shop Drawings: Details of electrified access control hardware indicating the following:
   1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:
      a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
      b. Complete (risers, point-to-point) access control system block wiring diagrams.
      c. Wiring instructions for each electronic component scheduled herein.
   2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.

D. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.

E. Informational Submittals:
   1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

### 1.04 CLOSEOUT SUBMITTALS

A. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

### 1.05 QUALITY ASSURANCE

A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).

C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum 5 years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.
   1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
   2. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.

F. Each unit to bear third party permanent label indicating compliance with the referenced testing standards.

G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:
   1. Function of building, purpose of each area and degree of security required.
   2. Plans for existing and future key system expansion.
   3. Requirements for key control storage and software.
   4. Installation of permanent keys, cylinder cores and software.
   5. Address and requirements for delivery of keys.

H. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier(s), Installer(s), and Contractor(s) to review proper methods and the procedures for receiving, handling, and installing door hardware.

1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for aluminum, hollow metal and wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
3. Review sequence of operation narratives for each unique access controlled opening.
4. Review and finalize construction schedule and verify availability of materials.
5. Review the required inspecting, testing, commissioning, and demonstration procedures

I. At completion of installation, provide written documentation that components were applied according to manufacturer's instructions and recommendations and according to approved schedule.

**1.06 DELIVERY, STORAGE AND HANDLING**

A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.

B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.

C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

**1.07 COORDINATION**

A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.

B. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

**1.08 WARRANTY**

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
1. Structural failures including excessive deflection, cracking, or breakage.
2. Faulty operation of the hardware.
3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
4. Electrical component defects and failures within the systems operation.

C. Warranty Period: Unless otherwise indicated, warranty shall be one year from date of Substantial Completion.

## PART 2 PRODUCTS

### 2.01 MATERIALS

A. Hardware shall not have any visible manufacturer names on exposed materials, except cylinders, when the door is in a closed position.

### 2.02 BUTT HINGES

A. Hinges: ANSI/BHMA A156.1 butt hinges with number of hinge knuckles and other options as specified in the Door Hardware Sets.
   1. Quantity: Provide the following hinge quantity:
      a. Two Hinges: For doors with heights up to 60 inches (1524 mm).
      b. Three Hinges: For doors with heights 61 to 90 inches (2286 mm).
      c. Four Hinges: For doors with heights 91 to 120 inches (3048 mm).
      d. For doors with heights more than 120 inches (3048 mm), provide 4 hinges, plus 1 hinge for every 30 inches (762 mm) of door height greater than 120 inches.
   2. Hinge Size: Provide the following, unless otherwise indicated, with hinge widths sized for door thickness and clearances required:
      a. Widths up to 3’0”: 4-1/2” standard or heavy weight as specified.
      b. Sizes from 3’1” to 4’0”: 5” standard or heavy weight as specified.
   3. Hinge Weight and Base Material: Unless otherwise indicated, provide the following:
      a. Exterior Doors: Heavy weight, non-ferrous, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate standard weight.
      b. Interior Doors: Standard weight, steel, ball bearing or oil impregnated bearing hinges unless Hardware Sets indicate heavy weight.
   4. Hinge Options: Comply with the following:
      a. Non-removable Pins: With the exception of electric through wire hinges, provide set screw in hinge barrel that, when tightened into a groove in hinge pin, prevents removal of pin while door is closed; for all out-swinging lockable doors.
   5. Manufacturers:
      a. Hager Companies (HA) - BB Series, 5-knuckle.
      b. McKinney (MK) - TA/T4A Series, 5-knuckle.
      c. dormakaba BEST (ST) - F/FBB Series, 5-knuckle.

### 2.03 CONTINUOUS HINGES

A. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 continuous geared hinge. with minimum 0.120-inch thick extruded 6063-T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches (101.6 mm). Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.
   1. Where specified, provide modular continuous geared hinges that ship in two or three pieces and form a single continuous hinge upon installation.
   2. Manufacturers:.
      a. Ives (IV).
      b. Pemko (PE).

### 2.04 DOOR OPERATING TRIM

A. Flush Bolts and Surface Bolts: Provide products conforming to ANSI/BHMA A156.3 and A156.16, Grade 1.
   1. Flush bolts to be furnished with top rod of sufficient length to allow bolt retraction device location approximately six feet from the floor.

2. Furnish dust proof strikes for bottom bolts.
3. Surface bolts to be minimum 8” in length and U.L. listed for labeled fire doors and U.L. listed for windstorm components where applicable.
4. Provide related accessories (mounting brackets, strikes, coordinators, etc.) as required for appropriate installation and operation.
5. Manufacturers:
   a. Burns Manufacturing (BU).
   b. Door Controls International (DC).
   c. Rockwood (RO).

B. Door Push Plates and Pulls: ANSI/BHMA A156.6 door pushes and pull units of type and design specified in the Hardware Sets. Coordinate and provide proper width and height as required where conflicting hardware dictates.
1. Push/Pull Plates: Minimum .050 inch (1.27 mm) thick, size as indicated in hardware sets, with beveled edges, secured with exposed screws unless otherwise indicated.
2. Door Pull and Push Bar Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door unless otherwise indicated.
3. Offset Pull Design: Size, shape, and material as indicated in the hardware sets. Minimum clearance of 2 1/2-inches from face of door and offset of 90 degrees unless otherwise indicated.
4. Pulls shall be provided with a 10” clearance from the finished floor on the push side to accommodate wheelchair accessibility.
5. Fasteners: Provide manufacturer's designated fastener type as indicated in Hardware Sets. When through-bolt fasteners are in the same location as a push plate, countersink the fasteners flush with the door face allowing the push plate to sit flat against the door.
6. Manufacturers:
   a. Ives (IV).
   b. Rockwood (RO).
   c. Trimco (TC).

**2.05 CYLINDERS AND KEYING**

A. General: Cylinder manufacturer to have minimum (10) years experience designing secured master key systems and have on record a published security keying system policy.

B. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:
1. Threaded mortise cylinders with rings and cams to suit hardware application.
2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
4. Tubular deadlocks and other auxiliary locks.
5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
6. Keyway: Manufacturer’s Standard.

C. Patented Cylinders: ANSI/BHMA A156.5, Grade 1 Certified Products Directory (CPD) listed cylinders employing a utility patented and restricted keyway requiring the use of a patented key. Cylinders are to be protected from unauthorized manufacture and distribution by manufacturer’s United States patents. Cylinders are to be factory keyed with owner having the ability for on-site original key cutting.
1. Patented key systems shall not be established with products that have an expired patent. Expired systems shall only be specified and supplied to support existing systems.

2. Manufacturers:
    a. Corbin Russwin (RU) - Access 3 AP.
    b. Sargent (SA) - Degree DG1.
    c. No Substitution.

D. Keying System: Each type of lock and cylinders to be factory keyed.
1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
3. Existing System: Field verify and key cylinders to match Owner's existing system.

E. Key Quantity: Provide the following minimum number of keys:
1. Change Keys per Cylinder: Two (2)
2. Master Keys (per Master Key Level/Group): Five (5).
3. Construction Keys (where required): Ten (10).

F. Construction Keying: Provide construction master keyed cylinders.

G. Key Registration List (Bitting List):
1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
2. Provide transcript list in writing or electronic file as directed by the Owner.

## 2.06 MORTISE LOCKS AND LATCHING DEVICES

A. Mortise Locksets, Grade 1 (Heavy Duty): Provide ANSI/BHMA A156.13, Series 1000, Operational Grade 1 Certified Products Directory (CPD) listed mortise locksets. Listed manufacturers shall meet all functions and features as specified herein.
1. Electromechanical locksets shall have the following functions and features:
    a. Universal Molex plug-in connectors that have standardized color-coded wiring and are available in fail safe or fail secure and operate from 12vdc to 24vdc regulated.
    b. EcoFlex or equivalent technology that reduces energy consumption up to 92% as certified by GreenCircle.
    c. Motorized electric latch retraction where the latchbolt retracts in 0.5 seconds of power being applied; removing power allows the latch to project back to the extended position. Motorized latch retraction force exceeds ANSI/BHMA 50 lbs. warped door test.
    d. Options to be available for request-to-exit or enter signaling, latchbolt and deadbolt monitoring.
    e. Optional high security monitoring with internal end-of-line monitoring alongside deadbolt privacy and integrated door position monitoring.
    f. Two-year limited warranty on electrified functions.
2. Manufacturers:
    a. Corbin Russwin Hardware (RU) - ML2000 Series.
    b. dormakaba BEST (BE) - 45H Series.
    c. Sargent Manufacturing (SA) - 8200 Series.

## 2.07 CYLINDRICAL LOCKS AND LATCHING DEVICES

A. Cylindrical Locksets, Grade 1 (Heavy Duty): ANSI/BHMA A156.2, Series 4000, Operational Grade 1 Certified Products Directory (CPD) listed cylindrical locksets. Listed manufacturers shall meet all functions and features as specified herein.
1. Manufacturers:

a. Corbin Russwin Hardware (RU) - CLX3300 Series.
b. dormakaba BEST (BE) - 9K Series.
c. Sargent Manufacturing (SA) - 10X Line.

## 2.08 DEADLOCKS AND LATCHES

A. Narrow Case Deadlocks and Deadlatches: ANSI/BHMA 156.13 Series 1000 Grade 1 narrow case deadlocks and deadlatches for swinging or sliding door applications. All functions shall be manufactured in a single sized case formed from 12 gauge minimum, corrosion resistant steel (option for fully stainless steel case and components). Provide minimum 2 7/8" throw laminated stainless steel bolt. Bottom rail deadlocks to have 3/8” diameter bolts.
   1. Manufacturers:
      a. Adams Rite Manufacturing (AD) - MS1850S / MS1950 Series.
      b. Adams Rite Manufacturing (AD) - 4900 Series.

## 2.09 LOCK AND LATCH STRIKES

A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
   1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
   2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
   3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
   4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.

B. Standards: Comply with the following:
   1. Strikes for Mortise Locks and Latches: BHMA A156.13.
   2. Strikes for Bored Locks and Latches: BHMA A156.2.
   3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
   4. Dustproof Strikes: BHMA A156.16.

## 2.10 CONVENTIONAL EXIT DEVICES

A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
   1. Exit devices shall have a five-year warranty.
   2. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
   3. Where exit devices are required on fire rated doors, provide devices complying with NFPA 80 and with UL labeling indicating "Fire Exit Hardware". Provide devices with the proper fasteners for installation as tested and listed by UL. Consult manufacturer’s catalog and template book for specific requirements.
   4. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
   5. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.

6. Lever Operating Trim: Where exit devices require lever trim, furnish manufacturer's heavy duty escutcheon trim with threaded studs for thru-bolts.
    a. Lock Trim Design: As indicated in Hardware Sets, provide finishes and designs to match that of the specified locksets.
    b. Where function of exit device requires a cylinder, provide a cylinder (Rim or Mortise) as specified in Hardware Sets.
7. Vertical Rod Exit Devices: Where surface or concealed vertical rod exit devices are used at interior openings, provide as less bottom rod (LBR) unless otherwise indicated. Provide dust proof strikes where thermal pins are required to project into the floor.
8. Narrow Stile Applications: At doors constructed with narrow stiles, or as specified in Hardware Sets, provide devices designed for maximum 2” wide stiles.
9. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
10. Rail Sizing: Provide exit device rails factory sized for proper door width application.
11. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.

B. Conventional Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed exit devices. Listed manufacturers shall meet all functions and features as specified herein.
    1. Provide exit devices with functions and features as follows:
        a. Where required by code, provide knurling or abrasive coating on all levers leading to hazardous areas.
        b. Meets UL and CUL Standard 10C Positive Pressure, Fire Test of Door Assemblies with levers that meet A117.1 Accessibility Code.
        c. No catch points: addition of applied deflectors or other added components are not allowed.
        d. No visible plastic.
        e. Heavy duty end caps with flush and overlapping options made of stainless steel, brass, or bronze with architectural finishes.
        f. Constructed of all stainless steel.
        g. Stainless steel pullman type latch with deadlock feature.
        h. Narrow or wide style exterior trim as specified in the hardware sets.
        i. Center case adjustability on concealed vertical rod exit devices; single operation with hex key individually adjusts top or bottom latches. No retainer screws or clips required to maintain adjustment.
        j. Ten-year limited warranty for mechanical features.
    2. Electromechanical exit devices shall have the following functions and features:
        a. Universal Molex plug-in connectors that have standardized color-coded wiring and are field configurable in fail safe or fail secure and operate from 12vdc to 24vdc regulated.
        b. Wire routing for all non-access control electromechanical functions and EcoFlex trim to be contained within the carrier of the device eliminating the need for cavities in doors to be drilled. Include a protective film so that wires don't get damaged if the rail needs to be removed.
        c. EcoFlex or equivalent technology that reduces energy consumption up to 92% as certified by GreenCircle.
        d. Options to be available for request-to-exit or enter signaling, latchbolt and touchbar monitoring.
        e. Field configurable electrified trim to fail-safe or fail-secure that operates from 12-24VDC.
    3. Manufacturers:

a. Corbin Russwin Hardware (RU) - PED4000 / PED5000 Series.
b. Sargent Manufacturing (SA) - PE80 Series.
c. Von Duprin (VD) - 35A/98 XP Series.

## 2.11 SURFACE DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:
   1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.
   2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
   3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.
   4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.
   5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
   6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.

B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.
   1. Heavy duty surface mounted door closers shall have a 30-year warranty.
   2. Manufacturers:
      a. ASSA ABLOY ACCENTRA (YA) - 4400 Series.
      b. Corbin Russwin Hardware (RU) - DC6000 Series.
      c. Norton Rixson (NO) - 7500 Series.
      d. Sargent Manufacturing (SA) - 351 Series.

C. Door Closers, Surface Mounted (Cam Action): ANSI/BHMA 156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, high efficiency door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be of the cam and roller design, one piece cast aluminum silicon alloy body with adjustable backcheck and independently controlled valves for closing sweep and latch speed.
   1. Manufacturers:
      a. Corbin Russwin (RU) - DC5000 Series.
      b. Norton Rixson (NO) - 2800ST Series.
      c. Sargent Manufacturing (SA) - 422 Series.

## 2.12 OVERHEAD CONCEALED DOOR CLOSERS

A. Door Closers, Overhead Concealed (Narrow Profile): ANSI/BHMA 156.4 Grade 1 Certified Products Directory (CPD) listed overhead concealed door closers designed for narrow profile frames and doors. Listed manufacturers shall meet all functions and features as specified herein.
   1. Provide overhead concealed doors closers with functions and features as follows:
      a. Meets UL and CUL Standard 10C Positive Pressure, Fire Test of Door Assemblies and A117.1 Accessibility Code.
      b. Single acting, offset hung with a cast iron body.
      c. Fully concealed body in the frame head and track assembly in the door.
      d. Separate and independent valves for closing speed and backcheck adjustments.
      e. Five-year limited warranty.
   2. Manufacturers:
      a. Norton Rixson (NO) - 91DCP Series.

## 2.13 ARCHITECTURAL TRIM AND ACCESSORIES

A. Door, Frame and Wall Protective Trim: ANSI/BHMA A156.6, protective products as specified in the hardware sets. Door protection plates shall be not more than 2" less than door width on stop side and 1” less door width on the pull side or on stop side of pairs of doors. Listed manufacturers shall meet all functions and features as specified herein.
   1. Provide protective trim with functions and features as follows:
      a. Meets ADA requirements for smooth bottom door surfaces.
      b. UL Classified options for use on fire-rated doors up to 3 hours.
      c. Fabricated from stainless steel, brass, bronze, aluminum, or high-impact plastic.
      d. Available in a variety of sizes, finishes, and profiles to suit aesthetic and functional requirements.
      e. Designed to protect doors, frames, and adjacent walls from damage due to impact, abrasion, or traffic.
      f. Fasteners included; adhesive-backed options available for select models.
      g. Ten-year limited warranty.
   2. Manufacturers:
      a. Burns Manufacturing (BU).
      b. Rockwood (RO).

## 2.14 DOOR STOPS AND HOLDERS

A. Door Stops and Bumpers: ANSI/BHMA A156.16, Grade 1 door stops and wall bumpers. Provide wall bumpers, either convex or concave types with anchorage as indicated, unless floor or other types of door stops are specified in Hardware Sets. Do not mount floor stops where they will impede traffic. Where floor or wall bumpers are not appropriate, provide overhead type stops and holders.
   1. Manufacturers:
      a. Hager Companies (HA).
      b. Hiawatha, Inc. (HI).
      c. Rockwood (RO).

B. Overhead Door Stops and Holders: ANSI/BHMA A156.8, Grade 1 Certified Products Directory (CPD) listed overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.

1. Manufacturers:
   a. Norton Rixson (NO).
   b. Rockwood (RO).
   c. Sargent Manufacturing (SA).

## 2.15 ARCHITECTURAL SEALS

A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.

B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
   1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.

C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
   1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NFPA 252, Standard Methods of Fire Tests of Door Assemblies.

D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.

E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.

F. Manufacturers:
   1. Pemko (PE).

## 2.16 ELECTRONIC ACCESSORIES

A. Door Position Switches: Door position magnetic reed contact switches specifically designed for use in commercial door applications. On recessed models the contact and magnetic housing snap-lock into a 1" diameter hole. Surface mounted models include wide gap distance design complete with armored flex cabling. Provide SPDT, N/O switches with optional Rare Earth Magnet installation on steel doors with flush top channels.
   1. Manufacturers:
      a. Alarm Controls (AK) - CP1-1026 Series.
      b. Sargent Manufacturing (SA) - 3280 Series.
      c. Securitron (SU) - DPS Series.

B. Intelligent Switching Power Supplies: Provide the least number of power supplies at the appropriate amperage level sufficient to exceed the required total draw for the specified electrified hardware and access control equipment.
   1. Manufacturers:
      a. Securitron (SU) - AQL Series.

## 2.17 FABRICATION

A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

### 2.18 FINISHES

A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.

B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware

C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.

B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

### 3.02 PREPARATION

A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.

B. Wood Doors: Comply with ANSI/DHI A115-W series.

### 3.03 INSTALLATION

A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
   1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.

B. Paint prime coated mullions to match frames.

C. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
   1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
   2. DHI TDH-007-20: Installation Guide for Doors and Hardware.
   3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
   4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.

D. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

E. Push Plates and Door Pulls: When through-bolt fasteners are in the same location as a push plate, countersink the fasteners flush with the door face allowing the push plate to sit flat against the door.

F. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."

G. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

**3.04 FIELD QUALITY CONTROL**

A. Field Inspection (Punch Report): Reference Division 01 Sections “Closeout Procedures”. Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.
   1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

**3.05 ADJUSTING**

A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.

**3.06 CLEANING AND PROTECTION**

A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

B. Clean adjacent surfaces soiled by door hardware installation.

C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

**3.07 DEMONSTRATION**

A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

**3.08 DOOR HARDWARE SETS**

A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
   1. Quantities listed are for each pair of doors, or for each single door.
   2. The supplier is responsible for handing and sizing all products.
   3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.

4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.

B. Manufacturer's Abbreviations:

| | | |
|---|---|---|
| | **1. MK - MCKINNEY** | |
| | **2. PE - PEMKO** | |
| | **3. RO - ROCKWOOD** | |
| | **4. SA - SARGENT** | |
| | **5. AD - ADAMS RITE** | |
| | **6. RF - RIXSON** | |
| | **7. SU - SECURITRON** | |

**HARDWARE SETS**

**SET: 1.0**
**DOORS: 100A, 111**
**DESCRIPTION: EXT - PR - AL - ENTRY - EAC**

| | | | | |
|---|---|---|---|---|
| **2** | **CONTINUOUS HINGE** | **BSPFM83HD1 SER** | | **PE** |
| **1** | **MULLION** | **L980** | **PC** | **SA** |
| **1** | **RIM EXIT DEVICE, EXIT ONLY** | **55 56 PE8810 EO** | **BSP** | **SA** |
| **1** | **RIM EXIT DEVICE, STOREROOM** | **DG164 55 56 PE8804 LESS PULL** | **BSP** | **SA** |
| **2** | **CYLINDER AND CORE** | **SARGENT TO MATCH** | **BSP** | **SA** |
| **2** | **DOOR PULL** | **RM7531-36 MTG-TYPE 12HD** | **BSP** | **RO** |
| **2** | **CONCEALED CLOSER** | **91NDCP** | **BSP** | **RF** |
| **2** | **DOOR STOP** | **467-RKW** | **BLACK** | **RO** |
| **1** | **GASKETING** | **BY DOOR / FRAME MFG** | | |
| **2** | **SWEEP** | **3452BSPPK TKSP** | | **PE** |
| **1** | **THRESHOLD** | **2005BSPT MSES25SS** | | **PE** |
| **1** | **ELECTROLYNX HARNESS** | **QC-C1500P PS TO HINGE** | | **MK** |
| **1** | **CARD READER** | **BY OTHERS** | | |
| **1** | **WIRING DIAGRAM** | **WD-SYSPK** | | **SA** |
| **1** | **ELECTROLYNX HARNESS** | **QC-C3XXP HINGE TO LOCK/EXIT/READER** | | **MK** |
| **2** | **POSITION SWITCH** | **DPS-M/W -W AS REQUIRED** | | **SU** |
| **1** | **POWER SUPPLY** | **AQL4-R8E1** | | **SU** |

**NOTES:**
**DOOR IS NORMALLY CLOSED AND SECURE. ACCESS BY VALID CREDENTIAL OR KEY OVERRIDE.**

| | | | | |
|---|---|---|---|---|
| THE DOOR WILL REMAIN LOCKED IN A POWER LOSS.<br>FREE EGRESS AT ALL TIMES | | | | |
| | | | | |
| SET: 2.0 | | | | |
| DOORS: S101B | | | | |
| DESCRIPTION: EXT - AL - ENTRY - EAC | | | | |
| | | | | |
| 1 | CONTINUOUS HINGE | BSPFM83HD1 SER | | PE |
| 1 | RIM EXIT DEVICE, STOREROOM | DG164 55 56 PE8804 LESS PULL | BSP | SA |
| 1 | DOOR PULL | RM7531-36 MTG-TYPE 12HD | BSP | RO |
| 1 | CONCEALED CLOSER | 91NDCP | BSP | RF |
| 1 | DOOR STOP | 467-RKW | BLACK | RO |
| 1 | GASKETING | BY DOOR / FRAME MFG | | |
| 1 | SWEEP | 3452BSPPK TKSP | | PE |
| 1 | THRESHOLD | 2005BSPT MSES25SS | | PE |
| 1 | ELECTROLYNX HARNESS | QC-C1500P PS TO HINGE | | MK |
| 1 | CARD READER | BY OTHERS | | |
| 1 | WIRING DIAGRAM | WD-SYSPK | | SA |
| 1 | ELECTROLYNX HARNESS | QC-C3XXP HINGE TO LOCK/EXIT/READER | | MK |
| 1 | POSITION SWITCH | DPS-M/W -W AS REQUIRED | | SU |
| 1 | POWER SUPPLY | AQL4-R8E1 | | SU |
| | | | | |
| NOTES: DOOR IS NORMALLY CLOSED AND SECURE. ACCESS BY VALID CREDENTIAL OR KEY OVERRIDE.<br>THE DOOR WILL REMAIN LOCKED IN A POWER LOSS.<br>FREE EGRESS AT ALL TIMES | | | | |
| | | | | |
| SET: 3.0 | | | | |
| DOORS: M105 | | | | |
| DESCRIPTION: EXT - PR - EAC | | | | |
| | | | | |
| 5 | HINGE, FULL MORTISE, HVY WT | T4A3386 NRP 4-1/2" X 4-1/2" | BSP(SS) | MK |
| 1 | ELECTRIC HINGE, HVY WT | T4A3386-QC 4-1/2" X 4-1/2" | BSP(SS) | MK |
| 2 | SURFACE BOLT | 988 / 580-8 | BRIGHT ZINC | SA |
| 1 | FAIL SECURE LOCK | DG164 RX 8271-24V E3MD | BSP | SA |
| 1 | CYLINDER AND CORE | SARGENT TO MATCH | BSP | SA |
| 1 | COORDINATOR W/MTG PLATES | 2672 X MTG BRKTS | BLACK | RO |

| | | | | |
|---|---|---|---|---|
| 2 | SURFACE CLOSER | 351 POTB / OTB | BSP | SA |
| 2 | ARMOR PLATE | K1050 36" X 1" LDW | BSP | RO |
| 2 | DOOR STOP | 467-RKW | BLACK | RO |
| 1 | ASTRAGAL | 3572BSP TKSP X S88BL | | PE |
| 1 | RAIN GUARD | 346BSP TKSP | | PE |
| 1 | GASKETING | S88BL | | PE |
| 2 | SWEEP | 3452BSPPK TKSP | | PE |
| 1 | THRESHOLD | 2005BSPT MSES25SS | | PE |
| 1 | ELECTROLYNX HARNESS | QC-C1500P PS TO HINGE | | MK |
| 1 | CARD READER | BY OTHERS | | |
| 1 | WIRING DIAGRAM | WD-SYSPK | | SA |
| 1 | ELECTROLYNX HARNESS | QC-C3XXP HINGE TO LOCK/EXIT/READER | | MK |
| 2 | POSITION SWITCH | DPS-M/W -W AS REQUIRED | | SU |
| 1 | POWER SUPPLY | AQL4-R8E1 | | SU |
| | | | | |
| NOTES: DOOR IS NORMALLY CLOSED AND SECURE. ACCESS BY VALID CREDENTIAL OR KEY OVERRIDE.<br>THE DOOR WILL REMAIN LOCKED IN A POWER LOSS.<br>FREE EGRESS AT ALL TIMES | | | | |
| | | | | |
| SET: 4.0 | | | | |
| DOORS: M106A | | | | |
| DESCRIPTION: EXT - EAC - PANIC | | | | |
| | | | | |
| 2 | HINGE, FULL MORTISE, HVY WT | T4A3386 NRP 4-1/2" X 4-1/2" | BSP(SS) | MK |
| 1 | ELECTRIC HINGE, HVY WT | T4A3386-QC 4-1/2" X 4-1/2" | BSP(SS) | MK |
| 1 | RIM EXIT DEVICE, STOREROOM | DG164 55 56 PE8804 NEMD | BSP | SA |
| 1 | CYLINDER AND CORE | SARGENT TO MATCH | BSP | SA |
| 1 | SURFACE CLOSER | 351 POTB / OTB | BSP | SA |
| 1 | ARMOR PLATE | K1050 36" X 1.5" LDW | BSP | RO |
| 1 | DOOR STOP | 467-RKW | BLACK | RO |
| 1 | RAIN GUARD | 346BSP TKSP | | PE |
| 1 | GASKETING | S88BL | | PE |
| 1 | SWEEP | 3452BSPPK TKSP | | PE |
| 1 | THRESHOLD | 2005BSPT MSES25SS | | PE |
| 1 | ELECTROLYNX HARNESS | QC-C1500P PS TO HINGE | | MK |
| 1 | CARD READER | BY OTHERS | | |
| 1 | WIRING DIAGRAM | WD-SYSPK | | SA |

| | | | | |
|---|---|---|---|---|
| 1 | ELECTROLYNX HARNESS | QC-C3XXP HINGE TO LOCK/EXIT/READER | | MK |
| 1 | POSITION SWITCH | DPS-M/W -W AS REQUIRED | | SU |
| 1 | POWER SUPPLY | AQL4-R8E1 | | SU |
| | | | | |
| NOTES: DOOR IS NORMALLY CLOSED AND SECURE. ACCESS BY VALID CREDENTIAL OR KEY OVERRIDE.<br>THE DOOR WILL REMAIN LOCKED IN A POWER LOSS.<br>FREE EGRESS AT ALL TIMES | | | | |
| | | | | |
| SET: 5.0 | | | | |
| DESCRIPTION: NOT USED EXT - OFF | | | | |
| | | | | |
| 3 | HINGE, FULL MORTISE, HVY WT | T4A3386 NRP 4-1/2" X 4-1/2" | BSP(SS) | MK |
| 1 | OFFICE/ENTRY LOCK | DG164 8255 E3MD | BSP | SA |
| 1 | CYLINDER AND CORE | SARGENT TO MATCH | BSP | SA |
| 1 | SURFACE CLOSER | 351 POTB / OTB | BSP | SA |
| 1 | ARMOR PLATE | K1050 36" X 1.5" LDW | BSP | RO |
| 1 | DOOR STOP | 467-RKW | BLACK | RO |
| 1 | RAIN GUARD | 346BSP TKSP | | PE |
| 1 | GASKETING | S88BL | | PE |
| 1 | SWEEP | 3452BSPPK TKSP | | PE |
| 1 | THRESHOLD | 2005BSPT MSES25SS | | PE |
| | | | | |
| SET: 6.0 | | | | |
| DOORS: S101A, S200, S201 | | | | |
| DESCRIPTION: RATED - STAIR | | | | |
| | | | | |
| 3 | HINGE, FULL MORTISE, HVY WT | T4A3786 4-1/2" X 4-1/2" | BSP | MK |
| 1 | RIM EXIT DEVICE, PASSAGE | 12 PE8815 NEMD | BSP | SA |
| 1 | SURFACE CLOSER | 422 CTB2 / PCTB2 | BSP | SA |
| 1 | KICK PLATE | K1050 10" X 1.5" LDW | BSP | RO |
| 1 | DOOR STOP | 446 / 409 | BSP | RO |
| 1 | GASKETING | S88BL | | PE |
| | | | | |
| SET: 7.0 | | | | |
| DOORS: M101, SR100 | | | | |
| DESCRIPTION: RATED - STOR | | | | |
| | | | | |
| 3 | HINGE, FULL MORTISE | TA2714-MCK 4-1/2" X 4-1/2" | BSP | MK |

| | | | | |
|---|---|---|---|---|
| 1 | STOREROOM/CLOSET LOCK | DG164 8204 E3MD | BSP | SA |
| 1 | CYLINDER AND CORE | SARGENT TO MATCH | BSP | SA |
| 1 | SURFACE CLOSER | 351 OT / POT | BSP | SA |
| 1 | KICK PLATE | K1050 10" X 1.5" LDW | BSP | RO |
| 1 | DOOR STOP | 446 / 409 | BSP | RO |
| 1 | GASKETING | S88BL | | PE |
| | | | | |
| SET: 8.0 | | | | |
| DOORS: M200 | | | | |
| DESCRIPTION: PR - STOR - OHS | | | | |
| | | | | |
| 6 | HINGE, FULL MORTISE | TA2714-MCK 4-1/2" X 4-1/2" | BSP | MK |
| 1 | FLUSH BOLT | 555 TOP ONLY | BSP | RO |
| 1 | STOREROOM/CLOSET LOCK | DG164 8204 E3MD | BSP | SA |
| 1 | CYLINDER AND CORE | SARGENT TO MATCH | BSP | SA |
| 2 | CONC OVERHEAD STOP | 1-X36 | BSP | RF |
| 2 | SILENCER | 608 | | RO |
| | | | | |
| SET: 9.0 | | | | |
| DOORS: 101 | | | | |
| DESCRIPTION: PR - AL - DL - PP | | | | |
| | | | | |
| 2 | CONTINUOUS HINGE | BSPFM83HD1 | | PE |
| 1 | MORTISE DEADLOCK 3 POINT | MS1850S X 4015 X 4085 X 4089 X 4066 | 335 | AD |
| 1 | CYLINDER AND CORE | SARGENT TO MATCH | BSP | SA |
| 2 | PUSH BAR & PULL | BF15747 | BSP | RO |
| 2 | CONCEALED CLOSER | 91NDCP | BSP | RF |
| 2 | DOOR STOP | 446 / 409 | BSP | RO |
| 1 | GASKETING | BY DOOR / FRAME MFG | | |
| | | | | |
| SET: 9.01 | | | | |
| DOORS: M106B | | | | |
| DESCRIPTION: ELECT - PANIC | | | | |
| | | | | |
| 3 | HINGE, FULL MORTISE, HVY WT | T4A3786 4-1/2" X 4-1/2" | BSP | MK |
| 1 | RIM EXIT DEVICE, STOREROOM | DG164 PE8804 NEMD | BSP | SA |
| 1 | CYLINDER AND CORE | SARGENT TO MATCH | BSP | SA |
| 1 | SURFACE CLOSER | 351 OT / POT | BSP | SA |
| 2 | DOOR STOP | 446 / 409 | BSP | RO |

| | | | | |
|---|---|---|---|---|
| 3 | SILENCER | 608 | | RO |
| | | | | |
| SET: 10.0 | | | | |
| DOORS: 105 | | | | |
| DESCRIPTION: PANIC - CLASS | | | | |
| | | | | |
| 3 | HINGE, FULL MORTISE, HVY WT | T4A3786 4-1/2" X 4-1/2" | BSP | MK |
| 1 | RIM EXIT DEVICE, CLASSROOM | DG164 PE8813 NEMD | BSP | SA |
| 1 | CYLINDER AND CORE | SARGENT TO MATCH | BSP | SA |
| 1 | SURFACE CLOSER | 351 OT / POT | BSP | SA |
| 1 | KICK PLATE | K1050 10" X 1.5" LDW | BSP | RO |
| 2 | DOOR STOP | 446 / 409 | BSP | RO |
| 3 | SILENCER | 608 | | RO |
| | | | | |
| SET: 10.01 | | | | |
| DOORS: 201, 201A | | | | |
| DESCRIPTION: PANIC - CLASS - STC50 | | | | |
| | | | | |
| 1 | RIM EXIT DEVICE, CLASSROOM | DG164 PE8813 NEMD | BSP | SA |
| 1 | CYLINDER AND CORE | SARGENT TO MATCH | BSP | SA |
| 1 | SURFACE CLOSER | 351 OT / POT | BSP | SA |
| 1 | KICK PLATE | K1050 10" X 1.5" LDW | BSP | RO |
| 2 | DOOR STOP | 446 / 409 | BSP | RO |
| | | | | |
| NOTES: GASKETS AND HINGES BY DOOR SUPPLIER. | | | | |
| | | | | |
| SET: 11.0 | | | | |
| DOORS: 102 | | | | |
| DESCRIPTION: AL - ENTRY | | | | |
| | | | | |
| 1 | CONTINUOUS HINGE | BSPFM83HD1 | | PE |
| 1 | OFFICE/ENTRY LOCK | DG164 8255 E3MD | BSP | SA |
| 1 | CYLINDER AND CORE | SARGENT TO MATCH | BSP | SA |
| 1 | CONCEALED CLOSER | 91NDCP | BSP | RF |
| 1 | DOOR STOP | 446 / 409 | BSP | RO |
| 1 | GASKETING | BY DOOR / FRAME MFG | | |
| | | | | |
| SET: 12.0 | | | | |
| DOORS: 200B | | | | |

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|---|---|---|---|---|
| **DESCRIPTION: STOR - STC50** | | | | |
| | | | | |
| **1** | **STOREROOM/CLOSET LOCK** | **DG164 10XG04 LMD** | **BSP** | **SA** |
| **1** | **CYLINDER AND CORE** | **SARGENT TO MATCH** | **BSP** | **SA** |
| **1** | **DOOR STOP** | **446 / 409** | **BSP** | **RO** |
| | | | | |
| **NOTES: GASKETS AND HINGES BY DOOR SUPPLIER.** | | | | |
| | | | | |
| **SET: 13.0** | | | | |
| **DOORS: M104** | | | | |
| **DESCRIPTION: EAC** | | | | |
| | | | | |
| **2** | **HINGE, FULL MORTISE** | **TA2714-MCK 4-1/2" X 4-1/2"** | **BSP** | **MK** |
| **1** | **HINGE, FULL MORTISE** | **TA2714-MCK QC 4-1/2" X 4-1/2"** | **BSP** | **MK** |
| **1** | **FAIL SECURE LOCK** | **DG164 RX 8271-24V E3MD** | **BSP** | **SA** |
| **1** | **CYLINDER AND CORE** | **SARGENT TO MATCH** | **BSP** | **SA** |
| **1** | **SURFACE CLOSER** | **351 OT / POT** | **BSP** | **SA** |
| **1** | **KICK PLATE** | **K1050 10" X 1.5" LDW** | **BSP** | **RO** |
| **1** | **DOOR STOP** | **446 / 409** | **BSP** | **RO** |
| **1** | **ELECTROLYNX HARNESS** | **QC-C1500P PS TO HINGE** | | **MK** |
| **1** | **CARD READER** | **BY OTHERS** | | |
| **1** | **WIRING DIAGRAM** | **WD-SYSPK** | | **SA** |
| **1** | **ELECTROLYNX HARNESS** | **QC-C3XXP HINGE TO LOCK/EXIT/READER** | | **MK** |
| **1** | **POSITION SWITCH** | **DPS-M/W -W AS REQUIRED** | | **SU** |
| | | | | |
| **NOTES: DOOR IS NORMALLY CLOSED AND SECURE. ACCESS BY VALID CREDENTIAL OR KEY OVERRIDE.<br>THE DOOR WILL REMAIN LOCKED IN A POWER LOSS.<br>FREE EGRESS AT ALL TIMES** | | | | |
| | | | | |
| **SET: 14.0** | | | | |
| **DOORS: M201** | | | | |
| **DESCRIPTION: EAC - OHS** | | | | |
| | | | | |
| **2** | **HINGE, FULL MORTISE** | **TA2714-MCK 4-1/2" X 4-1/2"** | **BSP** | **MK** |
| **1** | **HINGE, FULL MORTISE** | **TA2714-MCK QC 4-1/2" X 4-1/2"** | **BSP** | **MK** |
| **1** | **FAIL SECURE LOCK** | **DG164 RX 8271-24V E3MD** | **BSP** | **SA** |
| **1** | **CYLINDER AND CORE** | **SARGENT TO MATCH** | **BSP** | **SA** |
| **1** | **SURFACE CLOSER** | **351 POTB / OTB** | **BSP** | **SA** |
| **1** | **KICK PLATE** | **K1050 10" X 1.5" LDW** | **BSP** | **RO** |
| **1** | **DOOR STOP** | **446 / 409** | **BSP** | **RO** |

| | | | | |
|---|---|---|---|---|
| 1 | ELECTROLYNX HARNESS | QC-C1500P PS TO HINGE | | MK |
| 1 | CARD READER | BY OTHERS | | |
| 1 | WIRING DIAGRAM | WD-SYSPK | | SA |
| 1 | ELECTROLYNX HARNESS | QC-C3XXP HINGE TO LOCK/EXIT/READER | | MK |
| 1 | POSITION SWITCH | DPS-M/W -W AS REQUIRED | | SU |
| | | | | |
| NOTES: DOOR IS NORMALLY CLOSED AND SECURE. ACCESS BY VALID CREDENTIAL OR KEY OVERRIDE.<br>THE DOOR WILL REMAIN LOCKED IN A POWER LOSS.<br>FREE EGRESS AT ALL TIMES | | | | |
| | | | | |
| SET: 15.0 | | | | |
| DOORS: M102 | | | | |
| DESCRIPTION: JAN | | | | |
| | | | | |
| 3 | HINGE, FULL MORTISE | TA2714-MCK 4-1/2" X 4-1/2" | BSP | MK |
| 1 | STOREROOM/CLOSET LOCK | DG164 8204 E3MD | BSP | SA |
| 1 | CYLINDER AND CORE | SARGENT TO MATCH | BSP | SA |
| 1 | MOP PLATE | K1050 4" X 1" LDW | BSP | RO |
| 1 | DOOR STOP | 446 / 409 | BSP | RO |
| 3 | SILENCER | 608 | | RO |
| | | | | |
| SET: 16.0 | | | | |
| DOORS: 101B, 102A, 102B, 109, 202A | | | | |
| DESCRIPTION: STOR | | | | |
| | | | | |
| 3 | HINGE, FULL MORTISE | TA2714-MCK 4-1/2" X 4-1/2" | BSP | MK |
| 1 | STOREROOM/CLOSET LOCK | DG164 8204 E3MD | BSP | SA |
| 1 | CYLINDER AND CORE | SARGENT TO MATCH | BSP | SA |
| 1 | DOOR STOP | 446 / 409 | BSP | RO |
| 3 | SILENCER | 608 | | RO |
| | | | | |
| SET: 17.0 | | | | |
| DOORS: M103 | | | | |
| DESCRIPTION: STOR - OHS | | | | |
| | | | | |
| 3 | HINGE, FULL MORTISE | TA2714-MCK 4-1/2" X 4-1/2" | BSP | MK |
| 1 | STOREROOM/CLOSET LOCK | DG164 8204 E3MD | BSP | SA |
| 1 | CYLINDER AND CORE | SARGENT TO MATCH | BSP | SA |
| 1 | CONC OVERHEAD STOP | 1-X36 | BSP | RF |
| 3 | SILENCER | 608 | | RO |

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|---|---|---|---|---|
| | | | | |
| **SET: 18.0** | | | | |
| **DOORS: 101A, 102C, 102D, 102E, 103A, 103B, 103C, 204, 204A, 204B, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216** | | | | |
| **DESCRIPTION: OFFICE** | | | | |
| | | | | |
| **3** | **HINGE, FULL MORTISE** | **TA2714-MCK 4-1/2" X 4-1/2"** | **BSP** | **MK** |
| **1** | **OFFICE/ENTRY LOCK** | **DG164 8255 E3MD** | **BSP** | **SA** |
| **1** | **CYLINDER AND CORE** | **SARGENT TO MATCH** | **BSP** | **SA** |
| **1** | **DOOR STOP** | **446 / 409** | **BSP** | **RO** |
| **3** | **SILENCER** | **608** | | **RO** |
| | | | | |
| **SET: 19.0** | | | | |
| **DOORS: 219** | | | | |
| **DESCRIPTION: BREAKROOM** | | | | |
| | | | | |
| **3** | **HINGE, FULL MORTISE** | **TA2714-MCK 4-1/2" X 4-1/2"** | **BSP** | **MK** |
| **1** | **OFFICE/ENTRY LOCK** | **DG164 8255 E3MD** | **BSP** | **SA** |
| **1** | **CYLINDER AND CORE** | **SARGENT TO MATCH** | **BSP** | **SA** |
| **1** | **SURFACE CLOSER** | **351 OT / POT** | **BSP** | **SA** |
| **1** | **KICK PLATE** | **K1050 10" X 1.5" LDW** | **BSP** | **RO** |
| **1** | **DOOR STOP** | **446 / 409** | **BSP** | **RO** |
| **1** | **GASKETING** | **S88BL** | | **PE** |
| **1** | **GASKETING** | **BY DOOR / FRAME MFG** | | |
| | | | | |
| **SET: 20.0** | | | | |
| **DOORS: 103** | | | | |
| **DESCRIPTION: OFFICE - CLOSER** | | | | |
| | | | | |
| **3** | **HINGE, FULL MORTISE** | **TA2714-MCK 4-1/2" X 4-1/2"** | **BSP** | **MK** |
| **1** | **OFFICE/ENTRY LOCK** | **DG164 8255 E3MD** | **BSP** | **SA** |
| **1** | **CYLINDER AND CORE** | **SARGENT TO MATCH** | **BSP** | **SA** |
| **1** | **SURFACE CLOSER** | **351 OT / POT** | **BSP** | **SA** |
| **1** | **KICK PLATE** | **K1050 10" X 1.5" LDW** | **BSP** | **RO** |
| **1** | **DOOR STOP** | **446 / 409** | **BSP** | **RO** |
| **3** | **SILENCER** | **608** | | **RO** |
| | | | | |
| **SET: 21.0** | | | | |
| **DOORS: 202, 203** | | | | |
| **DESCRIPTION: CLASS** | | | | |
| | | | | |
| **3** | **HINGE, FULL MORTISE** | **TA2714-MCK 4-1/2" X 4-1/2"** | **BSP** | **MK** |

| | | | | |
|---|---|---|---|---|
| 1 | CLASSROOM LOCK | DG164 8237 E3MD | BSP | SA |
| 1 | CYLINDER AND CORE | SARGENT TO MATCH | BSP | SA |
| 1 | DOOR STOP | 446 / 409 | BSP | RO |
| 3 | SILENCER | 608 | | RO |
| | | | | |
| SET: 22.0 | | | | |
| DOORS: 200, 200A | | | | |
| DESCRIPTION: CLASS - STC50 | | | | |
| | | | | |
| 1 | CLASSROOM LOCK | DG164 10XG37 LMD | BSP | SA |
| 1 | CYLINDER AND CORE | SARGENT TO MATCH | BSP | SA |
| 1 | DOOR STOP | 446 / 409 | BSP | RO |
| | | | | |
| NOTES: GASKETS AND HINGES BY DOOR SUPPLIER. | | | | |
| | | | | |
| SET: 23.0 | | | | |
| DESCRIPTION: NOT USED TOILET | | | | |
| | | | | |
| 3 | HINGE, FULL MORTISE | TA2714-MCK 4-1/2" X 4-1/2" | BSP | MK |
| 1 | PRIVACY LOCK | LB V21 8265 E3MD | BSP | SA |
| 1 | SURFACE CLOSER | 351 OT / POT | BSP | SA |
| 1 | MOP PLATE | K1050 4" X 1" LDW | BSP | RO |
| 1 | KICK PLATE | K1050 10" X 1.5" LDW | BSP | RO |
| 1 | DOOR STOP | 446 / 409 | BSP | RO |
| 1 | GASKETING | S88BL | | PE |
| | | | | |
| SET: 24.0 | | | | |
| DOORS: 107, 108, 217, 218 | | | | |
| DESCRIPTION: RESTROOM | | | | |
| | | | | |
| 3 | HINGE, FULL MORTISE, HVY WT | T4A3786 4-1/2" X 4-1/2" | BSP | MK |
| 1 | PULL PLATE | 110X70C | BSP | RO |
| 1 | PUSH PLATE | 71E | BSP | RO |
| 1 | SURFACE CLOSER | 422 CTB2 / PCTB2 | BSP | SA |
| 1 | MOP PLATE | K1050 4" X 1" LDW | BSP | RO |
| 1 | KICK PLATE | K1050 10" X 1.5" LDW | BSP | RO |
| 1 | DOOR STOP | 446 / 409 | BSP | RO |
| 1 | GASKETING | S88BL | | PE |
| | | | | |
| SET: 25.0 | | | | |
| DOORS: 100B | | | | |

| | | | | |
|---|---|---|---|---|
| **DESCRIPTION: RATED - PR - ALUMINUM** | | | | |
| | | | | |
| **2** | **DOOR STOP** | **446 / 409** | **BSP** | **RO** |
| **1** | **HBO-BALANCE** | **BALANCE OF HARDWARE BY DOOR MFG** | | |
| | | | | |

**END OF SECTION**

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# SECTION 08 8000
# GLAZING

## GLAZING

### 1.01 SECTION INCLUDES

A. Glass.

B. Glazing compounds and accessories.

C. Food Shields

### 1.02 RELATED REQUIREMENTS

A. Section 08 4113 - Fire Rated Aluminum Framed Entrances and Storefronts.

B. Section 08 4313 - Aluminum Framed Storefronts

C. Section 07 9200 - Joint Sealants: Sealants for other than glazing purposes.

D. Section 08 1416 - Flush Wood Doors

E. Section 08 8813 - Fire Rated Glazing 60 Minutes

### 1.03 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; current edition.

B. ANSI Z97.1 - American National Standard for Safety Glazing Materials Used in Buildings, Safety Performance Specifications and Methods of Test; 2010.

C. ASTM C1036 - Standard Specification for Flat Glass; 2011.

D. ASTM C1048 - Standard Specification for Heat-Strengthened and Fully Tempered Flat Glass; 2012.

E. ASTM C1172 - Standard Specification for Laminated Architectural Flat Glass; 2014.

F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2015a.

G. ASTM E1300 - Standard Practice for Determining Load Resistance of Glass in Buildings; 2012a.

H. ASTM E2190 - Standard Specification for Insulating Glass Unit Performance and Evaluation; 2010.

I. GANA (GM) - GANA Glazing Manual; 2009.

J. GANA (SM) - GANA Sealant Manual; 2008.

K. GANA (LGRM) - Laminated Glazing Reference Manual; 2009.

L. ICC (IBC) - International Building Code; 2015.

M. IGMA TM-3000 - North American Glazing Guidelines for Sealed Insulating Glass Units for Commercial & Residential Use; 1990 (2004).

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data on Glass Types: Provide structural, physical and environmental characteristics, size limitations, special handling or installation requirements.

C. Product Data on Glazing Compounds: Provide chemical, functional, and environmental characteristics, limitations, special application requirements. Identify available colors.

D. Samples: Submit two samples 12 by 12 inch in size of glass units, showing coloration and design.

E. Certificates: Certify that products meet or exceed specified requirements.

**1.05 QUALITY ASSURANCE**

A. Perform Work in accordance with GANA Glazing Manual and GANA Sealant Manual for glazing installation methods.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience.

**1.06 FIELD CONDITIONS**

A. Do not install glazing when ambient temperature is less than 50 degrees F.

**1.07 WARRANTY**

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Sealed Insulating Glass Units: Provide a ten (10) year warranty to include coverage for seal failure, interpane dusting or misting, including replacement of failed units.

C. Laminated Glass: Provide a ten (10) year warranty to include coverage for delamination, including replacement of failed units.

**PART 2 PRODUCTS**

**2.01 INSULATING GLASS UNITS**

A. Type IG-1 - Sealed Insulating Glass Units: +/-1" Thick Vision glass, double glazed.
   1. Application: All exterior glazing unless otherwise indicated.
   2. Outboard Lite: Annealed float glass, 1/4 inch thick, minimum, tempered.
      a. Tint: Optigray.
      b. Coating: Low-E (passive type), on #2 surface.
      c. Coating: Equal to Solarban 70 or Cardinal Glass lo-E meeting below requirements
   3. Inboard Lite: Annealed float glass, +/- 1/4 inch thick, minimum, tempered.
      a. Tint: Clear. (non coated)
   4. Total Visible Light Transmittance: 46 percent, nominal.
   5. Total Solar Heat Gain Coefficient: 0.23 percent, nominal.
   6. U-Value: 0.28
   7. Glazing Method: Gasket glazing.

B. Type IG-2 - Sealed Insulating Spandrel Glass Units: +/-1" Thick Vision glass, double glazed.
   1. Application: All exterior glazing unless otherwise indicated.
   2. Outboard Lite: Annealed float glass, 1/4 inch thick, minimum, tempered.
      a. Tint: OptiGray.
      b. Coating: Low-E (passive type), on #2 surface.
      c. Coating: Equal to Solarban 70 XL.
   3. Inboard Lite: Annealed float glass, +/- 1/4 inch thick, minimum, tempered.
      a. Tint: 1/4" Clear w/ Standard Frit (#4)
   4. Total Visible Light Transmittance: 34 percent, nominal.
   5. Total Solar Heat Gain Coefficient: 0.20 percent, nominal.
   6. U-Value: 0.28
   7. Glazing Method: Gasket glazing.

C. Type S-1 Interior clear tempered 1/4 inch thick glazing

## 2.02 EXTERIOR GLAZING ASSEMBLIES

A. Structural Design Criteria: Select type and thickness to withstand dead loads and wind loads acting normal to plane of glass at design pressures calculated in accordance with The 2015 International Building Code code as well as applicable blast resistance requirements
   1. Design Pressure: Calculated in accordance with applicable codes.
   2. Comply with ASTM E1300 for design load resistance of glass type, thickness, dimensions, and maximum lateral deflection of supported glass.
   3. Provide glass edge support system sufficiently stiff to limit the lateral deflection of supported glass edges to less than 1/200 of their lengths under specified design load or flexural limit of glass, whichever is less, with full recovery of glazing materials.
   4. Glass thicknesses listed are minimum.

## 2.03 GLASS MATERIALS

A. Float Glass Manufacturers:
   1. AGC Flat Glass North America, Inc: www.na.agc-flatglass.com.
   2. Guardian Industries Corp: www.sunguardglass.com.
   3. Pilkington North America Inc: www.pilkington.com/na.
   4. PPG Industries, Inc: www.ppgideascapes.com.
   5. Substitutions: Refer to Section 01 6000 - Product Requirements.

B. Float Glass: Provide float glass based glazing unless noted otherwise.
   1. Annealed Type: ASTM C1036, Type I - Transparent Flat, Class 1 - Clear, Quality-Q3.
   2. Heat-Strengthened and Fully Tempered Types: ASTM C1048, Kind HS and Kind FT.
   3. Tinted Types: ASTM C1036, Class 2 - Tinted, color and performance characteristics as indicated.
   4. Thicknesses: As indicated; for exterior glazing comply with requirements indicated for wind load design regardless of thickness indicated.

C. Fire-Protection-Rated Glazing: Type, thickness, and configuration as required to achieve indicated ratings.
   1. IBC Fire Protection Rating: As indicated on drawings.
   2. Provide products listed by Underwriters Laboratories or Intertek Warnock Hersey.
   3. Labeling: Provide permanent label on each piece giving the IBC rating and other information required by the applicable code.

## 2.04 SEALED INSULATING GLASS UNITS

A. Manufacturers:
   1. Any of the manufacturers specified for float glass.
   2. Substitutions: Refer to Section 01 6000 - Product Requirements.

B. Sealed Insulating Glass Units: Types as indicated.
   1. Application: Exterior, except as otherwise indicated.
   2. Durability: Certified by an independent testing agency to comply with ASTM E2190.
   3. Edge Spacers: Aluminum, bent and soldered corners.
   4. Edge Seal: Glass to elastomer with supplementary silicone sealant.
   5. Purge interpane space with dry hermetic air.

## 2.05 GLAZING COMPOUNDS

A. Manufacturers:
   1. Bostik Inc: www.bostik-us.com.
   2. Pecora Corporation: www.pecora.com.

3. BASF Construction Chemicals-Building Systems: www.buildingsystems.basf.com.
4. Substitutions: Refer to Section 01 6000 - Product Requirements.

**2.06 GLAZING ACCESSORIES**

A. Setting Blocks: Neoprene, 80 to 90 Shore A durometer hardness; ASTM C864 Option II. Length of 0.1 inch for each square foot of glazing or minimum 4 inch x width of glazing rabbet space minus 1/16 inch x height to suit glazing method and pane weight and area.

B. Spacer Shims: Neoprene, 50 to 60 Shore A durometer hardness; ASTM C864 Option II. Minimum 3 inch long x one half the height of the glazing stop x thickness to suit application, self adhesive on one face.

C. Glazing Tape: Preformed butyl compound with integral resilient tube spacing device; 10 to 15 Shore A durometer hardness; coiled on release paper; black color.
1. Manufacturers:
a. Pecora Corporation: www.pecora.com.
b. Tremco Global Sealants: www.tremcosealants.com.
c. Substitutions: Refer to Section 01 6000 - Product Requirements.

D. Glazing Gaskets: Resilient silicone extruded shape to suit glazing channel retaining slot; ASTM C864 Option II; ____ color.

E. Glazing Clips: Manufacturer's standard type.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

A. Verify that openings for glazing are correctly sized and within tolerance.

B. Verify that surfaces of glazing channels or recesses are clean, free of obstructions that may impede moisture movement, weeps are clear, and ready to receive glazing.

**3.02 PREPARATION**

A. Clean contact surfaces with solvent and wipe dry.

B. Seal porous glazing channels or recesses with substrate compatible primer or sealer.

C. Prime surfaces scheduled to receive sealant.

D. Install sealants in accordance with ASTM C1193 and GANA Sealant Manual.

E. Install sealants in accordance with manufacturer's instructions.

**3.03 INSTALLATION - EXTERIOR/INTERIOR DRY METHOD (GASKET GLAZING)**

A. Place setting blocks at 1/4 points with edge block no more than 6 inch from corners.

B. Rest glazing on setting blocks and push against fixed stop with sufficient pressure on gasket to attain full contact.

C. Install removable stops without displacing glazing gasket; exert pressure for full continuous contact.

**3.04 CLEANING**

A. Remove glazing materials from finish surfaces.

B. Remove labels after Work is complete.

C. Clean glass and adjacent surfaces.

### 3.05 PROTECTION

A. After installation, mark pane with an 'X' by using removable plastic tape or paste; do not mark heat absorbing or reflective glass units.

**END OF SECTION 08 8000**

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# SECTION 08 8813
# FIRE-RATED GLAZING - 60 MINUTE

## PART 1 GENERAL

### 1.01 SUMMARY

A. Section Includes: Fire rated glazing
   1. SuperLite® II-XL 60 safety rated, fire protective glazing with fire resistive qualities for interior r applications.

B. Applications of fire rated glazing includes:
   1. Fire rated glazing as vision lites in door assemblies.
   2. Fire rated glazing as sidelites, transoms in fire rated frames.

C. Related sections:
   1. Section 08 8000: Glazing
   2. Section 08 11 13: Hollow Metal Doors and Frames
   3. Section 08 8813 : Fire-Rated Aluminum Framed Entrances and Storefronts

### 1.02 REFERENCES

A. American Society for Testing and Materials (ASTM):
   1. ASTM E119: Methods for Fire Tests of Building Construction and Materials.
   2. ASTM E152: Methods for Fire Tests of Door Assemblies.
   3. ASTM E163: Methods for Fire Tests of Window Assemblies.
   4. ASTM E2074: Standard Test Method for Fire Tests of Door Assemblies, including Positive Pressure Testing of Side-hinged and Pivoted Swinging Door Assemblies.
   5. ASTM E2010-1: Standard Test for Positive Pressure of Fire Tests of Window Assemblies.

B. National fire Protection Association (NFPA):
   1. NFPA 80: Fire Doors and Windows.
   2. NFPA 251: Fire Tests of Building Construction and Materials.
   3. NFPA 252: Fire Tests of Door Assemblies.
   4. NFPA 257: Fire Tests of Window Assemblies.

C. Underwriters Laboratories, Inc. (UL):
   1. UL 9: Standard for Safety of Fire Tests of Window Assemblies.
   2. UL 10 B: Standard for Safety of Fire Tests of Door Assemblies.
   3. UL 10 C: Standard for Safety of Positive Pressure Tests of Door Assemblies.
   4. UL 263: Fire Tests of Building Construction and Materials.

D. Standard Council of Canada:
   1. ULC Standard CAN4-S101: Fire Tests of Building Construction and Materials.
   2. ULC Standard CAN4-S104: Fire Tests of Door Assemblies.
   3. ULC Standard CAN4-S106: Fire Tests of Window Assemblies.

E. Consumer Product Safety Commission (CPSC):
   1. CPSC 16 CFR 1201: Safety Standard for Architectural Glazing Materials.

F. Glass Association of North America (GANA)
   1. GANA – Glazing Manual.
   2. FGMA – Sealant Manual.

G. National Fenestration Rating Council (NFRC)
   1. NFRC 100: Procedure for Determining Fenestration Product U-Factors.

2. NFRC 200: Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence.

H. [American Recovery and Reinvestment Act
   1. Section 1605, Title XVI Buy American Provision]

I. See section 01 4100 Regulatory Requirments

**1.03 SYSTEM DESCRIPTION**

A. A. Performance Requirements: Provide a fire rated glazing manufactured, fabricated and installed to maintain performance criteria stated by manufacturer without defects, damage, or failure.
   1. Fire Rating: 60 minutes with hose stream.
   2. Safety rated, fire protective glazing with fire resistive qualities tested in accordance with ASTM E119, NFPA 80, NFPA 251, NFPA 252, NFPA 257, UL 9, UL 10B, UL 10C and UL 263.
   3. Testing Laboratory: Fire test shall be conducted by a nationally recognized independent testing laboratory.

B. Listings and Labels:
   1. Fire rated glazing shall be under current follow-up services by nationally recognized independent testing laboratory approved by OSHA and maintain a current listing or certification. Assemblies shall be labeled in accordance with limits of listings.

**1.04 SUBMITTALS**

A. . Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedure Section.
   1. Shop Drawings: Submit shop drawings showing layouts, profiles and product components.
   2. Samples: Submit 12x12 glass samples.
   3. Technical Information: Submit latest edition of manufacturer’s product data.

**1.05 DELIVERY, STORAGE AND HANDLING**

A. General: Comply with Division 1 Product Requirements Sections.

B. Ordering: Comply with manufacturer’s ordering instructions and lead-time requirements to avoid construction delays.

C. Delivery: Deliver materials to specified destinations in manufacturer or distributor’s packaging.

D. Storage and Protection: Store off ground, under cover, protected from weather and construction activities and at temperature conditions recommended by manufacturer.

**1.06 PROJECT CONDITIONS**

A. A. Field Measurements: Verify actual measurements for openings by field measurements before fabrication. Show recorded measurements on shop drawings. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

**1.07 WARRANTY**

A. Project Warranty: Refer to Conditions of the Contract for project warranty provisions.

B. Manufacturer’s Warranty: Submit, for Owner’s acceptance, manufacturer’s standard warranty document. Manufacturer’s warranty is not intended to limit other rights that the Owner may have under the Contract Documents.
   1. Warranty Period: 5-year limited warranty from date of shipping.

### 1.08 REFERENCE STANDARDS

A. 16 CFR 1201 - Safety Standard for Architectural Glazing Materials; Current Edition.

B. ASTM C1629/C1629M - Standard Classification for Abuse-Resistant Nondecorated Interior Gypsum Panel Products and Fiber-Reinforced Cement Panels; 2015.

C. ASTM E119 - Standard Test Methods for Fire Tests of Building Construction and Materials; 2026.

D. ASTM E695 - Standard Method of Measuring Relative Resistance of Wall, Floor, and Roof Construction to Impact Loading; 2003, with Editorial Revision (2015).

E. NFPA 80 - Standard for Fire Doors and Other Opening Protectives; 2025, with Amendment (2024).

F. NFPA 252 - Standard Methods of Fire Tests of Door Assemblies; 2022.

G. NFPA 257 - Standard on Fire Test for Window and Glass Block Assemblies; 2012.

H. NFRC 100 - Procedure for Determining Fenestration Product U-factors; 2014.

I. NFRC 200 - Procedure for Determining Fenestration Product Solar Heat Gain Coefficient and Visible Transmittance at Normal Incidence; 2014.

J. UL 9 - Standard for Fire Tests of Window Assemblies; Current Edition, Including All Revisions.

K. UL 10B - Standard for Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

L. UL 10C - Standard for Positive Pressure Fire Tests of Door Assemblies; Current Edition, Including All Revisions.

M. UL 263 - Standard for Fire Tests of Building Construction and Materials; Current Edition, Including All Revisions.

## PART 2 PRODUCTS

### 2.01 FIRE RATED GLAZING

A. Type: FRG-1 - SuperLite® II-XL 60 minute fire protective glazing with fire resistive qualities.

B. Manufacturer: SuperLite® II-XL as manufactured and distributed by SAFTI FIRST®.
   1. Contact: 100 N Hill Drive, Suite 12, Brisbane, CA 94005; Telephone 888.653.3333; email info@safti.com; Web site www.safti.com.
   2. Fire rated glass and framing must be provided by a single-source, US manufacturer. Distributors of fire rated glass and framing are not to be considered as manufacturers.

C. Design Requirements:
   1. Make-up: Must be comprised of an inboard and outboard lite of [clear tempered] [Starphire Ultra-Clear® glass by Vitro] protecting a clear, fire resistive, intumescent interlayer.
   2. Thickness: 1-3/8” (35 mm) standard profile.
   3. Weight: 14-lbs/sq. for standard 1-3/8” (35 mm) standard profile.
   4. Sound Transmission Rating: Must meet 43 STC/39 OITC in 1-3/8” standard profile; Must meet 43 STC/ 37 OITC insulated with ¼” Low-E.
   5. Dimensions: Must meet max. clear view area of 4,952 sq. in., measuring at least 124 in. on the long side.
   6. Appearance: Must be tint-free, optically clear fire resistive glazing.
   7. Visible Transmittance: Must meet 0.877 with clear low-iron.
   8. Fire Rating: Must be fire rated to 60 minutes with hose stream and meet ASTM E-119.
   9. Impact Safety Resistance: CPSC 16 CFR 1201 Cat. I & II.
   10. Hard Body Impact Classification: Must meet ASTM C1629/C1629M Level 3.

11. Soft Body Impact Classification: Must meet ASTM E695 Level 3.
12. Surface Abrasion Resistance: Must meet ASTM D4977 Level 3.

D. Manufacturer's Fire Rated Glazing Material:
   1. Each piece of fire-rated glazing material shall be labeled with a permanent logo including name of product, manufacturer, testing laboratory, fire rating period and safety glazing standards.
   2. Glazing materials installed in Hazardous Locations, subject to human impact, shall be certified and permanently labeled as meeting applicable requirements reference in NFPA 80:
      a. CPSC 16 CFR 1201 Cat. I & II

E. Substitutions: No substitutions allowed except by addendum prior to bid.

**2.02 MATERIALS**

A. Glazing Accessories: Manufacturer recommended fire rated glazing accessory as follows:
   a. Glazing with EPDM tape or other listed flame resistant gasket material and calcium silicate setting blocks.

**2.03 RELATED PRODUCTS**

A. Glazing shall be installed in an equally rated framing system.

B. Pressure glazing is allowed.

**2.04 SOURCE QUALITY**

A. Obtain fire rated glazing products from a single manufacturer.

B. Fabrication Dimensions: Fabricate to approved dimensions. The general contractor shall guarantee dimensions where practicable within required tolerances.

**PART 3 EXECUTION**

**3.01 MANUFACTURER'S INSTRUCTIONS**

A. Compliance: Comply with manufacturer's product data including product technical bulletins and installation instructions.

**3.02 EXAMINATION**

A. Site Verification of Conditions: Verify substrate conditions, have been previously installed under other sections, and are acceptable for product installation in accordance with manufacturer's instructions.

**3.03 INSTALLATION**

A. Installation shall be in strict accordance with the fire glazing material manufacturer's specifications. Field cutting or tampering is strictly prohibited.

**3.04 CLEANING AND PROTECTION**

A. Protect glass from contact with contaminating substances resulting from construction operations. Remove such substances by method approved by manufacturer.

B. Wash glass on both faces not more than four days prior to date schedule for inspections intended to establish date of Substantial Completion. Wash glass by method recommended by glass manufacturer.

C. Remove temporary coverings and protection of adjacent work areas.

D. Remove construction debris from project site and legally dispose of debris.

# SECTION 08 9100
# LOUVERS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Vertical Louvers: Miami -Dade Qualified and Florida approved stationary vertical blade wind driven extruded aluminum louver.

### 1.02 RELATED REQUIREMENTS

A. Section 07 6200 - Sheet Metal Flashing and Trim.

B. Section 07 9005 - Joint Sealers.

C. Division 23 - Mechanical.

### 1.03 REFERENCE STANDARDS

A. AMCA 500-L Water Penetration, AIR Performance and Wind Driven Rain

B. AMCA 540 Test Method for Louvers Impacted by Wind Borne Debris

C. AMCA 550 High Velocity Wind Driven Rain

D. Florida Test Protocol: TAS 201 Large Missle Impact

E. Florida Test Prototocol: TAS 202 Uniform Static Air Pressure

F. Florida Test Protocol: TAS 203 Cyclic Wind Loading

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data describing design characteristics, maximum recommended air velocity, design free area, materials and finishes.

C. Shop Drawings: Indicate louver layout plan and elevations, opening and clearance dimensions, tolerances; head, jamb and sill details; blade configuration, screens, blankout areas required, and frames. Provide details noted above at 1 1/12" per foot for each wall condition, including but not limited to storefront.

D. Samples: Submit two samples 2 by 2 inches (50 by 50 mm) in size illustrating finish and color of exterior and interior surfaces.

E. Test Reports: Independent agency reports showing compliance with specified performance criteria.

F. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

G. Maintenance Data: Include lubrication schedules and adjustment requirements .

### 1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products of the type specified in this section, with minimum three years of documented experience.

### 1.06 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide five year Manufacturers Warranty on failure of Louver.

C. Provide twenty year manufacturer warranty against distortion, metal degradation, and failure of connections.

1. Finish: Include coverage against degradation of exterior finish.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. 5" deep Wall Louver:
   1. Location: All Louvers shown
      a. Meets AMCA 540.
      b. Meets AMCA 550
      c. NFA 55%.
      d. Greenheck SED-501, horizontal blade 5" depth, Aluminum or approved equal. Minimum free area to be 50%.
      e. Class A,
      f. PVDF Fluorpolymer Finish.

### 2.02 LOUVERS

A. Frame: Heavy gauge extruded aluminum.

B. Extended Sill

### 2.03 MATERIALS

A. Stainless Steel Fasteners: ASTM A666/A666M, Type 304, soft temper, smooth surface, No. 4 brushed finish.

B. Polyvinylidene Fluoride Coating: Minimum 70 percent Kynar 500/Hylar 500 resin, two coat PVDF finish, complying with AAMA 2605. with 10 year finish warranty for fading, flaking, or pealing.

### 2.04 FINISHES

A. Superior Performing Organic Coatings: AAMA 2605 multiple coat, thermally cured polyvinylidene fluoride system. PVDF

B. Color: As selected by architect from custom colors.

### 2.05 ACCESSORIES

A. Fasteners and Anchors: Galvanized steel.

B. Additional Head and Sill Flashings: See Section 07 6200.

C. Sealant: as specified in Section 07 9005.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify that prepared openings and flashings are ready to receive this work and opening dimensions are as indicated on shop drawings.

B. Verify that field measurements are as indicated.

### 3.02 INSTALLATION

A. Install louver assembly in accordance with manufacturer's instructions.
   1. Coordinate with installation of flashings by others.
   2. Install louvers level and plumb.
   3. Align louver assembly to ensure moisture shed from flashings and diversion of moisture to exterior.
   4. Secure louver frames in openings with concealed fasteners.
   5. Install perimeter sealant and backing rod in accordance with Section 07 9005.
   6. Coordinate with installation of mechanical ductwork.

### 3.03 CLEANING

A. Strip protective finish coverings.

B. Clean surfaces and components.

**END OF SECTION**

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# SECTION 09 0561
# COMMON WORK RESULTS FOR FLOORING PREPARATION

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. **All products and procedures must meet the manufacturer's required criteria for installation.**

B. This section applies to floors identified in contract documents that are receiving the following types of floor coverings:
   1. Resilient Tile
   2. Carpet Tile.
   3. Tiling
   4. Rubber Flooring
   5. Clear concrete sealers, see interior painting
   6. All other floor finishes as sepcified in individual sections.
   7. Exterior concrete sealers, see Interior Painting.

C. Preparation of new and existing concrete floor slabs for installation of floor coverings.

D. Testing of concrete floor slabs for moisture and alkalinity (pH).

E. Remediation of concrete floor slabs due to unsatisfactory moisture or alkalinity (pH) conditions.

F. Contractor shall perform all specified remediation of concrete floor slabs. If such remediation is indicated by testing agency's report and is due to a condition not under Contractor's control or could not have been predicted by examination prior to entering into the contract, a contract modification will be issued as approved by owner.

### 1.02 RELATED REQUIREMENTS

A. Section 01 4000 - Quality Requirements: Additional requirements relating to testing agencies and testing.

B. Section 03 3000 - Cast-in-Place Concrete: Concrete admixture for slabs to receive adhered flooring, to prevent moisture content-related flooring failures.

C. Section - 03 5400 Self Leveling Cast Underlayment

### 1.03 REFERENCE STANDARDS

A. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2021.

B. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2016a.

C. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.

### 1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate scheduling of cleaning and testing, so that preliminary cleaning has been completed for at least 24 hours prior to testing.

### 1.05 SUBMITTALS

A. Floor Covering and Adhesive Manufacturers' Product Literature: For each specific combination of substrate, floor covering, and adhesive to be used; showing:
   1. Moisture and alkalinity (pH) limits and test methods.

2. Manufacturer's required bond/compatibility test procedure.

B. Testing Agency's Report:
1. Description of areas tested; include floor plans and photographs if helpful.
2. Summary of conditions encountered.
3. Copies of specified test methods.
4. Recommendations for remediation of unsatisfactory surfaces.
5. Submit report to Architect, owner, owner's representative
6. Submit report not more than two business days after conclusion of testing.

C. Adhesive Bond and Compatibility Test Report.

**1.06 QUALITY ASSURANCE**

A. Moisture and alkalinity (pH) testing shall be performed by an independent testing agency employed and paid by Contractor.

B. Testing Agency Qualifications: Independent testing agency experienced in the types of testing specified.
1. Submit evidence of experience consisting of at least 3 test reports of the type required, with project Owner's project contact information.

C. Contractor's Responsibility Relating to Independent Agency Testing:
1. Provide access for and cooperate with testing agency.
2. Confirm date of start of testing at least 10 days prior to actual start.
3. Allow at least 4 business days on site for testing agency activities.
4. Achieve and maintain specified ambient conditions.
5. Notify Owner when specified ambient conditions have been achieved and when testing will start.
6. Notify Architect when specified ambient conditions have been achieved and when testing will start.

**1.07 FIELD CONDITIONS**

A. Maintain ambient temperature in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 65 degrees F (18 degrees C) or more than 85 degrees F (30 degrees C).

B. Maintain relative humidity in spaces where concrete testing is being performed, and for at least 48 hours prior to testing, at not less than 40 percent and not more than 60 percent.

**PART 2 EXECUTION**

**2.01 CONCRETE SLAB PREPARATION**

A. PROPER SURFACE PREPARATION INCLUDES THE FOLLOWING:
1. Inspection of the existing concrete substrate
2. Removal of existing floor coatings
3. Decontamination of the concrete surface
4. Creation of surface profile
5. Repair of surface irregularities

B. INSPECTION OF THE EXISTING CONCRETE SUBSTRATE
1. Inspect the existing concrete substrate to determine its general condition, soundness, presence of contaminants, existing floor coating, presence of moisture vapor emissions and the best methods to use in preparation of the surface to meet the requirements of the project.

C. DECONTAMINATION OF THE CONCRETE SURFACE
1. Decontamination of the concrete surface requires the removal of oils, grease, wax, fatty acids and other contaminants, and may be accomplished by the use of detergent scrubbing with a heavy duty cleaner/degreaser, low pressure water cleaning (less than 5,000 psi), steam cleaning, or chemical cleaning. The success of these methods is dependent upon the depth of penetration of the contaminant; which is completely dependent upon the contaminant's viscosity, the concrete's permeability and the duration of exposure. Special care should be taken when preparing concrete at an "in use" facility for repair, replacement or an initial floor topping.
2. Test concrete substrate for moisture vapor emission using test methods recommended by manufacturer of flooring system being installed.

D. CREATION OF SURFACE PROFILE
1. A. Creation of surface profile can be accomplished by a number of methods each utilizing a selection of tools, equipment and materials to accomplish the intended purpose, (See METHODS OF SURFACE PREPARATION below). Selection is dependent upon the type of surface to be prepared and the type of system to be installed. In addition, floors, trenches each have their own particular requirements. The type and thickness of the selected flooring system also plays an important role in the selection process. Regardless of the method selected or tools employed, the contractor must provide a surface that will accept the application of flooring products and allow the mechanical bond of the flooring system securely to the concrete. The type of service the structure will be subjected to, will also help to define the degree of profile required. The surface profile is the measure of the average distance from the peaks of the surface to the valleys as seen through a cross sectional view of the surface of the concrete.
2. This dimension is defined pictorially and through physical samples in the ICRI Technical Guideline No 03732, and is expressed as a Concrete Surface Profile number (CSP 1-9).
3. Methods of Surface Preparation
   a. Depending upon conditions of the concrete one or more methods of surface preparation may be required. It is common for decontamination to precede mechanical preparation, and if necessary a second decontamination to follow.
   b. The preferred methods for creation of a surface profile, including the removal of dirt, dust, laitance and curing compounds, is steel shotblasting, abrasive (sand) blasting or scarifying. The steel shotblasting or vacuum blasting process is commonly referenced by equipment brand names, such as, Blastrac, Vacu-Blast, Shot-Blast, etc. Vertical and overhead surfaces, such as cove base, wall, and ceiling surfaces shall be prepared utilizing methods of grinding, scarifying, abrasive (sand) blasting, needle scaling, or vertical steel shotblasting. The following table provides a guide for the degree of surface profile required for the coating or overlay to be applied and the preparation methods used to generate each profile. Provide written instruction from manufacturer to architect regarding profile requirements and recommended method for achieving profile.

| Application | Profile | Preparation |
|---|---|---|
| Sealers | 0-3 mils | Detergent scrub Low-pressure Water Acid Etching (not recommended) Grinding |
| Thin Film | 4-10 mils | Grinding Abrasive Blast Steel Shot Blast |

| | | |
|---|---|---|
| High Build | 10-40 mils | Abrasive Blast Steel Shot Blast Scarifying |
| Self-Leveling | 50 mils-1/8 inch | Abrasive Blast Steel Shot Blast Scarifying Needle Scaling |
| Polymer Overlay | 1/8-1/4 inch | Abrasive Blast Steel Shot Blast Scarifying Needle Scaling Scabbling Flame Blasting Milling/rotomilling |

4. Other surface preparation methods are mentioned in ADDITONAL SURFACE PREPARATION REFERENCES.

E. REPAIR OF SURFACE IRREGULARITIES
1. Repair of surface irregularities including bugholes, spalls, cracks, deteriorated joints, slopes, areas near transition zones, such as around drains, floor boxes, doorways, etc. must be repaired prior to the placement of the flooring system and/or the system must be designed to off-set the thickness of the irregularities. For bugholes and other minor surface irregularities, fill using materials recommended by manufacturer of flooring system. For treatment of cracks and joints refer to the section below entitled “Crack Isolation”.

F. CRACK ISOLATION
1. The performance of elastomeric products, requires a relatively uniform dry film thickness to resist drying shrinkage and thermal movement of the concrete, while maintaining a seamless bridge or seal over the concrete. Therefore it is critical that all mortar splatter, protrusions, ridges, penetrations, or sharp projections in the surface of the concrete, be ground smooth or otherwise made smooth, in addition to the normal surface preparation outlined above.
2. Prior to application of an elastomeric system, control/contraction joints, construction joints, and cracks should be sealed with the selected system flexible sealant as recommended by manufacturer of flooring system. This coating should extend a minimum of 6” on either side of the joint or crack. The entire surface area should then receive the specified crack isolation system. Isolation and/or expansion joints should be detailed in accordance with the floor system manufacturer’s recommendations.
3. General Polymer systems can be applied to a variety of substrates if the substrate is properly prepared. Preparation of surfaces other than concrete or steel, such as wood, concrete block, brick, quarry tile, glazed tile, cement terrazzo, vinyl composition tile, plastics and existing polymer systems, can be accomplished to receive bonded polymer sealers, coatings, or toppings. For questions regarding a substrate other than concrete or steel, or a condition not mentioned in this guideline, contact the product Technical Service Department prior to starting the project. For steel surfaces, refer to Guideline Instructions for Surface Preparation of Structural Steel, Form G-2.Repair of surface irregularities including bugholes, spalls, cracks, deteriorated joints, slopes, areas near transition zones, such as around drains, floor boxes, doorways, etc. must be repaired prior to the placement of the flooring system and/or the system must be designed to off-set the thickness of the irregularities.

G. ADDITIONAL SURFACE PREPARATION REFERENCES
1. Important and relevant information on surface preparation of concrete is available by referencing the following codes, standards, and guidelines.

a. SSPC The Society for Protective Coatings, 40 24th Street, 6th Floor, Pittsburgh, Pa. 15222-4643, (412) 281-2331.
   1) SSPC-SP 13 Surface Preparation of Concrete
   2) SSPC-TU 2/NACE 6G197 Design, Installation, and Maintenance of Coating Systems for Concrete Used in Secondary Containment
b. ICRI International Concrete Repair Institute, 38800 Country Club Drive Farmington Hills, MI 48331, (248) 848-3809
c. Technical Guideline No.03732, “Selecting and Specifying Concrete Surface
   1) Preparation for Sealers, Coatings, and Polymer Overlays”. Includes visual standards to act as a guide in defining acceptable surface profiles for the application of industrial coatings and polymer floor toppings.
   2) Technical Guideline No.03730, “Guide for Surface Preparation for the Repair of Deteriorated Concrete Resulting from Reinforcing Steel Corrosion”.
d. ASTM American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959, (610) 832-9585
   1) ASTM D 4258 “Practice for Surface Cleaning Concrete for Coating”
   2) ASTM D 4260 “Standard Practice for Acid Etching Concrete”
   3) ASTM D 4261 “Practice for Surface Cleaning Unit Masonry for Coating”
   4) ASTM D 4262 “Test Method for pH of Chemically Cleaned or Etched Concrete Surfaces”The performance of elastomeric products, requires a relatively uniform dry film thickness to resist drying shrinkage and thermal movement of the concrete, while maintaining a seamless bridge or seal over the concrete. Therefore it is critical that all mortar splatter, protrusions, ridges, penetrations, or sharp projections in the surface of the concrete, be ground smooth or otherwise made smooth, in addition to the normal surface preparation outlined above.

## 2.02 CONCRETE SLAB PREPARATION

A. Perform following operations in the order indicated:
   1. Preliminary cleaning.
   2. Internal relative humidity tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
   3. Alkalinity (pH) tests; in same locations as moisture vapor emission tests, unless otherwise indicated.
   4. Specified remediation, if required.
   5. Patching, smoothing, and leveling, as required.
   6. Other preparation specified.
   7. Adhesive bond and compatibility test.
   8. Protection.
   9. **Patch concrete floors where divots or holes have been caused by previous work or demolition of partitions. Comply with standards noted and manufacture's recommended patching products for concrete substrate and new floor finishes.**

## 2.03 MOISTURE VAPOR EMISSION TESTING

A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.

B. Test in accordance with ASTM F1869 and as follows.

C. Plastic sheet test and mat bond test may not be substituted for the specified ASTM test method, as those methods do not quantify the moisture content sufficiently.

D. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if test values exceed 3 pounds per 1000 square feet (1.4 kg per 93 square meters) per 24 hours.

E. Report: Report the information required by the test method.

**2.04 INTERNAL RELATIVE HUMIDITY TESTING**

A. Where the floor covering manufacturer's requirements conflict with either the referenced test method or this specification, comply with the manufacturer's requirements.

B. Test in accordance with ASTM F2170 Procedure A and as follows.

C. Testing with electrical impedance or resistance apparatus may not be substituted for the specified ASTM test method, as the values determined are not comparable to the ASTM test values and do not quantify the moisture content sufficiently.

D. In the event that test values exceed floor covering manufacturer's limits, perform remediation as indicated. In the absence of manufacturer limits, perform remediation if any test value exceeds 75 percent relative humidity.

E. Report: Report the information required by the test method.

**2.05 ALKALINITY TESTING**

A. The following procedure is the equivalent of that described in ASTM F710, repeated here for the Contractor's convenience.

B. Use a wide range alkalinity (pH) test paper, its associated chart, and distilled or deionized water.

C. Place several drops of water on a clean surface of concrete, forming a puddle approximately 1 inch (25 mm) in diameter. Allow the puddle to set for approximately 60 seconds, then dip the alkalinity (pH) test paper into the water, remove it, and compare immediately to chart to determine alkalinity (pH) reading.

**2.06 ADHESIVE BOND AND COMPATIBILITY TESTING**

A. Comply with requirements and recommendations of floor covering manufacturer.

**END OF SECTION**

# SECTION 09 2116
# GYPSUM BOARD ASSEMBLIES

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Performance criteria for gypsum board assemblies.
B. Metal stud wall framing.
C. Metal channel ceiling framing.
D. Acoustic insulation. Refer to Section 07 2100 Thermal Insulation
E. Gypsum wallboard.
F. Cementitious Backer Board (Provide at all installations of hard wall tile on metal studs).
G. Joint treatment and accessories.
H. Drywall Grid System for Gypsum Board
I. Acoustical Decoupled Wall Studs
J. Sound Isolation Clips for Stud Walls
K. Deck Suspended Ceiling Hanger and Miscellaneous Manufacturer's Supports
L. Ceiling Perimeter Tape
M. Isolated Floor / Wall / Ceiling Sealant

### 1.02 RELATED REQUIREMENTS

A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.
B. Section 05 4000 - Cold-Formed Metal Framing: Exterior wind-load-bearing metal stud framing.
C. Section 06 1000 - Rough Carpentry: Wood blocking product and execution requirements.
D. Section 06 2000 - Finish Carpentry.
E. Section 06 8316 - Fiberglass Reinforced Paneling.
F. Section 07 2100 - Thermal Insulation: Sound Attenuation Batt Insulation.
G. Section 09 3000 - Tiling.
H. Section 09 9913 - Interior Painting.
I. Section 08 3474 - Wood Sound Controlled Assemblies

### 1.03 REFERENCE STANDARDS

A. ASTM C475/C475M - Standard Specification for Joint Compound and Joint Tape for Finishing Gypsum Board; 2015.
B. ASTM C645 - Standard Specification for Nonstructural Steel Framing Members; 2014.
C. ASTM C754 - Standard Specification for Installation of Steel Framing Members to Receive Screw-Attached Gypsum Panel Products; 2015.
D. ASTM C840 - Standard Specification for Application and Finishing of Gypsum Board; 2013.
E. ASTM C954 - Standard Specification for Steel Drill Screws for the Application of Gypsum Panel Products or Metal Plaster Bases to Steel Studs from 0.033 in. (0.84 mm) to 0.112 in. (2.84 mm) in Thickness; 2022.

F. ASTM C1002 - Standard Specification for Steel Self-Piercing Tapping Screws for Application of Gypsum Panel Products or Metal Plaster Bases to Wood Studs or Steel Studs; 2022.

G. ASTM C1047 - Standard Specification for Accessories For Gypsum Wallboard and Gypsum Veneer Base; 2014a.

H. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.

I. GA-216 - Application and Finishing of Gypsum Board; 2013.

**1.04 SUBMITTALS**

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate special details associated with fireproofing and acoustic seals.

C. Product Data: Provide data on metal framing, gypsum board, accessories, and joint finishing system.

D. Test Reports: For all stud framing products that do not comply with ASTM C645 or C754, provide independent laboratory reports showing maximum stud heights at required spacings and deflections.

**1.05 QUALITY ASSURANCE**

A. Installer Qualifications: Company specializing in performing gypsum board application and finishing with a minimum 3 years of documented experience.

B. Copies of Documents at Site: Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. For all noise control assemblies, the Contractor shall provide testing as recommended by Manufacturers during construction and at project completion to assure specified noise control requirement are met. Any discrepencies shall be corrected by the Contractor at no cost to the Owner.

**PART 2 PRODUCTS**

**2.01 GYPSUM BOARD ASSEMBLIES**

A. Provide completed assemblies complying with ASTM C840 and GA-216.

B. **Refer to Drawing Wall type Legend** for wall types and required STC ratings.

**2.02 CEMENTITIOUS BACKER BOARD:**

A. ANSI A118.9; High density, cementitious, glass fiber reinforced, 5/8 inch (13 mm) thick; 2 inch (50 mm) wide coated glass fiber tape for joints and corners.

**2.03 METAL FRAMING MATERIALS ( FOR INTERIOR PARTITIONS, REFER TO DRAWINGS FOR WIDTH & HEIGHT)**

A. Manufacturers - Metal Framing, Connectors, and Accessories:
   1. Clarkwestern Dietrich Building Systems LLC; Product ____: www.clarkdietrich.com/#sle.
   2. Dietrich Metal Framing: www.dietrichindustries.com.
   3. Marino: www.marinoware.com/#sle.
   4. Phillips Manufacturing Company: www.phillipsmfg.com.
   5. Substitutions: See Section 01 6000 - Product Requirements.

B. Non-Loadbearing Framing System Components: ASTM C645; galvanized sheet steel, of size and properties necessary to comply with ASTM C754 for the spacing indicated, with maximum deflection of wall framing of L/240 at 5 psf (L/240 at 240 Pa).
   1. Studs: "C" shaped with flat or formed webs with knurled faces.

2. Ceiling Channels: C shaped.
3. Furring: Hat-shaped sections, minimum depth of 7/8 inch (22 mm).
4. Resilient Furring Channels: 1/2 inch (12 mm) depth, for attachment to substrate through one leg only.
    a. Manufacturers - Resilient Furring Channels:
        1) Same manufacturer as other framing materials.
5. Drywall Grid System for Gypsum Board equal to Armstrong .
    a. Main Tees at 48" on Center, size as per manufactures instructions.
    b. Secondary Tees at 16" on Center, size as per manufacturers instuctions.
    c. Provide 12 Gauge hanger wire spaced as required for loading. Except in areas indicated

C. Ceiling Hangers: Type and size as specified in ASTM C754 for spacing required.

**2.04 BOARD MATERIALS**

A. Manufacturers - Gypsum-Based Board:
1. American Gypsum: www.americangypsum.com/#sle.
2. American Gypsum: www.americangypsum.com.
3. CertainTeed Corporation: www.certainteed.com/#sle.
4. Georgia-Pacific Gypsum: www.gpgypsum.com/#sle.
5. Lafarge North America Inc: www.lafargenorthamerica.com.
6. National Gypsum Company: www.nationalgypsum.com/#sle.
7. USG Corporation: www.usg.com/#sle.

B. Gypsum Wallboard: Paper-faced gypsum panels as defined in ASTM C1396/C1396M; sizes to minimize joints in place; ends square cut.
1. Application: Use for vertical surfaces and ceilings, unless otherwise indicated.
2. Thickness:
    a. Vertical Surfaces: 5/8 inch (16 mm).Type X
    b. Ceilings: 5/8 inch (16 mm).Type X
    c. Multi-Layer Assemblies: Thicknesses as indicated on drawings.
3. Paper-Faced Products:
    a. American Gypsum; EagleRoc Regular Gypsum Wallboard and FireBloc Type X Gypsum Wallboard.
    b. CertainTeed Corporation; ProRoc Brand Gypsum Board.
    c. CertainTeed Corporation; ProRoc Brand Abuse Resistant Gypsum Board.
    d. Georgia-Pacific Gypsum; ToughRock, ToughRock Fireguard, and ToughRock FireGuard C Gypsum Wallboard.
    e. Lafarge North America Inc; Regular Drywall and Firecheck Type X and Type C.
    f. National Gypsum Company; Gold Bond Brand Gypsum Wallboard.
    g. USG Corporation; Sheetrock Brand Gypsum Panels.
4. Mold Resistant Paper Faced Type X Products: Locate in all Mechanical rooms, Toilet rooms, Janitor and Utility closets **and behind FRP wall panels.** Refer to wall types and finish schedule and (Section 06 8316 for fiberglass panels)

**2.05 ACCESSORIES**

A. Refer to Section 07 2100 - Thermal Insulation

B. Beads, Joint Accessories, and Other Trim: ASTM C1047, rigid plastic, galvanized steel, or rolled zinc, unless noted otherwise.
1. Expansion Joints:

a. Type: V-shaped PVC with tear away fins.

C. Joint Materials: ASTM C475 and as recommended by gypsum board manufacturer for project conditions.
1. Tape: 2 inch (50 mm) wide, creased paper tape for joints and corners, except as otherwise indicated.
2. Ready-mixed vinyl-based joint compound.

D. Screws for Attachment to Steel Members Less Than 0.03 inch (0.7 mm) In Thickness, to Wood Members, and to Gypsum Board: ASTM C1002; self-piercing tapping type; cadmium-plated for exterior locations.

E. Screws for Attachment to Steel Members From 0.033 to 0.112 inch (0.8 to 2.8 mm) in Thickness: ASTM C954; steel drill screws for application of gypsum board to loadbearing steel studs.

F. Anchorage to Substrate: Tie wire, nails, screws, and other metal supports, of type and size to suit application; to rigidly secure materials in place.

G. J-Molds, Corner Beads, Misc. moldings.

H. Reveal mouldings equal to Fry. Finish as selected by architect.

**2.06 SOUND DEADENING ACOUSTICAL MATERIALS IN AND AROUND THE GENERAL AREA OF THE MUSIC ROOMS AND ADJACENT ROOMS**

A. Acoustical Decoupled Wall Studs
1. Minimum 25 gauge 2 1/2 inch steel studs, increase thickness as required per IBC and manufacturer's height requirements. Install at 16" O.C., staggered per drawings and UL Design V488.

B. Sound Isolation Clips for Stud Walls
1. Equal to Kinetics Noise Control ISOMAX Sound Isolation Clips for Walls and Ceilings. Provide on steel studs spaced vertically and horizontally as required for STC rating of 60 per manufacturer's requirements and for stabilization of gypsum board. Refer to drawings and wall types.

C. Deck Suspended Ceiling Hanger and Miscellaneous Manufacturer's Supports
1. Equal to Kinetics Noise Control KSCH Low Profile Deck-Suspended Ceiling Hanger. Refer to manufacturer's requirements for ceiling specified. Coordinate all suspended support systems with other above ceiling trades.

D. Ceiling Perimeter Tape
1. Equal to Kinetics Noise Control, install as recommended by Manufacturer.

E. Isolated Floor / Wall / Ceiling Sealant
1. Equal to Kinetics Noise Control, install as recommended by Manufacturer.

**2.07 PROVIDE STC TESTING AS REQUIRED TO VERIFY ALL REQUIREMENTS ARE MET.**

**PART 3 EXECUTION**

**3.01 EXAMINATION**

A. Verify that project conditions are appropriate for work of this section to commence.

**3.02 FRAMING INSTALLATION**

A. Metal Framing: Install in accordance with ASTM C754 and manufacturer's instructions.

B. Suspended Ceilings and Soffits: Space framing and furring members as indicated.
1. Laterally brace entire suspension system.

C. Studs: Space studs as permitted by standard.
   1. Extend partition framing to structure where indicated and to ceiling in other locations.
   2. Partitions Terminating at Ceiling: Attach ceiling runner securely to ceiling track in accordance with manufacturer's instructions.

D. Openings: Reinforce openings as required for weight of doors or operable panels, using not less than double studs at jambs.

E. Acoustic Furring: Install resilient channels at maximum 24 inches (600 mm) on center. Locate joints over framing members.

F. Blocking: Install cocealed wood blocking for support of:
   1. Wall mounted cabinets.
   2. Toilet partitions.
   3. Toilet accessories.
   4. Refer to Section 06 1000, Rough Carpentry, for additional requirements.

**3.03 BOARD INSTALLATION**

A. Comply with ASTM C840, GA-216, and manufacturer's instructions. Install to minimize butt end joints, especially in highly visible locations.

B. Single-Layer Non-Rated: Install gypsum board in most economical direction, with ends and edges occurring over firm bearing.
   1. Exception: Tapered edges to receive joint treatment at right angles to framing.

C. Double-Layer Non-Rated: Use gypsum board for first layer, placed parallel to framing or furring members, with ends and edges occurring over firm bearing. Use glass mat faced gypsum board at exterior walls and at other locations as indicated. Place second layer perpendicular to framing or furring members. Offset joints of second layer from joints of first layer.

D. Fire-Rated Construction: Install gypsum board in strict compliance with requirements of assembly listing.

E. Installation on Metal Framing: Use screws for attachment of all gypsum board except face layer of non-rated double-layer assemblies, which may be installed by means of adhesive lamination.

F. Install cementitious backer board as shown on drawings **and at all walls to receive hard tile** in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of dry-set mortar to a feather edge.

**3.04 INSTALLATION OF TRIM AND ACCESSORIES**

A. Control Joints: Place control joints consistent with lines of building spaces and as indicated.

B. Corner Beads: Install at external corners, using longest practical lengths.

**3.05 JOINT TREATMENT**

A. Paper Faced Gypsum Board: Use paper joint tape, bedded with ready-mixed vinyl-based joint compound and finished with ready-mixed vinyl-based joint compound.

B. Finish gypsum board in accordance with levels defined in ASTM C840, as follows:
   1. Level 5: Walls over ten feet high.
   2. Level 4: Walls and ceilings to receive paint finish or wall coverings, unless otherwise indicated.
   3. Level 1: Fire rated wall areas above finished ceilings, whether or not accessible in the completed construction.

C. Tape, fill, and sand exposed joints, edges, and corners to produce smooth surface ready to receive finishes.
   1. Feather coats of joint compound so that camber is maximum 1/32 inch (0.8 mm).

**3.06 TOLERANCES**

A. Maximum Variation of Finished Gypsum Board Surface from True Flatness: 1/8 inch in 10 feet (3 mm in 3 m) in any direction.

**END OF SECTION**

# SECTION 09 2953
# MULLION MATE® PLUS EXTRUDED ALUMINUM PARTITION GAP CLOSURE

## PART 1 – GENERAL

### 1.01 SECTION INCLUDES:

A. This section includes drywall accessories or noise control components featuring Mullion Mate® Plus (Against the Mullion / Against the Glass) Extruded Aluminum Partition Gap Closure, as shown on the Architectural Drawings.

B. Related sections include the following: (List applicable sections).

### 1.02 RELATED DOCUMENTS/SECTIONS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions.

B. Section 1 Specification section as it applies to work of this Section.

C. Finish Schedule or Finish Legend as it applies to work of this Section.

### 1.03 REFERENCES:

A. GENERAL
   1. Comply with applicable requirements of the following, except where more stringent requirements are indicated by building codes.

### 1.04 REFERENCE STANDARDS

A. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2026.

B. ASTM D2247 - Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity; 2015 (Reapproved 2020).

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.

D. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2023.

E. American Architectural Manufacturers Association (AAMA):
   1. AAMA 2604 – Specification for Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels

F. American Society for Testing and Materials (ASTM)
   1. ASTM D2247 Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity
   2. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials
   3. ASTM E1399/E1399M-97 Standard Test Method for Cyclic Movement and Measuring the Minimum and Maximum Joint Widths of Architectural Joint Systems
   4. ASTM E90-2016 Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.

G. National Association of Architectural Metal Manufacturers (NAAMM)
   1. Metal Finishes Manual for Architectural and Metal Products

**1.05 DESIGN/PERFORMANCE REQUIREMENTS:**

A. All components of the Mullion Mate® Plus (Against the Mullion / Against the Glass) Extruded Aluminum Partition Gap Closure shall be provided by one (1) Manufacturer to ensure single source responsibility and quality control.

B. Partition Gap Closure shall meet specified performance requirements listed in ASTM E1399/E1399M-97 for the joint width minimum and maximum dimension verification as well as the cyclic movement performance for Class IV – Combined movement which encompasses Seismic, Thermal and Wind Sway, movement at a cycling rate greater than or equal to 10 cycles per minute.

C. Sound Transmission Class (STC) for Mullion Mate® Plus (Against the Mullion / Against the Glass) Extruded Aluminum Partition Gap Closure per ASTM E90-2016. See Tables A and B for specific STC ratings.

D. All materials are Class A rated per ASTM E84.

**1.06 SUBMITTALS:**

A. Submission must be made within ten (10) working days of the General Contract Award to avoid project delay.

B. Product Data: Submit Manufacturer's:
   1. Product Specifications
   2. Detail Drawings
   3. Installation Instructions

C. Samples:
   1. Submit samples consisting of 12" long Mullion Mate® Plus (Against the Mullion / Against the Glass) Extruded Aluminum Partition Gap Closure and finish Q-Panel as specified, as well as accessories.

D. Sustainability:
   1. Materials and Resources
      a. Building Life-Cycle Impact Reduction
         1) LCAs for aluminum are available.
            (a) Aluminum - http://www.gordon-inc.com/literature/pdf/cisca_background_report_aluminum_2020-04-24.pdf
      b. Building Product Disclosure and Optimization - Environmental Product Declarations
         1) Industry-average EPDs for aluminum are available.
            (a) Aluminum - http://www.gordon-inc.com/literature/pdf/101.1_cisca_industry_wide_epd_aluminum_specialty_products.pdf
      c. Building Product Disclosure and Optimization - Sourcing of Raw Materials
         1) Regional Materials – Raw materials can be purchased from Vendors within 100 miles of the project location and fabrication of all materials in Bossier City, LA, U.S.A.
         2) Gordon's mission is to locate recycled materials that are not only of high recycled content, but extracted, produced, or extruded in the U.S.A.
      d. Building Product Disclosure and Optimization - Material Ingredients
         1) Full disclosure of material recycled content is available.
      e. Construction and Demolition Waste Management

1) Most products shipped from our plant are engineered to fit and reduce field cutting during installation.
   (a) Fewer indoor air quality problems
   (b) Less scrap and debris – cleaner work environment
   (c) Less noise pollution caused by field cutting of materials.
   (d) Maintain comfort and well-being of workers and occupants.

2. Indoor Environmental Quality
   a. Low-Emitting Materials
      1) Gordon's State-of-the-art Powder Coating line produces the highest quality powder coated surfaces while also contributing to our sustainability drive.
         (a) No heavy Metals used in pre-treatment.
         (b) Processed water is fully compliant for introducing into waste stream.
         (c) Extremely efficient use of powder coating through reclamation system reducing powder wastage.
         (d) Factory finished products shipped from our plant eliminates field painting.
            (1) Prevents odorous and irritating air contaminants.
            (2) Introduces no hazardous waste.
            (3) Contributes no VOCs.
            (4) Maintains comfort and well-being of workers and occupants.
   b. Interior Lighting
      1) Gordon's AAMA 2604 powder coating finishes can provide the proper light reflectance to improve illumination in the space and reduce lumen output requirements.
   c. Acoustic Performance
      1) Gordon's Mullion Mate® Plus (Against the Mullion / Against the Glass) Extruded Aluminum Partition Gap Closure provides STC value for transitions at the building perimeter and curtainwall.
3. Innovation
   a. Innovation
      1) Gordon is a strategic partner with the design community and continuously finds ways to design products that can aid in improving environmental performance.

E. Certification: Submit certification from Manufacturer of accessory attesting products comply with specified requirements, including finish as specified.

F. Qualification Data:
   1. Firms specified in "Quality Assurance" Article must demonstrate their capabilities and experience by including lists of completed projects with project names and addresses, names and addresses of Architects and owners, and other information specified.

**1.07 QUALITY ASSURANCE:**

A. Source Limitations:
   1. All components of the Mullion Mate® Plus (Against the Mullion / Against the Glass) Extruded Aluminum Partition Gap Closures shall be provided by a single Manufacturer to ensure responsibility and quality control.

B. Manufacturer Qualifications:
   1. Manufacturer must have manufacturing and delivery capacity required for the project and shall have successfully completed at least ten (10) projects within the past five (5) years, utilizing systems, materials, and techniques as herein specified.

2. Manufacturer must own and operate its own manufacturing facilities for all metal components. “Stick Built” or “Kit of Parts Systems” consisting of components from a variety of Manufacturers/Fabricators will not be considered or accepted.
3. Manufacturer must own and operate its own painting and finishing facility to assure single source responsibility and quality control.

C. Installer Qualifications:
1. Installers shall have a minimum of five (5) years of experience installing systems of similar type and scope as those specified in this section.

**1.08 PRODUCT DELIVERY, STORAGE AND HANDLING:**

A. All materials shall be protected during fabrication, shipment, and installation to prevent damage to the finished work from other trades.

B. To avoid lasting deformation of the Mullion Mate® Plus (Against the Mullion / Against the Glass) Extruded Aluminum Partition Gap Closure components when exposed to temperature and humidity extremes, store this material at or near room temperature. Allow a minimum of 48 hours for the product to adjust to internal room temperature and humidity conditions before installing the Mullion Mate® Plus (Against the Mullion / Against the Glass) Extruded Aluminum Partition Gap Closure.

C. Store Mullion Mate® Plus (Against the Mullion / Against the Glass) Extruded Aluminum Partition Gap Closures inside a well-ventilated area, away from uncured concrete and masonry, and protected from the weather, moisture, soiling, abrasion, extreme temperatures, and humidity.

D. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommend by Manufacturer for optimum results. Do not install products under environmental conditions outside Manufacturer’s recommendations.

E. Exercise care in loading, unloading, storing, and installing units to preclude bending, warping, twisting and other surface damage.

**1.09 WARRANTY:**

A. Standard Warranty:
1. Furnish Manufacturer’s Standard Warranty of one (1) year for workmanship and for finish against defects in materials and/or workmanship.

B. Extended Finish Warranty:
1. Furnish Manufacturer’s Standard Finish Warranty shall be extended up to a maximum of twenty (20) years from date of material shipment, when installed in accordance with Manufacturer’s recommendations.

**1.10 SUBSTITUTIONS:**

A. Substitutions are permitted for the Mullion Mate® Plus (Against the Mullion / Against the Glass) Extruded Aluminum Partition Gap Closure.Refer to 01 3000 - Adminisrative Proceedures.

B. Requests for substitutions will be considered in accordance with the provisions

**PART 2 - PRODUCTS**

**2.01 MANUFACTURERS:**

A. Basis-of-Design: Subject to compliance with requirements, provide Mullion Mate® Plus (Against the Mullion / Against the Glass) Extruded Aluminum Partition Gap Closures manufactured by Gordon, Inc. Or approved equal. For all inquiries contact:

Gordon, Inc.
5023 Hazel Jones Road
Bossier City, LA 71111
(800) 747-8954
sales@mullionmate.com

B. The listed Manufacturer shall not be construed as closing specifications to other prospective Manufacturers, but rather as establishing a level of quality in a metal system. Other systems may be submitted for approval, as provided for in the specifications at least ten (10) working days prior to submission of bids. Companies desiring to submit a proposal shall submit all descriptive information of the system proposed including photographs and Shop Drawings of at least ten (10) projects within the past five (5) years, utilizing systems, materials, and techniques as herein specified.

**2.02 MATERIALS:**

A. Provide metals free from surface blemishes where exposed to view in finished Mullion Mate® Plus (Against the Mullion / Against the Glass) Extruded Aluminum Partition Gap Closures. Surfaces exhibiting pitting, seam marks, roller marks, stains, discolorations, or other imperfections on finished Mullion Mate® Plus (Against the Mullion / Against the Glass) Extruded Aluminum Partition Gap Closures are not acceptable. All metal shall be of the highest commercial grade available.

B. Mullion Mate® Plus (Against the Mullion / Against the Glass) Extruded Aluminum Partition Gap Closures are pre-assembled, and spring-loaded to provide a tight fit for vertical junctures of partitions and window walls.

C. Materials:
   1. Aluminum extrusions: 6063-T5 or T6 temper alloy.
   2. Aluminum sheet, 3000 series alloy.

**2.03 FABRICATION:**

A. Provide Mullion Mate® Plus (Against the Mullion / Against the Glass) Extruded Aluminum Partition Gap Closures in specified lengths and size to fit specified openings.
   1. Specify Mullion Mate® Plus - 2 (Against the Mullion / Against the Glass) for openings 2” – 2-15/16”.
   2. Specify Mullion Mate® Plus - 3 (Against the Mullion / Against the Glass) for openings 3” – 3-15/16”.
   3. Specify Mullion Mate® Plus - 4 (Against the Mullion / Against the Glass) for openings 4” – 4-15/16”.
   4. Specify Mullion Mate® Plus - 5 (Against the Mullion / Against the Glass) for openings 5” – 6-15/16”.
   5. Specify Mullion Mate® Plus - 7 (Against the Mullion / Against the Glass) for openings 7” – 8-15/16”.
   6. Specify Mullion Mate® Plus - 9 (Against the Mullion / Against the Glass) for openings 9” – 13-1/2”.

B. Single-Piece construction available in lengths up to sixteen (16) feet. Spliced conditions are available in lengths up to thirty (30) feet.

C. Provide Mullion Mate® End Caps in ten (10) foot lengths and widths to fit specified wall conditions.
   1. Mullion Mate® End Caps –

a. Specify MMEC-375 for 3-3/4” walls.
b. Specify MMEC-487 for 4-7/8” walls.
c. Specify MMEC-600 for 6” walls.
d. Specify MMEC-725 for 7-1/4” walls.
e. Specify MMECBF-518 for 5-1/8” walls.
f. Specify MMECBF-514 for 5-1/4” walls.
g. Specify MMECBF-512 for 5-1/2” walls.
h. Specify MMECBF-618 for 6-1/8” walls.
i. Specify MMECBF-812 for 8-1/2” walls.
j. Specify out-to-out wall width for custom-fit applications.

**2.04 FINISHES:**

A. Comply with the National Association of Architectural Metal Manufacturers (NAAMM) “Metal Finishes Manual for Architectural and Metal Products” for recommendations relative to applying and designating finishes.

B. All material shall be in a finish chosen from one of the following options: **Match color of adjoining Storefront Mullion.**
   1. Factory applied Powder Coating to match Standard Colors or Custom Color and gloss as required.
      a. Factory finish with a 5-stage pretreatment with dried-in-place conversion coating followed by:
         1) AAMA 2604, super durable compliant powder coating, with Antimicrobial Properties, which provide up to 99.9999% anti-microbial efficacy.

**PART 3 - EXECUTION**

**3.01 EXAMINATION:**

A. Examination of Surfaces: Installer must examine conditions under which work is to be performed and must notify Contractor in writing of unsatisfactory conditions.

B. Verify that field measurements and block-out dimensions are as shown on Shop Drawings.

**3.02 PREPARATION:**

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the Manufacturer to achieve the best result for the project conditions.

**3.03 INSTALLATION:**

A. Mullion Mate® Plus (Against the Mullion / Against the Glass) Extruded Aluminum Partition Gap Closures shall be inspected before installation to be free from dents, scratches, and other defects.

B. Install Mullion Mate® Plus (Against the Mullion / Against the Glass) Extruded Aluminum Partition Gap Closures in accordance with Manufacturer’s written Installation Instructions and Details.

C. Space Enclosure: Do not install any work until space is enclosed and weatherproofed, wet-work in space is completed and nominally dry, work above ceilings is complete, and temperature and humidity shall be continuously maintained at values near those of final occupancy.

**3.04 CLEANING:**

A. Follow Manufacturer’s cleaning instructions for specified finish.

**3.05 PROTECTION:**

A. Procedures: Advise the Contractor of procedures required to protect the finished work from damage during the remainder of the construction period.

**END OF SECTION**

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# SECTION 09 2954
# MULLION MATE PRO FIRE RATED EXTRUDED ALUMINUM PARTITION GAP CLOSURE

## PART 1 – GENERAL

### 1.01 SECTION INCLUDES:

A. This section includes drywall accessories or noise control components featuring Mullion Mate® Pro FR, Fire-Rated Extruded Aluminum Partition Gap Closure, as shown on the Architectural Drawings. Or approved equal. Refer to Wall Type Plan and Life Safety Plan.

B. Related sections include the following: (List applicable sections).

### 1.02 RELATED DOCUMENTS/SECTIONS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions.

B. Division 1 Specification sections as it applies to work of this Section.

C. Finish Schedule or Finish Legend as it applies to work of this Section.

### 1.03 REFERENCES:

A. GENERAL
   1. Comply with applicable requirements of the following, except where more stringent requirements are indicated by building codes.

### 1.04 REFERENCE STANDARDS

A. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2026.

B. ASTM D2247 - Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity; 2015 (Reapproved 2020).

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.

D. ASTM E90 - Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements; 2023.

E. UL 2079 - Standard for Tests for Fire Resistance of Building Joint Systems; Current Edition, Including All Revisions.

F. American Architectural Manufacturers Association (AAMA):
   1. AAMA 2604 – Specification for Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels

G. ASTM (American Society for Testing and Materials)
   1. ASTM D2247 Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity
   2. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
   3. ASTM E1399/E1399M Standard Test Method for Cyclic Movement and Measuring the Minimum and Maximum Joint Widths of Architectural Joint Systems.
   4. ASTM E90-2016 Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements.

H. Underwriters Laboratory (UL)

1. UL 2079 Fire Resistance of Building Joint Systems

I. National Association of Architectural Metal Manufacturers (NAAMM)
1. Metal Finishes Manual for Architectural and Metal Products

**1.05 DESIGN/PERFORMANCE REQUIREMENTS:**

A. All components of the Mullion Mate® Pro FR, Fire-Rated Extruded Aluminum Partition Gap Closure shall be provided by one (1) Manufacturer to ensure single source responsibility and quality control.

B. Partition Gap Closure shall meet specified performance requirements listed in ASTM E1399/E1399M-97 for the joint width minimum and maximum dimension verification as well as the cyclic movement performance for Class IV – Combined movement which encompasses Seismic, Thermal and Wind Sway, movement at a cycling rate greater than or equal to 10 cycles per minute.

C. Sound Transmission Class (STC) for Mullion Mate® Pro FR, Fire-Rated Extruded Aluminum Partition Gap Closure per ASTM E90-2016. See Table A for specific STC ratings.
1. Table A

D. All materials are Class A rated per ASTM E84.

E. Mullion Mate® Pro FR, Fire-Rated Extruded Aluminum Partition Gap Closure passes the requirements of UL 2079 for a duration of two hours.

**1.06 SUBMITTALS:**

A. Submission must be made within ten (10) working days of the General Contract Award to avoid project delay.

B. Product Data: Submit Manufacturer's:
1. Product Specifications
2. Detail Drawings
3. Installation Instructions

C. Samples:
1. Submit samples consisting of 12" long Mullion Mate® Pro FR, Fire-Rated Extruded Aluminum Partition Gap Closure and finish Q-Panel as specified, as well as accessories.

D. Sustainability:
1. Materials and Resources
a. Building Life-Cycle Impact Reduction
1) LCAs for aluminum are available.
(a) Aluminum - http://www.gordon-inc.com/literature/pdf/cisca_background_report_aluminum_2020-04-24.pdf
b. Building Product Disclosure and Optimization - Environmental Product Declarations
1) Industry-average EPDs for aluminum are available.
(a) Aluminum - http://www.gordon-inc.com/literature/pdf/101.1_cisca_industry_wide_epd_aluminum_specialty_products.pdf
c. Building Product Disclosure and Optimization - Sourcing of Raw Materials
1) Regional Materials – Raw materials can be purchased from Vendors within 100 miles of the project location and fabrication of all materials in Bossier City, LA, U.S.A.

2) Gordon's mission is to locate recycled materials that are not only of high recycled content, but extracted, produced, or extruded in the U.S.A.

d. Building Product Disclosure and Optimization - Material Ingredients
   1) Full disclosure of material recycled content is available.

e. Construction and Demolition Waste Management
   1) Most products shipped from our plant are engineered to fit and reduce field cutting during installation.
      (a) Fewer indoor air quality problems
      (b) Less scrap and debris – cleaner work environment
      (c) Less noise pollution caused by field cutting of materials.
      (d) Maintain comfort and well-being of workers and occupants.
   2) Indoor Environmental Quality
      (a) Low-Emitting Materials
         (1) Gordon's State-of-the-art Powder Coating line produces the highest quality powder coated surfaces while also contributiing to our sustainability drive. **Match adjoining Storefront Mullions color.**
         (2) No heavy Metals used in pre-treatment.
         (3) Processed water is fully compliant for introducing into waste stream.
         (4) Extremely efficient use of powder coating through reclamation system reducing powder wastage.
      (b) Factory finished products shipped from our plant eliminates field painting.
         (1) Prevents odorous and irritating air contaminants.
         (2) Introduces no hazardous waste.
         (3) Contributes no VOCs.
         (4) Maintains comfort and well-being of workers and occupants.
      (c) Interior Lighting
         (1) Gordon's AAMA 2604 powder coating finishes can provide the proper light reflectance to improve illumination in the space and reduce lumen output requirements.
      (d) Acoustic Performance
         (1) Gordon's Mullion Mate Pro FR, Fire- Rated Extruded Aluminum Partition Gap Closure provides STC value for transitions at the building perimeter and curtainwall.
   3) Innovation
      (a) Innovation
         (1) Gordon is a strategic partner with the design community and continuously finds ways to design products that can aid in improving environmental performance.

E. Certification: Submit certification from Manufacturer of accessory attesting products comply with specified requirements, including finish as specified.

F. Qualification Data:
   1. Firms specified in "Quality Assurance" Article must demonstrate their capabilities and experience by including lists of completed projects with project names and addresses, names and addresses of Architects and owners, and other information specified.

**1.07 QUALITY ASSURANCE:**

A. Source Limitations:

1. All components of the Mullion Mate® Pro FR, Fire-Rated Extruded Aluminum Partition Gap Closures shall be provided by a single Manufacturer to ensure responsibility and quality control.

B. Manufacturer Qualifications:
1. A manufacturer must have manufacturing and delivery capacity required for the project and shall have successfully completed at least ten (10) projects within the past five (5) years, utilizing systems, materials, and techniques as herein specified.
2. A manufacturer must own and operate its own manufacturing facilities for all metal components. “Stick Built” or “Kit of Parts Systems” consisting of components from a variety of Manufacturers/Fabricators will not be considered or accepted.
3. Manufacturer must own and operate its own painting and finishing facility to assure single source responsibility and quality control.

C. Installer Qualifications:
1. Installers shall have a minimum of five (5) years of experience installing systems of similar type and scope as those specified in this section.

**1.08 PRODUCT DELIVERY, STORAGE AND HANDLING:**

A. All materials shall be protected during fabrication, shipment and installation to prevent damage to the finished work from other trades.

B. To avoid lasting deformation of the Mullion Mate® Pro FR, Fire-Rated Extruded Aluminum Partition Gap Closure components when exposed to temperature and humidity extremes, store this material at or near room temperature. Allow a minimum of 48 hours for the product to adjust to internal room temperature and humidity conditions before installing the Mullion Mate® Pro FR, Fire-Rated Extruded Aluminum Partition Gap Closure.

C. Store Mullion Mate® Pro FR, Fire-Rated Extruded Aluminum Partition Gap Closures inside a well-ventilated area, away from uncured concrete and masonry, and protected from the weather, moisture, soiling, abrasion, extreme temperatures, and humidity.

D. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommend by Manufacturer for optimum results. Do not install products under environmental conditions outside Manufacturer’s recommendations.

E. Exercise care in loading, unloading, storing, and installing units so as to preclude bending, warping, twisting and other surface damage.

**1.09 WARRANTY:**

A. Standard Warranty:
1. Furnish Manufacturer’s Standard Warranty of one (1) year for workmanship and for finish against defects in materials and/or workmanship.

B. Extended Finish Warranty:
1. Furnish Manufacturer’s Standard Finish Warranty shall be extended up to a maximum of twenty (20) years from date of material shipment, when installed in accordance with Manufacturer’s recommendations.

**1.10 SUBSTITUTIONS:**

A. Substitutions are permitted for the Mullion Mate® Pro FR, Fire-Rated Extruded Aluminum Partition Gap Closure.Refer to 01 3000 Adminisrative Proceedures.

B. Requests for substitutions will be considered in accordance with the provisions of Section 01 60 00. Companies desiring to submit a proposal shall submit all descriptive information of the system proposed including photographs and Shop Drawings of at least ten (10) projects within the past five (5) years, utilizing systems, materials and techniques as herein specified.

**PART 2 - PRODUCTS**

**2.01 MANUFACTURERS:**

A. Basis-of-Design: Subject to compliance with requirements, provide Mullion Mate® Pro FR, Fire-Rated Extruded Aluminum Partition Gap Closures manufactured by Gordon, Inc. For all inquiries contact:

Gordon, Inc.
5023 Hazel Jones Road
Bossier City, LA 71111,
(800) 747-8954
sales@mullionmate.com

B. The listed Manufacturer shall not be construed as closing specifications to other prospective Manufacturers, but rather as establishing a level of quality in a metal system. Other systems may be submitted for approval, as provided for in the specifications at least ten (10) working days prior to submission of bids. Companies desiring to submit a proposal shall submit all descriptive information of the system proposed including photographs and Shop Drawings.

**2.02 MATERIALS:**

A. Provide metals free from surface blemishes where exposed to view in finished Mullion Mate® Pro FR, Fire-Rated Extruded Aluminum Partition Gap Closures. Surfaces exhibiting pitting, seam marks, roller marks, stains, discolorations, or other imperfections on finished Mullion Mate® Pro FR, Fire-Rated Extruded Aluminum Partition Gap Closures are not acceptable. All metal shall be of the highest commercial grade available.

B. Mullion Mate® Pro FR, Fire-Rated Extruded Aluminum Partition Gap Closures are pre-assembled, and spring loaded to provide a tight fit for vertical junctures of partitions and window walls.

C. Materials:
1. Aluminum extrusions: 6063-T5 or T6 temper alloy.
2. Aluminum sheet, 3000 series alloy.

**2.03 FABRICATION:**

A. Provide Extruded Aluminum Mullion Mate® Pro FR, Fire-Rated Extruded Aluminum Partition Gap Closures in specified lengths and size to fit specified openings.
1. Specify Mullion Mate® Pro FR - 4 for openings 4” – 5 7/16”.
2. Specify Mullion Mate® Pro FR - 5.5 for openings 5 1/2”– 6 15/16”.
3. Specify Mullion Mate® Pro FR - 7 for openings 7”- 8.1/2”.

B. Single-Piece construction available in lengths up to sixteen (16) feet.

C. Provide Mullion Mate® Corner Trim in ten (10) foot lengths for field cutting.
1. Mullion Mate® Corner Trim MMFRCNRZ10

D. Intumescent/Insulation Materials Assembly
1. Refer to Manufacturer’s Installation Instructions for correct placement of Intumescent/Insulation Materials.

**2.04 FINISHES:**

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations relative to applying and designating finishes.

B. All material shall be in a finish chosen from one of the following options:
   1. Factory applied Powder Coating to match Standard Colors or Custom Color and gloss as required. Match adjoining storefront mullion color.
      a. Factory finish with a 5-stage pretreatment with dried-in-place conversion coating followed by:
         1) AAMA 2604, super durable compliant powder coating, with Antimicrobial Properties, which provide up to 99.9999% efficacy.

**PART 3 - EXECUTION**

**3.01 EXAMINATION:**

A. Examination of Surfaces: Installer must examine conditions under which work is to be performed and must notify Contractor in writing of unsatisfactory conditions.

B. Verify that field measurements and block-out dimensions are as shown on Shop Drawings.

**3.02 PREPARATION:**

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the Manufacturer to achieve the best result for the project conditions.

C. To avoid lasting deformation of the Mullion Mate® Pro FR, Fire-Rated Extruded Aluminum Partition Gap Closures components when exposed to temperature and humidity extremes, store this material at or near room temperature. Allow a minimum of 48 hours for the product to adjust to internal room temperature and humidity conditions before installing the Mullion Mate® Pro FR, Fire-Rated Extruded Aluminum Partition Gap Closures.

**3.03 INSTALLATION:**

A. General: Comply with Manufacturer's printed instructions, governing regulations for Seismic Codes, and any other regulations applicable to work.

B. Space Enclosure: Do not install any work until space is enclosed and weatherproofed, wet-work in space is completed and nominally dry, work above ceilings is complete, and temperature and humidity shall be continuously maintained at values near those of final occupancy.

**3.04 CLEANING:**

A. Follow Manufacturer's cleaning instructions for specified finish.

**3.05 PROTECTION:**

A. Procedures: Advise the Contractor of procedures required to protect the finished work from damage during the remainder of the construction period.

**END OF SECTION**

# SECTION 09 2955
# MULLION MATE® SNAP EXTRUDED ALUMINUM PARTITION GAP CLOSURE

## PART 1 – GENERAL

### 1.01 SECTION INCLUDES:

A. This section includes drywall accessories or noise control components featuring Mullion Mate® Snap Extruded Aluminum Partition Gap Closure, as shown on the Architectural Drawings.

B. Related sections include the following: (List applicable sections).

### 1.02 RELATED DOCUMENTS/SECTIONS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions.

B. Section 1 Specification sections as it applies to work of this Section.

C. Finish Schedule or Finish Legend as it applies to work of this Section.

### 1.03 REFERENCES:

A. GENERAL
   1. Comply with applicable requirements of the following, except where more stringent requirements are indicated by building codes.

### 1.04 REFERENCE STANDARDS

A. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2026.

B. ASTM D2247 - Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity; 2015 (Reapproved 2020).

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.

D. American Architectural Manufacturers Association (AAMA):
   1. AAMA 2604 – Specification for Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels

E. American Society for Testing and Materials (ASTM)
   1. ASTM D2247 Standard Practice for Testing Water Resistance of Coatings in 100% Relative Humidity
   2. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
   3. ASTM E1399/E1399M Standard Test Method for Cyclic Movement and Measuring the Minimum and Maximum Joint Widths of Architectural Joint Systems.

F. National Association of Architectural Metal Manufacturers (NAAMM)
   1. Metal Finishes Manual for Architectural and Metal Products

### 1.05 DESIGN/PERFORMANCE REQUIREMENTS:

A. All components of the Mullion Mate® Snap Extruded Aluminum Partition Gap Closure shall be provided by one (1) Manufacturer to ensure single source responsibility and quality control.

B. Partition Gap Closure shall meet specified performance requirements listed in ASTM E1399/E1399M-97 for the joint width minimum and maximum dimension verification as well as the cyclic movement performance for Class IV – Combined movement which encompasses Seismic, Thermal and Wind Sway movement at a cycling rate greater than or equal to 10 cycles per minute.

C. All materials are Class A rated per ASTM E84.

**1.06 SUBMITTALS:**

A. Submission must be made within ten (10) working days of the General Contract Award to avoid project delay.

B. Product Data: Submit Manufacturer's:
   1. Product Specifications
   2. Detail Drawings
   3. Installation Instructions

C. Samples:
   1. Submit samples consisting of 12" long Mullion Mate® Snap Extruded Aluminum Partition Gap Closure and finish Q-Panel as specified, as well as accessories.

D. Sustainability:
   1. Materials and Resources
      a. Building Life-Cycle Impact Reduction
         1) LCAs for aluminum are available.
            (a) Aluminum - http://www.gordon-inc.com/literature/pdf/cisca_background_report_aluminum_2020-04-24.pdf
      b. Building Product Disclosure and Optimization - Environmental Product Declarations
         1) Industry-average EPDs for aluminum are available.
            (a) Aluminum - http://www.gordon-inc.com/literature/pdf/101.1_cisca_industry_wide_epd_aluminum_specialty_products.pdf
      c. Building Product Disclosure and Optimization - Sourcing of Raw Materials
         1) Regional Materials – Raw materials can be purchased from Vendors within 100 miles of the project location and fabrication of all materials in Bossier City, LA, U.S.A.
            (a) Gordon's mission is to locate recycled materials that are not only of high recycled content, but extracted, produced, or extruded in the U.S.A.
      d. Building Product Disclosure and Optimization - Material Ingredients
         1) Full disclosure of material recycled content is available.
      e. Construction and Demolition Waste Management
         1) Most products shipped from our plant are engineered to fit and reduce field cutting during installation.
            (a) Fewer indoor air quality problems
            (b) Less scrap and debris – cleaner work environment
            (c) Less noise pollution caused by field cutting of materials.
            (d) Maintain comfort and well-being of workers and occupants.
   2. Indoor Environmental Quality
      a. Low-Emitting Materials

1) Gordon's State-of-the-art Powder Coating line produces the highest quality powder coated surfaces while also contributing to our sustainability drive.
   (a) No heavy Metals used in pre-treatment.
   (b) Processed water is fully compliant for introducing into waste stream.
   (c) Extremely efficient use of powder coating through reclamation system reducing powder wastage.
   (d) Factory finished products shipped from our plant eliminates field painting.
      (1) Prevents odorous and irritating air contaminants.
      (2) Introduces no hazardous waste.
      (3) Contributes no VOCs.
      (4) Maintains comfort and well-being of workers and occupants.

b. Interior Lighting
   1) Gordon's AAMA 2604 powder coating finishes can provide the proper light reflectance to improve illumination in the space and reduce lumen output requirements.

c. Acoustic Performance
   1) Gordon's Mullion Mate® provides STC value for transitions at the building perimeter and curtainwall.

3. Innovation
   a. Innovation
      1) Gordon is a strategic partner with the design community and continuously finds ways to design products that can aid in improving environmental performance.

E. Certification: Submit certification from Manufacturer of accessory attesting products comply with specified requirements, including finish as specified.

F. Qualification Data:
   1. Firms specified in "Quality Assurance" Article must demonstrate their capabilities and experience by including lists of completed projects with project names and addresses, names and addresses of Architects and owners, and other information specified.

**1.07 QUALITY ASSURANCE:**

A. Source Limitations:
   1. All components of the Mullion Mate® Snap Extruded Aluminum Partition Gap Closures shall be provided by a single Manufacturer to ensure responsibility and quality control.

B. Manufacturer Qualifications:
   1. A manufacturer must have manufacturing and delivery capacity required for the project and shall have successfully completed at least ten (10) projects within the past five (5) years, utilizing systems, materials, and techniques as herein specified.
   2. A manufacturer must own and operate its own manufacturing facilities for all metal components. "Stick Built" or "Kit of Parts Systems" consisting of components from a variety of Manufacturers/Fabricators will not be considered or accepted.
   3. Manufacturer must own and operate its own painting and finishing facility to assure single source responsibility and quality control.

C. Installer Qualifications:
   1. Installers shall have a minimum of five (5) years of experience installing systems of similar type and scope as those specified in this section.

**1.08 PRODUCT DELIVERY, STORAGE AND HANDLING:**

A. All materials shall be protected during fabrication, shipment, and installation to prevent damage to the finished work from other trades.

B. To avoid lasting deformation of the Mullion Mate® Snap Extruded Aluminum Partition Gap Closure components when exposed to temperature and humidity extremes, store this material at or near room temperature. Allow a minimum of 48 hours for the product to adjust to internal room temperature and humidity conditions before installing the Mullion Mate® Snap Extruded Aluminum Partition Gap Closure.

C. Store Mullion Mate® Snap Extruded Aluminum Partition Gap Closures inside a well-ventilated area, away from uncured concrete and masonry, and protected from the weather, moisture, soiling, abrasion, extreme temperatures, and humidity.

D. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommend by Manufacturer for optimum results. Do not install products under environmental conditions outside Manufacturer's recommendations.

E. Exercise care in loading, unloading, storing, and installing units to preclude bending, warping, twisting and other surface damage.

**1.09 WARRANTY:**

A. Standard Warranty:
   1. Furnish Manufacturer's Standard Warranty of one (1) year for workmanship and for finish against defects in materials and/or workmanship.

B. Extended Finish Warranty:
   1. Furnish Manufacturer's Standard Finish Warranty shall be extended up to a maximum of twenty (20) years from date of material shipment, when installed in accordance with Manufacturer's recommendations.

**1.10 SUBSTITUTIONS:**

A. Substitutions are permitted for the Mullion Mate® Snap Extruded Aluminum Partition Gap Closure. Refer to Section 01 3000- Adminisrtative Proceedures.

B. Requests for substitutions will be considered in accordance with the provisions of Section 01 60 00. Companies desiring to submit a proposal shall submit all descriptive information of the system proposed including photographs and Shop Drawings. of at least ten (10) projects within the past five (5) years, utilizing systems, materials and techniques as herein specified.

**PART 2 - PRODUCTS**

**2.01 MANUFACTURERS:**

A. Basis-of-Design: Subject to compliance with requirements, provide Mullion Mate® Snap Extruded Aluminum Partition Gap Closures manufactured by Gordon, Inc. Or approved equal.:

Gordon, Inc.
5023 Hazel Jones Road
Bossier City, LA 71111
(800) 747-8954
sales@mullionmate.com

B. The listed Manufacturer shall not be construed as closing specifications to other prospective Manufacturers, but rather as establishing a level of quality in a metal system. Other systems may be submitted for approval, as provided for in the specifications at least ten (10) working days prior to submission of bids. Companies desiring to submit a proposal shall submit all descriptive information of the system proposed including photographs and Shop Drawings.

**2.02 MATERIALS:**

A. Provide metals free from surface blemishes where exposed to view in finished Mullion Mate® Snap Extruded Aluminum Partition Gap Closures. Surfaces exhibiting pitting, seam marks, roller marks, stains, discolorations, or other imperfections on finished Mullion Mate® Snap Extruded Aluminum Partition Gap Closures are not acceptable. All metal shall be of the highest commercial grade available.

B. Mullion Mate® Snap Extruded Aluminum Partition Gap Closures are pre-assembled, and spring loaded to provide a tight fit for vertical junctures of partitions and window walls.

C. Materials:
   1. Aluminum extrusions: 6063-T5 or T6 temper alloy.
   2. Aluminum sheet, 3000 series alloy.

D. Aluminum extrusions: 6063-T5 or T6 temper, tensile strength 31 KSI (ASTM B 221, ASTM B 221M).

E. Accessories: None.

**2.03 FABRICATION:**

A. Provide Mullion Mate® Snap Extruded Aluminum Partition Gap Closure in specified lengths and size to fit specified openings.
   1. Specify Mullion Mate® Snap - 1 for openings 1” to 1-7/16”.
   2. Specify Mullion Mate® Snap - 1.5 for openings 1-1/2” to 2”.

B. Single-Piece construction available in lengths up to sixteen (16) feet. Spliced conditions are available in lengths up to thirty (30) feet.

C. Mullion Mate End Caps
   1. Specify MMEC-375 for 3-3/4” walls.
   2. Specify MMEC-487 for 4-7/8” walls.
   3. Specify MMEC-600 for 6’’ walls.
   4. Specify MMEC-725 for 7-1/4” walls.
   5. Specify MMECBF-518 for 5-1/8” walls.
   6. Specify MMECBF-514 for 5-1/4” walls.
   7. Specify MMECBF-512 for 5-1/2” walls.
   8. Specify MMECBF-618 for 6-1/8” walls.
   9. Specify MMECBF-812 for 8-1/2” walls.
   10. Specify out-to-out wall width for custom-fit applications.

**2.04 FINISHES:**

A. Comply with the National Association of Architectural Metal Manufacturers (NAAMM) “Metal Finishes Manual for Architectural and Metal Products” for recommendations relative to applying and designating finishes.

B. All material shall be in a finish chosen from one of the following options:
   1. Field Paintable

2. Factory Anodized
   a. Standard satin clear anodized.
   b. Custom color anodized.
3. Factory applied Powder Coating to match Standard Colors or Custom Color and gloss as required.
   a. Factory finish with a 5-stage pretreatment with dried-in-place conversion coating followed by:
      1) AAMA 2604, super durable compliant powder coating, with Antimicrobial Properties, which provide up to 99.9999% anti-microbial efficacy.

**PART 3 - EXECUTION**

**3.01 EXAMINATION:**

A. Examination of Surfaces: Installer must examine conditions under which work is to be performed and must notify Contractor in writing of unsatisfactory conditions.

B. Verify that field measurements and block-out dimensions are as shown on Shop Drawings.

**3.02 PREPARATION:**

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the Manufacturer to achieve the best result for the project conditions.

**3.03 INSTALLATION:**

A. Mullion Mate® Snap Extruded Aluminum Partition Gap Closures shall be inspected before installation to be free from dents, scratches, and other defects.

B. Install Mullion Mate® Snap Extruded Aluminum Partition Gap Closures in accordance with Manufacturer's written Installation Instructions and Details.

C. Space Enclosure: Do not install any work until space is enclosed and weatherproofed, wet-work in space is completed and nominally dry, work above ceilings is complete, and temperature and humidity shall be continuously maintained at values near those of final occupancy.

**3.04 CLEANING:**

A. Follow Manufacturer's cleaning instructions for specified finish.

**3.05 PROTECTION:**

A. Procedures: Advise the Contractor of procedures required to protect the finished work from damage during the remainder of the construction period.

**END OF SECTION**

# SECTION 09 3000
# TILING

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Porcelain Tile for floor and wall applications.

B. Ceramic Tile for wall applications.

C. Ceramic Metal Trim and transition strips.

### 1.02 RELATED REQUIREMENTS

A. Section 07 9005 - Joint Sealers.

B. Section 09 2116 - Gypsum Board Assemblies: Installation of tile on cementitious backer board.

C. Section 01 6116 - Volatile Organic Compound (VOC) restrictions

D. Section 22 1540 - Plumbing Fixtures.

E. Section 09 0561 - Common Work Results for Flooring Preparation.

### 1.03 REFERENCE STANDARDS

A. ANSI A108.1a - American National Standard Specifications for Installation of Ceramic Tile in the Wet-Set Method, with Portland Cement Mortar; 2017.

B. ANSI A108.1b - Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set, Modified Dry-Set, or Improved Modified Dry-Set Cement Mortar; 2023.

C. ANSI A108.1c - Contractor's Option: Installation of Ceramic Tile in the Wet-Set Method with Portland Cement Mortar or Installation of Ceramic Tile on a Cured Portland Cement Mortar Setting Bed with Dry-Set, Modified Dry-Set, or Improved Modified Dry-Set Cement Mortar; 2023.

D. ANSI A108.4 - American National Standard Specifications for Installation of Ceramic Tile with Organic Adhesive or Water Cleanable Tile-Setting Epoxy Adhesive; 2023.

E. ANSI A108.5 - Setting of Ceramic Tile with Dry-Set Cement Mortar, Modified Dry-Set Cement Mortar, EGP (Exterior Glue Plywood) Modified Dry-Set Cement Mortar, or Improved Modified Dry-Set Cement Mortar; 2023.

F. ANSI A108.6 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant, Water Cleanable Tile-Setting and -Grout Epoxy; 2023.

G. ANSI A108.8 - American National Standard Specifications for Installation of Ceramic Tile with Chemical Resistant Furan Resin Mortar and Grout; 1999 (Reaffirmed 2024).

H. ANSI A108.9 - American National Standard Specifications for Installation of Ceramic Tile with Modified Epoxy Emulsion Mortar/Grout; 2023.

I. ANSI A108.10 - American National Standard Specifications for Installation of Grout in Tilework; 2017 (Reaffirmed 2022).

J. ANSI A108.12 - Installation of Ceramic Tile with EGP (Exterior Glue Plywood) Modified Dry-Set Mortar; 2023.

K. ANSI A108.13 - American National Standard for Installation of Load Bearing, Bonded, Waterproof Membranes for Thin-Set Ceramic Tile and Dimension Stone; 2005 (Reaffirmed 2021).

L. ANSI A108/A118/A136.1 - Specifications for the Installation of Ceramic Tile; 2020.

M. ANSI A108/A118/A136.1 - Specifications for the Installation of Ceramic Tile; 2020.

N. ANSI A118.3 - American National Standard Specifications for Chemical Resistant, Water Cleanable Tile-Setting and -Grouting Epoxy and Water Cleanable Tile-Setting Epoxy Adhesive; 2013 (Revised).

O. ANSI A118.10 - American National Standard Specifications for Load Bearing, Bonded, Waterproof Membranes For Thin-Set Ceramic Tile And Dimension Stone Installation; 2014.

P. TCNA (HB) - Handbook for Ceramic, Glass, and Stone Tile Installation; 2026.

**1.04 ADMINISTRATIVE REQUIREMENTS**

A. Preinstallation Meeting: Convene a preinstallation meeting one week before starting work of this section; require attendance by all affected installers.

**1.05 SUBMITTALS**

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturers' data sheets on tile, mortar, grout, and accessories. Include instructions for using grouts and adhesives.

C. Maintenance Data: Include recommended cleaning methods, cleaning materials, stain removal methods, and polishes and waxes.

D. Provide physical tile samples to Architect for approval.

E. Provide physical grout samples to Architect for approval.

**1.06 QUALITY ASSURANCE**

A. Maintain one copy of and ANSI A108/A118/A136.1 and TCNA (HB) on site.

B. Manufacturer Qualifications: Company specializing in manufacturing the types of products specified in this section, with minimum 5 years of documented experience.

C. Installer Qualifications: Company specializing in performing tile installation, with minimum of 5 years of documented experience.

**1.07 MOCK-UP**

A. See Section 01 4000 - Quality Requirements, for general requirements for mock-up.

B. Construct tile mock-up, incorporating all components specified for the location.
   1. Minimum size of mock-up is 100 S.F. and should include transitions of patterns/colors as selected by Architect.

**PART 2 PRODUCTS**

**2.01 TILE - REFER TO FINISH SCHEDULE AND FINISH LEGEND ON DRAWINGS FOR MORE DETAILS AND SPECIFIC FINISHES**

**2.02 SETTING MATERIALS**

**2.03 MORTAR MATERIALS**

A. Manufacturers:
   1. Bonsal American, Inc: www.prospec.com (or equal)
   2. Bostik Inc: www.bostik-us.com.
   3. Custom Building Products: www.custombuildingproducts.com.
   4. **Latticrete 4XLT polymer fortified, Basis of Design.** Follow all manufacturer's installation and safety instructions.
   5. Substitutions: See Section 01 6000 - Product Requirements.

### 2.04 GROUTS

A. Manufacturers:
   1. Bonsal American, Inc: www.prospec.com
   2. Bostik Inc: www.bostik-us.com/#sle.
   3. Custom Building Product; www.custombuildingproducts.com/#sle.
   4. **LATICRETE; LATICRETE SPECTRALOCK PRO Premium Grout:** Follow all manufacturer's installation and safety instructions. Provide proper ventilation in installation area(s) to accomplish all safety concerns. www.laticrete.com/#sle. **Basis of Design**
   5. Custom Building Products: www.custombuildingproducts.com.
   6. Substitutions: See Section 01 6000 - Product Requirements.
   7. Mapei

B. Epoxy Grout: non sage, ANSI A118.3, ISO 13007-3 RG and EN 13888 RG, anti microbial, grout joints from 1/16" to 1/2" , grout joint width per tile manufacturer's recomendations.
   1. Colors: To be selected by Architect from manufacturer's standard range of 40 colors.

### 2.05 THIN-SET ACCESSORY MATERIALS

A. Waterproofing Membrane at Floors: Specifically designed for bonding to cementitious substrate under thick mortar bed or thin-set tile; complying with ANSI A118.10.
   1. Type: Fluid-applied.
   2. Material: **Laticrete 9235** with manufacturer's fiber mesh at all corners, drains. intersections, and plumbing fixtures. Follow all manufacturer's installation and safety instructions. Other products must be approved by addendum prior to the bid. Latticrte hydro ban is not accepted. Turn waterproofing up 6" vertical at all tiled walls.
      a. ASTM C627 Robinson Floor Test
      b. UL GREENGUARD GOLD certified

B. Mesh Tape: Wide fiberglass mesh tape by waterproof manufacturer.

C. Aluminum wall outside corner trim and floor transition trim equal to schluter, refer to drawings for additional requirements.
   1. Provide aluminum trim as follows:
   2. Outside tile-to-tile corners at walls and vertical surfaces
   3. Top of tile walls to gypsum board transition
   4. Where tile floors meet non-tile floors
   5. Color selected by Architect from standard manufacturers color
   6. Submit samples of each aluminum trim piece profile to be used
   7. All aluminum trim is not shown on the drawings. Provide aluminum trim where it is shown on drawings but also provide in all locations noted in this addendum.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify that sub-floor surfaces are smooth and flat within the tolerances specified for that type of work and are ready to receive tile.

B. Verify that wall surfaces are smooth and flat within the tolerances specified for that type of work, are dust-free, and are ready to receive tile.

C. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of setting materials to sub-floor surfaces.

D. Verify that concrete sub-floor surfaces are ready for tile installation by testing for moisture emission rate and alkalinity; obtain instructions if test results are not within limits recommended by tile manufacturer and setting materials manufacturer.

E. Verify that required floor-mounted utilities are in correct location.

**3.02 PREPARATION**

A. Protect surrounding work from damage.

B. Vacuum clean surfaces and damp clean.

C. Seal substrate surface cracks with filler. Level existing substrate surfaces to acceptable flatness tolerances.

D. Install backer board in accordance with ANSI A108.11> ANSI A108/A118/A136.1 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of setting material to a feather edge. Refer to Section 09 2900

E. Install cementitious backer board in accordance with ANSI A108.11 and board manufacturer's instructions. Tape joints and corners, cover with skim coat of dry-set mortar to a feather edge.

**3.03 INSTALLATION - GENERAL**

A. Install tile and thresholds and grout in accordance with applicable requirements of ANSI A108.1a thru A108.13, manufacturer's instructions, and TCNA (HB) recommendations.

B. Lay tile to pattern indicated. Do not interrupt tile pattern through openings.

C. Cut and fit tile to penetrations through tile, leaving sealant joint space. Form corners and bases neatly. Align floor joints.

D. Place tile joints uniform in width, subject to variance in tolerance allowed in tile size. Make grout joints without voids, cracks, excess mortar or excess grout, or too little grout.

E. Form internal angles square and external angles bullnosed.

F. Install thresholds where indicated.

G. Sound tile after setting. Replace hollow sounding units.

H. Keep expansion joints free of adhesive or grout. Apply sealant to joints. Sealant to match grout color.

I. Allow tile to set for a minimum of 48 hours prior to grouting or more if recommended by manufacturer.

J. Grout tile joints.

K. Apply sealant to junction of tile and dissimilar materials and junction of dissimilar planes.

**3.04 INSTALLATION - FLOORS - THIN-SET METHODS - ALL TILE FLOOR AREAS UNLESS NOTED OTHERWISE**

A. Over concrete substrate install the following in accordance with Tile Council of America.
   1. Waterproof membrane at all tiled floors and turn waterproofing up walls 6" vertically.
   2. Mortar Bed.
   3. Tile as shown on finish schedule.
   4. Epoxy Grout.
   5. Cleaning.

**3.05 INSTALLATION - WALL TILE ON CEMENTIOUS BACKER BOARD ON METAL STUDS**

A. Cementious backer board as specified in Section 09 2116.

B. Mortar Bed.
C. Tile as shown on Finish Schedule.
D. Epoxy Grout.
E. Cleaning

**3.06 INSTALLATION - WALL TILE ON CONCRETE MASONRY UNITS**

A. Mortar Bed
B. Tile as shown on finish schedule
C. Epoxy Grout
D. Cleaning
   1. Clean tile and grout surfaces.
E. PROTECTION:
   1. Do not permit traffic over finished floor surface for 4 days after installation.
F. SCHEDULE:
   1. Refer to drawings for the locations of tile, the type of tile, and the patterns of tile.

**END OF SECTION**

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# SECTION 09 5100
# ACOUSTICAL CEILINGS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Suspended metal grid ceiling system.

B. Acoustical Ceiling Tile Units.

### 1.02 RELATED REQUIREMENTS

A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 05 3100 - Steel Decking: Placement of special anchors or inserts for suspension system.

C. Section 07 2100 - Thermal Insulation: Acoustical insulation.

D. Section 21 1300 - Fire-Suppression Sprinkler Systems: Sprinkler heads in ceiling system.

E. Section 26 5100 - Interior Lighting: Light fixtures in ceiling system.

F. Section 28 4600 - Fire Detection and Alarm: Fire alarm components in ceiling system.

G. Applicable sections from Divisions 21, 23, & 26.

### 1.03 REFERENCE STANDARDS

A. ASTM C635/C635M - Standard Specification for the Manufacture, Performance, and Testing of Metal Suspension Systems for Acoustical Tile and Lay-in Panel Ceilings; 2017.

B. ASTM C636/C636M - Standard Practice for Installation of Metal Ceiling Suspension Systems for Acoustical Tile and Lay-In Panels; 2019 (Reapproved 2025).

C. ASTM E580/E580M - Standard Practice for Installation of Ceiling Suspension Systems for Acoustical Tile and Lay-in Panels in Areas Subject to Earthquake Ground Motions; 2024a.

D. ASTM E1264 - Standard Classification for Acoustical Ceiling Products; 2019.

E. NFPA 286 - Standard Methods of Fire Tests for Evaluating Contribution of Wall and Ceiling Interior Finish to Room Fire Growth; 2024.

F. UL (FRD) - Fire Resistance Directory; Current Edition.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate grid layout and related dimensioning, junctions with other ceiling finishes, and mechanical and electrical items installed in the ceiling.

C. Product Data: Provide data on suspension system components and acoustical units.

D. Samples: Submit two full size samples illustrating material and finish of acoustical units.

E. Manufacturer's Installation Instructions: Indicate special procedures and perimeter conditions requiring special attention.

F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. Extra Acoustical Units: Quantity equal to 5 percent of total installed.

### 1.05 QUALITY ASSURANCE

A. Suspension System Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

B. Acoustical Unit Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

**1.06 FIELD CONDITIONS**

A. Maintain uniform temperature of minimum 60 degrees F (16 degrees C), and maximum humidity of 40 percent prior to, during, and after acoustical unit installation.

**PART 2 PRODUCTS**

**2.01 ACOUSTICAL UNITS - SEE FINISH SCHEDULE**

A. Acoustical Panels **(ACT-1)**
   1. Surface Texture: Smooth Texture
   2. Composition: Mineral Fiber
   3. Color: See finish schedule.
   4. Size: 24 in x 24 in
   5. Edge Profile: Square Tegular
   6. Noise Reduction Coefficient (NRC) ASTM C 423 Classified w/ UL label on product carton 0.85
   7. Ceiling Attenuation Class (CAC): ASTM C 1414; Classified with UL label on product carton: 35
   8. Articulation Class (AC): ASTM E 1111; Classified with UL label on product carton: 170
   9. Flame Spread: ASTM E 1264; Class A
   10. Light Reflectance (LR) White Panel: ASTM E 1477; 0.85
   11. Dimensional Stability: HumiGuard Plus
   12. Recycle Content: Up to 76% total recycled content. (Total recycled content: pre-consumer, post-consumer and post-industrial)
   13. Material Ingredient Transparency: Health Product Declaration (HPD); Declare Label
   14. Life Cycle Assessment: Third Party Certified Environment Product Declaration (EPD)
   15. Acceptable Product: **Calla as manufactured by Armstrong World Industries or approved equal**
   16. Exposed Steel Suspension System - **15/16" Prelude XL or approved equal.**

B. Acoustical Panels **(ACT-2)**
   1. Size: 24 by 24 inches (600 by 600 mm); 1/2" thick.
   2. Sound Attenuation (CAC): 35
   3. Light Reflectance: 0.77
   4. Edge Profile: Square
   5. Color: See finish schedule.
   6. Acceptable Product: **USG 3260 Vinyl Faced Sheetrock Brand Lay-In Gypsum Ceiling Panels with ClimaPlus Performance. or approved equal**
   7. Suspension System: Square Edge , Flat White 15/16" wide **DXL grid , Class A or approved equal.**

**2.02 SUSPENSION SYSTEM(S)**

A. Suspension Systems - Main beams and cross tees, base metal and end detail, fabricated from commercial quality hot dipped galvanized steel complying with ASTM A 653. Main beams and cross tees are double-web steel construction exposed flange design. Exposed surfaces chemically cleansed, capping prefinished galvanized steel in baked polyester paint. Main beams and cross tees shall have rotary stitching.
   1. Structural Classification: ASTM C 635 Intermediate or Heavy Duty.
   2. Color: Refer to finish schedule.

3. Sustainability: Environmental Product Declaration (EPD), Health Product Declaration (HPD)

B. Exposed Steel Suspension System Type 1: Formed steel, commercial quality cold rolled; heavy-duty.
   1. Profile: Tee; 15/16 inch (24 mm) wide face.
   2. Finish: Refer to finish schedule.
   3. Product: Equal to Armstong Prelude XL 15/16"
   4. Attachment Devices: Size for five times design load indicated in ASTM C 635, Table 1, Direct Hung unless otherwise indicated.

**2.03 ACCESSORIES**

A. Support Channels and Hangers: Galvanized steel; size and type to suit application, seismic requirements, and ceiling system flatness requirement specified.

B. Perimeter Moldings: Same material and finish as grid.
   1. At Exposed Grid type I: Provide L-shaped molding for mounting at same elevation as face of grid.
   2. At Exposed Grid Type II, Provide L-shaped molding for mounting at same elevation as face of grid.
      a. Where indicated on the drawings, provide manufacturer's standard cloud trim. Product to be equal to the Axiom Formations Floating Clouds as manufacturered by Armstrong.
      b. Where indicated on the drawings, provide manufacturer's standard perimeter extension. Product to be equal to the Axiom Perimeter Extension as manufacturered by Armstrong.

C. Touch-up Paint: Type and color to match acoustical and grid units.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

A. Verify existing conditions before starting work.

B. Verify that layout of hangers will not interfere with other work.

**3.02 INSTALLATION - SUSPENSION SYSTEM**

A. Install suspension system in accordance with ASTM C 636/C 636M, ASTM E 580/E 580M, ASTM C 636/C 636M, ASTM E 580/E 580M, ASTM C 636/C 636M, and ASTM E 580/E 580M and as supplemented in this section.

B. Rigidly secure system, including integral mechanical and electrical components, for maximum deflection of 1:360.

C. Lay out system to a balanced grid design with edge units no less than 50 percent of acoustical unit size.

D. Install after major above-ceiling work is complete. Coordinate the location of hangers with other work.

E. Hang suspension system independent of walls, columns, ducts, pipes and conduit. Where carrying members are spliced, avoid visible displacement of face plane of adjacent members.

F. Where ducts or other equipment prevent the regular spacing of hangers, reinforce the nearest affected hangers and related carrying channels to span the extra distance.

G. Do not support components on main runners or cross runners if weight causes total dead load to exceed deflection capability.

H. Support fixture loads using supplementary hangers located within 6 inches (150 mm) of each corner, or support components independently.

I. Do not eccentrically load system or induce rotation of runners.

J. Perimeter Molding: Install at intersection of ceiling and vertical surfaces and at junctions with other interruptions.
   1. Use longest practical lengths.
   2. Miter corners.

K. Coordinate with mechanical, plumbing and electrical.

L. Coordinate installation with Food Service hood manufacturer - provider.

**3.03 INSTALLATION - ACOUSTICAL UNITS**

A. Install acoustical units in accordance with manufacturer's instructions.

B. Fit acoustical units in place, free from damaged edges or other defects detrimental to appearance and function.

C. Fit border trim neatly against abutting surfaces.

D. Install units after above-ceiling work is complete.

E. Install acoustical units level, in uniform plane, and free from twist, warp, and dents.

F. Cutting Acoustical Units:
   1. Cut to fit irregular grid and perimeter edge trim.
   2. Make field cut edges of same profile as factory edges.

G. Where round obstructions occur, provide preformed closures to match perimeter molding.

H. Install hold-down clips on panels within 20 ft (6 m) of an exterior door.

**3.04 TOLERANCES**

A. Maximum Variation from Flat and Level Surface: 1/8 inch in 10 feet (3 mm in 3 m).

B. Maximum Variation from Plumb of Grid Members Caused by Eccentric Loads: 2 degrees.

**END OF SECTION**

# SECTION 09 6501
# RESILIENT STAIR TREADS

## RESILIENT STAIR TREADS

## PART 1 - GENERAL

### 1.01 REFERENCE STANDARDS

A. ASTM D3389 - Standard Test Method for Coated Fabrics Abrasion Resistance (Rotary Platform Abrader); 2015.

B. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2021.

C. ASTM F2169 - Standard Specification for Resilient Stair Treads; 2015 (Reapproved 2020).

D. ISO 9001 - Quality management systems -- Requirements; 2015.

E. ISO 14001 - Environmental Management Systems — Requirements with Guidance for Use; 2026.

### 1.02 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this section of the specifications.

### 1.03 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials, and equipment necessary to complete the work of this section, including but not limited to the following:
   1. Resilient stair treads (one-piece nosing, tread, and riser).
   2. Resilient stair accessories.
   3. Substrate preparation.

B. Related Work: The following items are not included in this section and are specified under the designated sections:
   1. CAST-IN-PLACE CONCRETE for concrete substrate; slab surface tolerances; vapor retarder for applications on or below grade; requirement for 83/90-degree riser and tread edge angle for stair tread and nosings.
   2. METAL STAIRS AND RAILINGS; requirement for 83/90-degree riser and tread edge angle for stair tread and nosings.
   3. ROUGH CARPENTRY for plywood substrate and surface tolerances.
   4. Section 09 0561 - Common Work Results for Flooring Preparation

C. References (Industry Standards):
   1. American Association of Textile Chemists and Colorists (AATCC):
      a. AATCC 134 Electrostatic Propensity of Carpets
   2. American National Standards Institute (ANSI):
      a. AASI ESD S997.2 Floor Materials and Footwear – Voltage Measurement on a Person
   3. ASTM International (ASTM):
      a. **ASTM C518 -** Standard Test Method for Steady State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
      b. **ASTM D412 -** Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers – Tension

c. **ASTM D2047 -** tandard Test Method for Static Coefficient of Friction of Polish-Coated Floor Surfaces as Measured by the James Machine
d. **ASTM D2240 -** Standard Test Method for Rubber Property – Durometer Hardness
e. **ASTM D3389 -** Standard Test Method for Coated Fabrics Abrasion Resistance (Rotary Platform, Double Head Abrader)
f. **ASTM D6499** - Standard Test Method for the Immunological Measurement of Antigenic Protein in Natural Rubber and its Products
g. **ASTM E84** - Standard Test Method for Surface Burning Characteristics of Building Materials
h. **ASTM E648** - Standard Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source
i. **ASTM E662** - Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials
j. **ASTM E1745** - Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs
k. **ASTM E2179** - Standard Test Method for Laboratory Measurement of the Effectiveness of Floor Coverings in Reducing Impact Sound Transmission Through Concrete Floors
l. **ASTM 2180** - Standard Test Method for Determining the Activity of Incorporated Antimicrobial Agent(s) in Polymeric or Hydrophobic Materials
m. **ASTM F150** - Standard Test Method for Electrical Resistance of Conductive and Static Dissipative Resilient Flooring
n. **ASTM F155** - Method of Test for Temper of Strip and Sheet Metals for Electronic Devices
o. **ASTM F386** - Standard Test Method for Thickness of Resilient Flooring Materials Having Flat Surfaces
p. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
q. **ASTM F925** - Standard Test Method for Resistance to Chemicals of Resilient Flooring
r. **ASTM F970** - Standard Test Method for Static Load Limit
s. **ASTM F1344** - tandard Specification for Rubber Floor Tile
t. **ASTM F1482** - Standard Practice for Installation and Preparation of Panel Type Underlayments to Receive Resilient Flooring
u. **ASTM F1514** - Standard Test Method for Measuring Heat Stability of Resilient Flooring by Color
v. **ASTM F1515 -** Standard Test Method for Measuring Light Stability of Resilient Flooring by Color Change
w. **ASTM F1859** - Standard Specification for Rubber Sheet Floor Covering Without Backing
x. **ASTM F1860** - Standard Specification for Rubber Sheet Floor Covering with Backing
y. **ASTM F1861** - Standard Specification for Resilient Wall Base
z. **ASTM F2055** - Standard Test Method for Size and Squareness of Resilient Floor Tile by Dial Gage Method
aa. **ASTM F2169** - Standard Specification for Resilient Stair Treads
bb. **ASTM F2170** - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes
cc. **ASTM F2199** - Standard Test Method for Determining Dimensional Stability of Resilient Floor Tile after Exposure to Heat

dd. **ASTM F2753** - Standard Practice to Evaluate the Effect of Dynamic Rolling Load over Resilient Floor Covering System
ee. **ASTM F3010** - Standard Practice for Two-Component Resin Based Membrane-Forming Moisture Mitigation Systems for Use Under Resilient Floor Coverings
ff. **ASTM G21** - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi

4. European Norm (FTM):
   a. **FTM 101 C 4046** - Static Decay
5. International Organization for Standardization (ISO):
   a. **ISO 10140-3** - Measurement of sound insulation in buildings and of building elements
   b. **ISO 26987** - Determination of staining and resistance to chemicals
6. National Fire Protection Association (NFPA):
   a. **NFPA 253** - Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Energy Source
   b. **NFPA 258** - Test Method for Specific Density of Smoke Generated by Solid Materials
7. Standards Council of Canada (SCC):
   a. **CAN/ULC-S102.2** - Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies

## 1.04 SUBMITTALS

A. Product Data: Submit manufacturer's product data, installation instructions and maintenance guidelines for each material and accessory proposed for use.

B. Samples: Submit three representative samples of each product specified for verification.

## 1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Provide resilient flooring manufactured by a firm with a minimum of 10 years' experience with resilient flooring of type equivalent to those specified.
   1. Manufacturer's quality management system must have ISO 9001:2000 approval.
   2. Provide resilient flooring products and accessories from one manufacturer to ensure compatibility.
   3. Manufacturer shall be capable of providing technical training and technical field service representation.

B. Installer Qualifications: Acceptable to manufacturer of resilient flooring or INSTALL (International Standards & Training Alliance) resilient certified for the requirements of the project with a minimum of 4 years' experience with resilient flooring of type equivalent to those specified.
   a. It is recommended to have a minimum of one installer per working party with the ability to provide proof of current credentials at request.
   b. Has obtained and maintained current credentials from manufacturer's training program.
   c. Installers shall be able to exhibit proficient skills with flash cove detailing, both hot and cold-welding techniques, adhesives, specialty adhesive systems and seam cutting.
   d. The installing parties shall provide a submittal of their skills in the form of mock-ups of the specified material. These mock-ups will be accepted as proof of their skills and benchmarking for the proposed project.

C. Sustainable Design Requirements:
   1. ISO 14001 Environmental Management Systems certification.

2. Construction waste take back program for the purpose of reducing jobsite waste by taking back uninstalled waste flooring. Details of the nora® program are available at www.nora.com.
3. Flooring surfaces that are easily cleaned and do not require coatings, stripping, or use of chemicals that may be hazardous to human health.
4. Supply all required products that are CA 01350 compliant.
5. Flooring that contains no polyvinyl chloride or phthalate plasticizers.
6. Flooring that contains no halogenated polymers.
7. Flooring that contains no asbestos.

### 1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in labeled packages. Store and handle in strict compliance with manufacturer's recommendations. Protect from damage due to weather, excessive temperatures, and construction operations.

B. Deliver materials sufficiently in advance of installation to condition materials to the required temperature for 48-hours prior to installation.

### 1.07 PROJECT CONDITIONS

A. The installation area must be fully enclosed, weather tight, and climate controlled between 63°F and 75°F and 40% to 60% ambient relative humidity (RH) for at least 48 hours prior, during and 72 hours after installation (do not use gas fueled blowers). Dew point must be avoided. The substrate must be at least 5°F above dew point to be considered acceptable.

### 1.08 WARRANTY

A. Provide 15 year manufacturer’s standard warranty for wear, defect, bond, and conductivity.

## PART 2 - PRODUCTS

### 2.01 ACCEPTABLE MANUFACTURER

A. Basis-of-Design: nora systems, Inc., 9 Northeastern Blvd., Salem, NH 03079; telephone 800-332-NORA or 603-894-1021; fax 603-894-6615.

### 2.02 RESILIENT STAIRTREADS (ONE-PIECE NOSING TREAD AND RISER)

A. SEE RBST-1 ON FINISH SCHEDULE

B. Rubber Stair Treads:

| | | |
|---|---|---|
| 1. | **Basis of Design Product:** | norament® aragoTM stairtreads, Articles 3170 (4 foot), 3171 (5 foot) and 3172 (6 foot) (visually impaired strips available) |
| 2. | ASTM Specification: ASTM F2169 Standard Specification for Resilient Stair Treads | Type TS, Class 2, can be Group 1 and/or 2 and Grade 2 |
| 3. | Limited Wear Warranty: | 15 years |
| 4. | Material: | nora vulcanized rubber compound 926 with environmentally compatible color pigments that are free of toxic heavy metals like lead, cadmium, or mercury |
| 5. | Composition: | Homogeneous |
| 6. | Color: | See finish schedule |

| | | |
|---|---|---|
| 7. | Surface: | Relief structure and smooth |
| 8. | Back of Stair Tread: | Double-sanded smooth |
| 9. | Material Dimensions (ASTM F2169):<br><br>Length<br><br>Depth<br><br>Height<br><br>Thickness | <br><br>50.59 inches (1285mm), 63.54 inches (1614mm) and 78.89 inches (2004mm)<br><br>19.88 inches (505mm)<br><br>1.77 inches (45mm)<br><br>0.20 inches (5.0mm) |
| 10. | Flammability (E648/((NFPA 253))):<br>≥ 0.45 watts/sq. cm for Class 1 is required | NBSIR 75 950, 0.92 |
| 11. | Smoke Density (((ASTM E662))/NFPA 258):<br>< 450 is required | NBS, 267 (flaming) and 130 (non-flaming) |
| 12. | Burn Resistance: | Resistant to cigarette and solder burns |
| 13. | Slip Resistance (((ASTM D2047))):<br>≥ 0.5 is required | Static coefficient of friction, Neolite dry 0.81, Neolite wet 0.87 |
| 14. | Bacteria Resistance (((ASTM E2180))/((ASTM G21))): | Resistant to bacteria, fungi, and micro-organism activity |
| 15. | Indoor Air Quality: | Greenguard Gold Certified for low VOC emissions in compliance with CDPH 01350 |
| 16. | Carbon: | 3rd party verified carbon neutral throughout their entire life cycle through the Interface Carbon Neutral FloorsTM program. Learn more at www.interface.com/carbonneutral. |
| 17. | Latex Allergies (ASTM D6499): | Inhibition ELISA, results are below detection level |
| 18. | Hardness (((ASTM D2240))):<br>≥ 70 is required | Shore type “A”, 82 achieved |
| 19. | Static Load (((ASTM F970))):<br>≤ 0.005 inches with 250 lbs. is required | Residual compression of 0.005 inches with 800 lbs. |
| 20. | Abrasion Resistance (((ASTM D3389))): | 1.1 lbs. (500g) load on H-18 wheel with 1000 cycles, 0.006 oz. (0.16g) weight |

| | | |
|---|---|---|
| | ≤ 0.035 oz. (1.0g) is required | loss |
| 21. | Oil & Grease Resistance (EN/ISO 26987): | Yes |
| 22. | Heat Resistance (ASTM F1514): Avg. ΔE ≤ 8.0 is required | Easily achieved with all batches and regular maintenance |
| 23. | Static Generation (AATCC 134): | < 1000 Volts at 20% RH |
| 24. | Cleaning: | Cleaned and maintained effectively using water, nora pads and a suitable cleaning machine, without the use of any factory and/or field-applied coatings. **Also, without using any chemicals that may be hazardous or containing any teratogenic, mutagenic or any other ingredients known to be carcinogenic. Refer to nora Maintenance Guidelines for product specific details.** |
| 25. | Shine: | Higher shine achieved by buffing without any artificial topical applied coatings. |
| 26. | Stain Removal: | Samples of the product must be provided for stain removal testing by the owner. Sample size must be 24 inches by 24 inches, pre-cleaned by manufacture per published recommendations. Samples must have no coatings, sealers, floor finish or other manually or mechanically applied finish on the surface of the product. Stain testing must consist of application of common healthcare related disinfectants and chemicals to include, but not limited to, Betadine, Methylene Blue, Silver Nitrate, and alcohol-based hand sanitizer. Duration of test period must be no less than one week. Removal of chemicals must be in accordance with manufacturers published cleaning and maintenance recommendations. |
| 27. | Substrate Preparation: | Per ASTM F710 and the nora Installation Instructions |

## PART 3 - GENERAL

### 3.01 GENERAL CONTRACTOR RESPONSIBILITIES

A. Supply a safe, climate-controlled building and subfloor as detailed in the nora Installation Instructions (available at www.nora.com)

B. A subfloor that meets the requirements of ASTM F710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring is required, or as detailed in the nora Installation Instructions or nora nTx Installation Instructions as appropriate.

C. A secure storage area that is fully enclosed, weather tight, and climate controlled between 63°F and 75°F and 40% to 60% ambient relative humidity (RH) for at least 48-hours prior and during the installation, so the flooring contractor can acclimate all materials.

D. An installation area that is fully enclosed, weather tight, and climate controlled between 63°F and 75° and 40% to 60% ambient relative humidity (RH) for at least 48-hours prior, during, and 72-hours after installation (do not use gas fueled blowers). If this is not possible, contact the nora Technical Department.

E. Areas with direct prolonged exposure to sunlight should be protected with the use of Low E glass doors, windows or facades that reduce the UV transmissions to less than 1%.

F. Areas of the flooring subjected to direct sunlight, for example through doors or windows, must be covered using blind, curtains, cardboard, or similar materials for 24-hours before, during, and for a period of 72-hours after the installation to allow nora “wet” adhesives to cure. Do not allow traffic when using wet set adhesives for a minimum of 12-hours and prohibit rolling loads for 72-hours. When using nora® nTxTM or nora dryfixTM, the flooring can be trafficked immediately with no restrictions. All flooring must be protected from damage during construction operations using Masonite, plywood, or a similar product. Before laying the panels, the flooring surface must be free of all debris. Lay panels so that they are edge to edge and tape the joints to prevent movement and debris entrapment. Inspect the flooring before covering and after removal for final acceptance.

G. Conduct post-installation cleaning after 72-hours for wet set adhesives. Conduct post-installation cleaning immediately for installations using nora dryfix or nora nTx. Refer to the appropriate nora Maintenance Guidelines for product specific details.

### 3.02 FLOORING CONTRACTOR RESPONSIBILITES

A. Provide trained installers that have at least one of the following:
   1. Approved by specified manufacturer (nora systems, Inc.) or INSTALL (International Standards & Training Alliance) certified for the requirements of the project.
   2. It is recommended to have a minimum of one installer per working party with the ability to provide proof of current credentials at request.
   3. An effective installation manager to manage the project, installers, and ensure that all the required procedures are followed as detailed in the nora Installation Instructions (available at www.nora.com).

B. Follow all requirements in the appropriate nora Installation Instructions or nora nTx Installation Instructions.

**END OF SECTION**

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# SECTION 09 6502
# RUBBER FLOORING

## PART 1 - GENERAL

### 1.01 REFERENCE STANDARDS

A. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2021.

B. ASTM F1344 - Standard Specification for Rubber Floor Tile; 2021a.

C. ISO 9001 - Quality management systems -- Requirements; 2015.

D. ISO 14001 - Environmental Management Systems — Requirements with Guidance for Use; 2026.

### 1.02 GENERAL PROVISIONS

A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

### 1.03 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials, and equipment necessary to complete the work of this Section, including but not limited to the following:
   1. Resilient tile flooring for commercial traffic.
   2. Resilient tile flooring for electrostatic dissipative protection.
   3. Substrate preparation.

B. Related Work: The following items are not included in this Section and are specified under the designated Sections:
   1. CAST-IN-PLACE CONCRETE for concrete substrate; slab surface tolerances; vapor retarder for applications on or below grade; requirement for 83/90-degree riser and tread edge angle for stair tread and nosings.
   2. METAL STAIRS AND RAILINGS; requirement for 83/90-degree riser and tread edge angle for stair tread and nosings.
   3. ROUGH CARPENTRY for plywood substrate and surface tolerances.
   4. ACCESS FLOORING for resilient floor covering for access panels.
   5. Section 09 0561 - Common Work Results for Flooring Preparation

C. References (Industry Standards):
   1. American Association of Textile Chemists and Colorists (AATCC):
      a. **AATCC 134** - Electrostatic Propensity of Carpets
   2. American National Standards Institute (ANSI):
      a. **ANSI ESD S97.2** - Floor Materials and Footwear – Voltage Measurement on a Person
   3. ASTM International (ASTM):
      a. **ASTM C518** - Standard Test Method for Steady State Thermal Transmission Properties by Means of the Heat Flow Meter Apparatus
      b. **ASTM D412** - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers – Tension
      c. **ASTM D2047** - Standard Test Method for Static Coefficient of Friction of Polish-Coated Floor Surfaces as Measured by the James Machine
      d. **ASTM D2240** - Standard Test Method for Rubber Property – Durometer Hardness

e. **ASTM D3389** - Standard Test Method for Coated Fabrics Abrasion Resistance (Rotary Platform, Double Head Abrader)
f. **ASTM D6499** - Standard Test Method for the Immunological Measurement of Antigenic Protein in Natural Rubber and its Products
g. **ASTM E84** - Standard Test Method for Surface Burning Characteristics of Building Materials
h. **ASTM E648** - Standard Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source
i. **ASTM E662** - Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials
j. **ASTM E1745** - Standard Specification for Water Vapor Retarders Used in Contact with Soil or Granular Fill under Concrete Slabs
k. **ASTM E2179** - Standard Test Method for Laboratory Measurement of the Effectiveness of Floor Coverings in Reducing Impact Sound Transmission Through Concrete Floors
l. **ASTM E2180** - Standard Test Method for Determining the Activity of Incorporated Antimicrobial Agent(s) in Polymeric or Hydrophobic Materials
m. **ASTM F150** - Standard Test Method for Electrical Resistance of Conductive and Static Dissipative Resilient Flooring
n. **ASTM F155** - Method of Test for Temper of Strip and Sheet Metals for Electronic Devices
o. **ASTM F386** - Standard Test Method for Thickness of Resilient Flooring Materials Having Flat Surfaces
p. **ASTM - F710** - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring
q. **ASTM F925** - Standard Test Method for Resistance to Chemicals of Resilient Flooring
r. **ASTM F970** - Standard Test Method for Static Load Limit
s. **ASTM F1344** - Standard Specification for Rubber Floor Tile
t. **ASTM F1482** - Standard Practice for Installation and Preparation of Panel Type Underlayments to Receive Resilient Flooring
u. **ASTM F1514** - Standard Test Method for Measuring Heat Stability of Resilient Flooring by Color
v. **ASTM F1515** - Standard Test Method for Measuring Light Stability of Resilient Flooring by Color Change
w. **ASTM F1859** - Standard Specification for Rubber Sheet Floor Covering Without Backing
x. **ASTM F1860** - Standard Specification for Rubber Sheet Floor Covering with Backing
y. **ASTM F1861** - Standard Specification for Resilient Wall Base
z. **ASTM F2055** - Standard Test Method for Size and Squareness of Resilient Floor Tile by Dial Gage Method
aa. **ASTM F2169** - Standard Specification for Resilient Stair Treads
bb. **ASTM F2170** - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes
cc. **ASTM F2199** - Standard Test Method for Determining Dimensional Stability of Resilient Floor Tile after Exposure to Heat
dd. **ASTM F2753** - Standard Practice to Evaluate the Effect of Dynamic Rolling Load over Resilient Floor Covering System

ee. **ASTM F3010** - Standard Practice for Two-Component Resin Based Membrane-Forming Moisture Mitigation Systems for Use Under Resilient Floor Coverings
ff. **ASTM G21** - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi

4. European Norm (FTM):
   a. **FTM 101 C 4046** - Static Decay
5. International Organization for Standardization (ISO):
   a. **ISO 10140-3** - Measurement of sound insulation in buildings and of building elements
   b. **ISO 26987** - Determination of staining and resistance to chemicals
6. National Fire Protection Association (NFPA):
   a. **NFPA 253** - Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Energy Source
   b. **NFPA 258** - Test Method for Specific Density of Smoke Generated by Solid Materials
7. Standards Council of Canada (SCC):
   a. **CAN/ULC-S102.2** - Standard Method of Test for Surface Burning Characteristics of Flooring, Floor Coverings, and Miscellaneous Materials and Assemblies

## 1.04 SUBMITTALS

A. Product Data: Submit manufacturer's product data, installation instructions and maintenance guidelines for each material and accessory proposed for use.

B. Samples: Submit three representative samples of each product specified for verification.

## 1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Provide resilient flooring manufactured by a firm with a minimum of 10 years' experience with resilient flooring of type equivalent to those specified.
   1. Manufacturer's quality management system must have ISO 9001:2000 approval.
   2. Provide resilient flooring products and accessories from one manufacturer to ensure compatibility.
   3. Manufacturer shall be capable of providing technical training and technical field service representation.

B. Installer Qualifications: Acceptable to manufacturer of resilient flooring or INSTALL (International Standards & Training Alliance) resilient certified for the requirements of the project with a minimum of 4 years' experience with resilient flooring of type equivalent to those specified.
   a. It is recommended to have a minimum of one installer per working party with the ability to provide proof of current credentials at request.
   b. Has obtained and maintained current credentials from manufacturer's training program.
   c. Installers shall be able to exhibit proficient skills with flash cove detailing, both hot and cold-welding techniques, adhesives, specialty adhesive systems and seam cutting.
   d. The installing parties shall provide a submittal of their skills in the form of mock-ups of the specified material. These mock-ups will be accepted as proof of their skills and benchmarking for the proposed project.

## 1.06 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in labeled packages. Store and handle in strict compliance with manufacturer's recommendations. Protect from damage due to weather, excessive temperatures, and construction operations.

B. Deliver materials sufficiently in advance of installation to condition materials to the required temperature for 48-hours prior to installation.

### 1.07 PROJECT CONDITIONS

A. The installation area must be fully enclosed, weather tight, and climate controlled between 63°F and 75°F and 40% to 60% ambient relative humidity (RH) for at least 48 hours prior, during and 72 hours after installation (do not use gas fueled blowers). Dew point must be avoided. The substrate must be at least 5°F above dew point to be considered acceptable.

### 1.08 WARRANTY

A. Provide manufacturer's standard limited warranty for wear, defect, bond, and conductivity.

## PART 2 - PRODUCTS

### 2.01 ACCEPTABLE MANUFACTURER

A. Basis-of-Design: nora systems, Inc., 9 Northeastern Blvd., Salem, NH 03079; telephone 800-332-NORA or 603-894-1021; fax 603-894-6615.

### 2.02 RESILIENT TILE FLOORING FOR COMMERCIAL TRAFFIC

A. SEE RF-1 ON FINISH SCHEDULE

B. Rubber Floor Tile:

| | | |
|---|---|---|
| 1. | **Basis of Design Product:** | norament® aragoTM, Article 3118 |
| 2. | ASTM Specification: ASTM F1344 Standard Specification for Rubber Floor Tile | Type IB and Grade 2 |
| 3. | Limited Wear Warranty: | 15 years |
| 4. | Material: | nora vulcanized rubber compound 926 with environmentally compatible color pigments that are free of toxic heavy metals like lead, cadmium, or mercury |
| 5. | Composition: | Homogeneous rubber compound with a random scattered design |
| 6. | Color: | See finish schedule |
| 7. | Surface: | Relief structure |
| 8. | Back of Tile: | Double-sanded smooth |
| 9. | Material Size (((ASTM F2055))): ± 0.02 inches (± 0.5mm) by ± 0.018 inch (± 0.45mm) is required | 39.53 inches by 19.76 inches (1004mm by 502mm) |
| 10. | Squareness (((ASTM F2055))): ± 0.010 inches (± 0.254mm) is required | Meets requirements |
| 11. | Thickness (((ASTM F386))): | 0.14 inches (3.5mm) |

| | | |
|---|---|---|
| | + 0.015/-0.005 inches (+ 0.381/- 0.127mm) is required | |
| 12. | Dimensional Stability (ASTM F2199):<br>≤ 0.15% in both directions is required | Meets requirements |
| 13. | Flammability (E648/((NFPA 253))):<br>≥ 0.45 watts/sq. cm for Class 1 is required | NBSIR 75 950, 0.92 |
| 14. | Smoke Density (((ASTM E662))/NFPA 258):<br>< 450 is required | NBS, 267 (flaming) and 130 (non-flaming) |
| 15. | Surface Burning (((CAN/ULC-S102.2))): | FSC1 of 75 and SD of 470 |
| 16. | Burn Resistance: | Resistant to cigarette and solder burns |
| 17. | Slip Resistance (((ASTM D2047))):<br>≥ 0.5 is required | Static coefficient of friction, Neolite dry 0.81, Neolite wet 0.87 |
| 18. | Bacteria Resistance (((ASTM E2180))/((ASTM G21))): | Resistant to bacteria, fungi, and micro-organism activity |
| 19. | Indoor Air Quality: | Greenguard Gold Certified for low VOC emissions in compliance with CDPH 01350 |
| 20. | Carbon: | 3rd party verified carbon neutral throughout their entire life cycle through the Interface Carbon Neutral FloorsTM program. Learn more at www.interface.com/carbonneutral. |
| 21. | Latex Allergies (ASTM D6499): | Inhibition ELISA, results are below detection level |
| 22. | Sound Absorption (((ASTM E2179))/ISO 10140-3): | $\Delta$ IIC 15, $\Delta$ Lw 10dB (compare only $\Delta$ values) |
| 23. | Hardness (((ASTM D2240))):<br>≥ 70 is required | Shore type “A”, 82 |
| 24. | Static Load (((ASTM F970))):<br>≤ 0.005 inches with 250 lbs. is required | Residual compression of 0.004 inches with 800 lbs. |
| 25. | Rolling Load Limit (ASTM F2753): | ≤ 850 lbs. / sq. inch; for forklift traffic nora polyurethane adhesive is required |

| | | |
|---|---|---|
| 26. | Abrasion Resistance (((ASTM D3389))): ≤ 0.035 oz. (1.0g) is required | 1.1 lbs. (500g) load on H-18 wheel with 1000 cycles, 0.008 oz. (0.24g) weight loss |
| 27. | Oil & Grease Resistance (EN/ISO 26987): | Yes |
| 28. | Heat Resistance (ASTM F1514): Avg. ∆E ≤ 8.0 is required | Easily achieved with all batches and regular maintenance |
| 29. | Static Generation (AATCC 134): | < 1000 Volts at 20% RH |
| 30. | Thermal Transmission (((ASTM C518))): | R-value of -0.90 |
| 31. | Cleaning: | Cleaned and maintained effectively using water, nora pads and a suitable cleaning machine, without the use of any factory and/or field-applied coatings. Also, without using any chemicals that may be hazardous or containing any teratogenic, mutagenic or any other ingredients known to be carcinogenic. Refer to nora Maintenance Guidelines for product specific details. |
| 32. | Stain Removal: | Samples of the product must be provided for stain removal testing by the owner. Sample size should be ~ 1 m2, pre-cleaned by manufacture per published recommendations. Samples must have no coatings, sealers, floor finish or other manually or mechanically applied finish on the surface of the product. Stain testing must consist of application of common healthcare related disinfectants and chemicals to include, but not limited to, Betadine, Methylene Blue, Silver Nitrate, and alcohol-based hand sanitizer. Duration of test period must be no less than one week. Removal of chemicals must be in accordance with manufacturers published cleaning and maintenance recommendations. |
| 33. | Substrate Preparation: | Per ASTM F710 and the nora Installation Instructions |

## PART 3 - GENERAL

### 3.01 GENERAL CONTRACTOR RESPONSIBILITIES

A. Supply a safe, climate-controlled building and subfloor as detailed in the nora Installation Instructions (available at www.nora.com)

B. A subfloor that meets the requirements of ASTM F710 Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring is required, or as detailed in the nora Installation Instructions or nora nTx Installation Instructions as appropriate.

C. A secure storage area that is fully enclosed, weather tight, and climate controlled between 63°F and 75°F and 40% to 60% ambient relative humidity (RH) for at least 48-hours prior and during the installation, so the flooring contractor can acclimate all materials.

D. An installation area that is fully enclosed, weather tight, and climate controlled between 63°F and 75° and 40% to 60% ambient relative humidity (RH) for at least 48-hours prior, during, and 72-hours after installation (do not use gas fueled blowers). If this is not possible, contact the nora Technical Department.

E. Areas with direct prolonged exposure to sunlight should be protected with the use of Low E glass doors, windows or facades that reduce the UV transmissions to less than 1%.

F. Areas of the flooring subjected to direct sunlight, for example through doors or windows, must be covered using blind, curtains, cardboard, or similar materials for 24-hours before, during, and for a period of 72-hours after the installation to allow nora “wet” adhesives to cure. Do not allow traffic when using wet set adhesives for a minimum of 12-hours and prohibit rolling loads for 72-hours. When using nora® nTxTM or nora dryfixTM, the flooring can be trafficked immediately with no restrictions. All flooring must be protected from damage during construction operations using Masonite, plywood, or a similar product. Before laying the panels, the flooring surface must be free of all debris. Lay panels so that they are edge to edge and tape the joints to prevent movement and debris entrapment. Inspect the flooring before covering and after removal for final acceptance.

G. Conduct post-installation cleaning after 72-hours for wet set adhesives. Conduct post-installation cleaning immediately for installations using nora dryfix or nora nTx. Refer to the appropriate nora Maintenance Guidelines for product specific details.

### 3.02 FLOORING CONTRACTOR RESPONSIBILITES

A. Provide trained installers that have at least one of the following:
   1. Approved by specified manufacturer (nora systems, Inc.) or INSTALL (International Standards & Training Alliance) certified for the requirements of the project.
   2. It is recommended to have a minimum of one installer per working party with the ability to provide proof of current credentials at request.
   3. An effective installation manager to manage the project, installers, and ensure that all the required procedures are followed as detailed in the nora Installation Instructions (available at www.nora.com).

B. Follow all requirements in the appropriate nora Installation Instructions or nora nTx Installation Instructions.

**END OF SECTION**

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# SECTION 09 6513
# RESILIENT BASE

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Resilient base.

B. Resilient transition trim.

### 1.02 RELATED REQUIREMENTS

A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 03 3000 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors to receive adhesive-applied resilient flooring.

C. Section 09 0561 - Common Work Results for Flooring Preparation: Removal of existing floor coverings, cleaning, and preparation.

### 1.03 REFERENCE STANDARDS

A. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2021.

B. ASTM F1913 - Standard Specification for Vinyl Sheet Floor Covering Without Backing; 2019.

C. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.

D. ASTM E662 - Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials; 2013b.

E. ASTM F137 - Standard Test Method for Flexibility of Resilient Flooring; 2011

F. ASTM F1514 - Standard Test Method for Measuring Heat Stability for Color Change; 2003 (Reapproved 2008)

G. ASTM F1515 - Standard Test Method for Measuring Light Stability of Resieleint Flooring by Color Change; 2003 (Reapproved 2008)

H. ASTM F1914 - Standard Test Method for Short-Term Indention and Residual Indention of Resileint FLoor Covering; 2007 (Reapproved 2011)

I. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anydrous Calcium Chloride; 2011

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate seaming plans and floor patterns.

C. Verification Samples: Submit two samples, 12 by 12 inch (___ by ___ mm) in size illustrating color and pattern for each resilient flooring product specified.

D. Concrete Subfloor Test Report: Submit a copy of the moisture and alkalinity (pH) test reports. See Specification 09 0561.

E. Maintenance Data: Include maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning, stripping, and re-waxing.

F. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.
   2. Extra Materials/ Attic Stock: Quantity equivalent to 3 percent of each type and color.

### 1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in installing specified flooring with minimum three years documented experience.

### 1.06 DELIVERY, STORAGE, AND HANDLING

A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and the correct style, color, quantity and run numbers.

B. Store all materials off of the floor in an acclimatized, weather-tight space.

C. Maintain temperature in storage area between 55 degrees F (13 degrees C) and 90 degrees F (72 degrees C).

D. Protect roll materials from damage by storing on end.

E. Do not double stack pallets.

### 1.07 FIELD CONDITIONS

A. Maintain ambient temperatures as recommeded by the manufacturer but not less than 65 degrees or more than 85 degrees.

B. Maintain the ambient relative humidity between 40-60% during installation.

## PART 2 PRODUCTS

### 2.01 RESILIENT BASE - SEE FINISH SCHEDULE

A. **Traditional Rubber Resilient Base: ASTM F1861, Type TS rubber, vulcanized thermoset; top set Style B, Cove.**
   1. **See RB-1 on finish schedule.**
   2. Manufacturers:
      a. Burke Flooring; Commercial Wall Base - TS: www.burkeflooring.com/#sle.
      b. Johnsonite, a Tarkett Company; _____: www.johnsonite.com/#sle. Basis of Design.
      c. Roppe Corp; _____: www.roppe.com/#sle.
      d. Length: Roll.
      e. Color: See Finish Schedule
      f. Accessories: Premolded external corners and internal corners.
      g. Style: Cove (with top-set toe).
      h. Height: See finish schedule.

B. **Artisanal Rubber Resilient Base: - ASTM F1861, Type TS rubber, vulcanized thermoset**
   1. **See RB-2 and RB-3 on finish schedule.**
   2. Manufacturers:
      a. Burke Flooring; Commercial Wall Base - TS: www.burkeflooring.com/#sle.
      b. Johnsonite, a Tarkett Company; _____: www.johnsonite.com/#sle. **Basis of Design.**
      c. Roppe Corp; _____: www.roppe.com/#sle.
      d. Length: 8' pieces .
      e. Top Edge: 45 degree angular top.
      f. Surface Reveal: 7/32 inch wide.
      g. Pieces per carton: 8 (64 feet per carton, 58 lbs pe carton).
      h. Height: See finish schedule.
      i. Accepted product: Millwork Finishing System by Tarkett, Reveal 6 inches.
      j. Color: See finish schedule.

k. Profile: See finish schedule.

**2.02 MOLDINGS, TRANSITION AND EDGE STRIPS:**

A. Manufacturers:
1. Burke Flooring; Mercer Vinyl Mouldings: www.burkeflooring.com/#sle.
2. Johnsonite - Basis of Design.
3. Substitutions: See Section 01 6000 - Product Requirements.

B. Flooring Transition Material - equal to Tarkett Metal Edge - **See RB-4 on finish schedule.** Provide where LVT and Rubber flooring Meets and at other appropriate locations.
1. Static Coefficient of Friction (ASTM D2047) ≥ 08
2. Hardness (ASTM D2240)85 SHORE A
3. Resistance to Heat (ASTM F1514) ≤ 8
4. Residual Indentation (ASTM F1914) False
5. Flammability (ASTM E648) CLASS 1
6. Smoke Density (ASTM E662) LT450
7. Warranty - 5 years

**PART 3 EXECUTION**

**3.01 EXAMINATION**

A. Verify that surfaces are flat to tolerances acceptable to flooring manufacturer, free of cracks that might telegraph through flooring, clean, dry, and free of curing compounds, surface hardeners, and other chemicals that might interfere with bonding of flooring to substrate.

B. Cementitious Subfloor Surfaces: Verify that substrates are ready for resilient flooring installation by testing for moisture and alkalinity (pH).
1. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive manufacturer.

C. **Flooring manufacturers to give architect written approval that substrate is acceptable prior to commencing with any floor installation. This shall not add any cost to the owner or time to the contract schedule.**

D. Refer to paragraph 1.03 References for floor substrate testing.

E. Surface cracks, grooves, depressions, control joints or other non-moving joints, and other irregularities shall be filled or smoothed with patching or underlayment compound recommended by the resilient flooring manufacturer and for job conditions for filling or smoothing, or both. The flooring contractor shall include these cost in their bid.
1. Obtain instructions if test results are not within limits recommended by resilient flooring manufacturer and adhesive materials manufacturer.

**3.02 INSTALLATION - GENERAL**

A. Starting installation constitutes acceptance of subfloor conditions.

B. Install in accordance with manufacturer's written instructions.

**3.03 INSTALLATION - RESILIENT BASE**

A. Fit joints tightly and make vertical. Maintain minimum dimension of 18 inches (45 mm) between joints.

B. Install base on solid backing. Bond tightly to wall and floor surfaces.

**3.04 CLEANING**

A. Remove excess adhesive from floor, base, and wall surfaces without damage.

B. Clean in accordance with manufacturer's written instructions.

**3.05 PROTECTION**

A. Prohibit traffic on resilient flooring for 48 hours after installation.

B. No heavy traffic, rolling loads or furniture for 72 hours after installation.

**END OF SECTION**

# SECTION 09 6519
# RESILIENT TILE FLOORING

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Resilient tile flooring.

B. Installation accessories:
   1. Adhesives.
   2. Finishes and cleaners.

### 1.02 RELATED REQUIREMENTS

A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions: SCS FloorScore certification documentation.

B. Section 01 7419 - Construction Waste Management and Disposal.

C. Section 03 3000 Cast in Place Concrete

D. Section 07 9200 - Joint Sealants.

E. Section 09 0561 Common Work Results from Flooring Prep

### 1.03 REFERENCE STANDARDS

A. ASTM D2047 - Standard Test Method for Static Coefficient of Friction of Polish-Coated Flooring Surfaces as Measured by the James Machine; 2011.

B. ASTM E662 - Standard Test Method for Specific Optical Density of Smoke Generated by Solid Materials; 2015a.

C. ASTM F137 - Standard Test Method for Flexibility of Resilient Flooring Materials with Cylindrical Mandrel Apparatus; 2008 (Reapproved 2013).

D. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2021.

E. ASTM F970 - Standard Test Method for Measuring Recovery Properties of Floor Coverings after Static Loading; 2017.

F. ASTM F1514 - Standard Test Method for Measuring Heat Stability of Resilient Flooring by Color Change; 2003 (Reapproved 2013).

G. ASTM F1515 - Standard Test Method for Measuring Light Stability of Resilient Flooring by Color Change; 2003 (Reapproved 2008).

H. ASTM F1700 - Standard Specification for Solid Vinyl Floor Tile; 2020.

I. ASTM F1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride; 2016a.

J. ASTM F1914 - Standard Test Method for Short-Term Indentation and Residual Indentation of Resilient Floor Covering; 2007 (Reapproved 2011).

K. ASTM F2170 - Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs Using in situ Probes; 2019a.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Manufacturer's documentation for flooring and accessories:
   1. Technical Data.

2. Installation and Maintenance.
3. Warranty.

C. Verification Samples: Submit two samples, 6 by 30 inch (____ by ____ mm) in size illustrating color and pattern for each resilient flooring product specified.

D. Verification Samples: Submit two samples, full size, illustrating color and pattern for each resilient flooring product specified.

**1.05 DELIVERY, STORAGE, AND HANDLING**

A. Upon receipt, immediately remove any shrink-wrap and check materials for damage and that the material is of the correct style, color, quantity and run number(s).

B. Store all materials flat and off of the floor in an acclimatized, weather-tight space between 65 to 85 degrees F (18 to 29 degrees C).

C. Do not double stack pallets.

**1.06 FIELD CONDITIONS**

A. Acclimate material at jobsite between 65 to 85 degrees F (18 to 29 degrees C) and 35 percent to 85 percent relative humidity for 48 hours prior to installation. Temperature and relative humidity should also be maintained at the same levels during installation, and after installation.

B. Spread unopened cartons no more than 6 cartons high and at least 4 inches (101 mm) apart.

C. Keep away from heating and cooling ducts and direct sunlight.

D. If permanent HVAC is not operational, temporary means should be used to maintain the recommended temperature and relative humidity levels.

E. Close areas to traffic during installation of flooring and accessories.

**1.07 QUALITY ASSURANCE**

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. Installer Qualifications: Should only be installed by professional flooring mechanics that have demonstrated successful installations of jobs in similar size and scope.

**1.08 WARRANTY**

A. Manufacturer's 10-Year Limited Commercial Warranty for Luxury Vinyl Flooring

**PART 2 PRODUCTS**

**2.01 RESILIENT TILE FLOORING**

A. Luxury Vinyl Flooring: Refer to finish schedule for **LVT-1 & LVT-2 for Basis of Design**.
   1. Pattern: See finish schedule.
   2. Color: See finish schedule.
   3. Physical Properties:
      a. Construction: Phthalate-free solid plank and tile made from 100 percent virgin vinyl.
      b. Edge Treatment: Square Edge
      c. Wear Layer Thickness: 30 mil
      d. Total Thickness (Gauge): min. 3.0 mm
      e. Finish: Techtonic
      f. Meets ASTM F1700, Class III, Type B performance
      g. Static Coefficient of Friction (ASTM D2047): SCOF ≥ 0.5
      h. Fire Resistance (ASTM E648): CRF ≥ 0.45 watts/cm2 NFPA, Class I

i. Color/Texture: See Finish Schedule

4. Manufacturing, Performance, and Safety Standards:
   a. ASTM F1700, Classification: Class III
   b. ASTM F1914, Residual Indentation: Meets requirements.
   c. ASTM F137, Flexibility: Meets requirements.
   d. ASTM F1514, Resistance to Heat: Meets requirements.
   e. ASTM F1515, Resistance to Light: Meets requirements.
   f. ASTM E662, Smoke Density (Flaming and Non-Flaming): Passes requirements.
   g. ASTM D2047, Coefficient of Friction (Dry): Greater than or equal to 0.65
   h. ASTM F970, Static Load Limit: 250 psi

B. Moldings, Transition and Edge Strips: See dwgs for transtion details.

C. Adhesive and Adhesive Encapsulators: As recommended by flooring manufacturer.

D. Finishes and Cleaners: As recommended by flooring manufacturer.

**PART 3 EXECUTION**

**3.01 EXAMINATION _____**

A. Install flooring and accessories after other operations (including painting) have been completed.

B. Acceptance of Conditions: Carefully examine all installation areas with installer/applicator present, for compliance with requirements affecting work performance.
   1. Verify that field measurements, product, adhesives, substrates, surfaces, structural support, tolerances, levelness, temperature, humidity, moisture content level, pH, cleanliness and other conditions are as required by the manufacturer, and ready to receive work.

C. Verify that substrate is contaminant-free, including old adhesives and any chemicals.

D. Test substrates as required by manufacturer to verify proper conditions exist.
   1. Concrete:
      a. Check for concrete additives such as fly ash, curing compounds, hardeners, or other surface treatments that may prevent proper bonding of floor coverings.
      b. Moisture testing: Perform either the In-Situ Relative Humidity (RH) test (ASTM F2170) or Moisture Vapor Emission Rate (MVER) test (ASTM F1869). Refer to the Manufacturer's Installation Guide/Manual for the maximum allowable substrate moisture content. Substrates above the maximum allowable moisture content will require a moisture mitigation system.
      c. Perform alkalinity testing to verify pH level is between 5 to 9 per ASTM F710.

E. Verify that required floor-mounted utilities are in correct location.

**3.02 PREPARATION**

A. Prior to installation, the flooring installer should plan and attend an on-site construction meeting with the General Contractor, Architect and Property Owner to review all requirements and inspect site conditions as outlined in the manufacturer's installation document, as well as to review the requirements of ASTM F710 and any relevant building codes, or local, state, or national regulations.

B. Flooring installation should not begin until all site conditions have been assessed, testing has been completed and subfloor conditions have been approved.

C. Prepare per manufacturer's written instructions, Section 01 7000, and as follows:
   1. Prepare substrates to ensure proper adhesion of Luxury Vinyl Plank and Tile Flooring.

2. Concrete Substrates: Prepare substrate per ASTM F710.
   a. Verify that subfloor is clean, flat, smooth, free of dirt, rust, paint, oil, wax or any contaminant that will interfere with adhesive bonding.
   b. Mechanically remove substrate coatings that are not compatible with adhesives, such as sealers, curing, hardening or parting compounds, soap, wax, oil, etc.
      1) Do not use solvents or adhesive removers.
   c. Expansion joints, isolation joints, or other moving joints must be honored and must not be filled with underlayment products or other materials, and floor coverings must not be laid over them. Expansion joint covering systems should be detailed by the architect or engineer, and based upon intended usage and aesthetic considerations.
   d. Surface cracks, grooves, depressions, control joints or other non-moving joints, and other irregularities shall be filled or smoothed with high-quality Portland cement or calcium aluminate based patching or underlayment compound for filling or smoothing, or both.
      1) Do not skim-coat large areas with patching compound, especially slick power-troweled surfaces.
      2) Sand smooth per manufacturer's instructions.
   e. Slick surfaces such as power-troweled concrete shall be profiled as needed to allow for a mechanical bond between the adhesive and subfloor.
   f. Do not use gypsum-based underlayment products and do not skim coat concrete subfloors.
   g. Self-Leveling Underlayments: Provide a dry and smoothly-sanded underlayment substrate ready for installation of Luxury Vinyl Plank Underlayment compound shall be moisture-resistant, mildew-resistant, and alkali-resistant and must have a minimum of 3,000 psi compressive strength per ASTM C109/C109M prior to installation of underlayment provide architect with written approval by flooring manufacturer citing all specified warranties will be in affect.
   h. Lightweight concrete shall have a compressive strength greater than 90 pounds per cubic foot with minimum compression strength of 2,500 psi or greater.
3. Existing and Other Substrates:
   a. Refer to manufacturer's professional installation guide and/or contact manufacturer, as special conditions may exist.

**3.03 INSTALLATION**

A. Installation per manufacturer's written instructions, Section 01 7000, and as follows:
   1. Layout shall be specified by Architect, Designer or End User.
   2. Follow layout and ensure installation reference lines are square.
   3. Field tiles shall be installed with directional arrows on back aligned in the same direction, or may be installed in quarter-turned fashion.
   4. Check cartons for and do not mix dye lots.
   5. Expansion Joints: Locate expansion, isolation, and other moving joints prior to installation.
      a. Do not fill expansion, isolation, and other moving joints with patching compound nor cover with resilient flooring.
      b. Install movement joint systems per manufacturer's instructions.
   6. Adhesives: Adhere flooring to substrate using the full spread method resulting in a completed installation without gaps, voids, raised edges, bubbles or any other surface imperfections.
      a. Select appropriate adhesive, trowel and follow manufacturer's instructions.

b. Periodically spot-check transfer of adhesive to back of tile during installation.
c. Roll floor with a 100 pound roller to ensure proper transfer of adhesive and bonding.
d. Protect floor from traffic per manufacturer's instructions.
e. Do not wet mop floor until the adhesive has properly set per written instructions.

**3.04 FIELD QUALTITY CONTROL**

A. Site tests and inspections per Section 01 4000 and as follows:
1. Inspect flooring installation for non-conforming work including (but not limited to) the following:
a. Lack of adhesion.
b. Bubbles, loose tiles or raised edges.
c. Dirt and debris underneath flooring.
d. Excessive gaps.
e. Improper substrate preparation (as indicated by telegraphing).
f. Damage to tiles, including: dents/indentations, cuts, cracks, burns or punctures.

B. Non-conforming work per General Conditions and as follows:
1. Repair or replace damaged material if not acceptable to the Architect.

**3.05 CLEANING**

A. Waste Management per Section 01 7000 and as follows:
1. Coordinate material reclamation program with manufacturer, if applicable.
a. Store and return cartons and pallets to manufacturer or recycler for reuse or recycling.

B. Provide progress cleaning per manufacturer's written instructions, Section 01 7000, and as follows:
1. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the work.
a. Clean and protect completed construction until Date of Substantial Completion.
b. During installation, remove wet adhesive from surface of flooring per manufacturer's instructions.
2. Site: Maintain project site free of waste materials and debris.

C. Provide final cleaning immediately prior to Date of Substantial Completion inspection per manufacturer's written instructions and Section 01 7000 and 01 7800
1. Protection: Remove manufacturer's and other installed protection immediately prior to Date of Substantial Completion inspection, unless required otherwise.
2. Clean floor with a neutral 6-8 pH cleaner or as recommended by manufacturer.

**3.06 MAINTENANCE**

A. Initial maintenance per flooring manufacturer’s written instructions.

**3.07 PROTECTION**

A. Protect materials from construction operations until Date of Substantial Completion or Owner occupancy, whichever occurs first.
1. Protect finished floor from abuse and damage by using heavy non-staining kraft paper, drop cloths or equivalent. Use additional, non-damaging protective materials as needed.
2. Light foot traffic on a newly installed floor can be permitted after 24 hours.
3. Keep heavy traffic and rolling loads off the newly installed LVT flooring for 48 hours.
4. Protect the floor from rolling loads by covering with protective boards.

**END OF SECTION**

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# SECTION 09 6813
# TILE CARPETING

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Carpet tile, Adhered per written instructions of manufacturer.

### 1.02 RELATED REQUIREMENTS

A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 01 60 00 Product Requirements

C. Section 03 3000 - Cast-in-Place Concrete: Restrictions on curing compounds for concrete slabs and floors.

D. Division 26: Electrical floor boxes with carpet inserts.

E. Section 09 0561 Common Work Results from Flooring Prep

### 1.03 REFERENCE STANDARDS

A. ASTM D2859 - Standard Test Method for Ignition Characteristics of Finished Textile Floor Covering Materials; 2016 (Reapproved 2021).

B. ASTM E648 - Standard Test Method for Critical Radiant Flux of Floor-Covering Systems Using a Radiant Heat Energy Source; 2025a.

C. ASTM F710 - Standard Practice for Preparing Concrete Floors to Receive Resilient Flooring; 2021.

D. CRI 104 - Standard for Installation of Commercial Carpet; 2018.

E. CRI (CIS) - Carpet Installation Standard; Carpet and Rug Institute; 2011.

F. CRI (GLP) - Green Label Plus Testing Program - Certified Products; Current Edition.

G. NFPA 253 - Standard Method of Test for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source; 2023.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on specified products, describing physical and performance characteristics; sizes, patterns, colors available, and method of installation.

C. Shop Drawings: Indicate layout of joints.

D. Samples: Submit two carpet tiles illustrating color and pattern design for each carpet color selected.

E. Manufacturer's written Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention, and ____.

F. Maintenance Data: Include written maunufactueres maintenance procedures, recommended maintenance materials, and suggested schedule for cleaning.

G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.

### 1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing specified carpet tile with minimum three years documented experience.

B. Installer Qualifications: Company specializing in installing carpet tile with minimum 3 years documented experience and approved by carpet tile manufacturer.

### 1.06 FIELD CONDITIONS

A. Store materials in area of installation for minimum period of 24 hours prior to installation.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. Tile Carpeting: Refer to finish schedule.
   1. Substitutions: See Section 01 6000 - Product Requirements.
      a. Mannington Carpet , must receive architect's written of specific product.
      b. Tarkett, must receive architect's written approval of specific product.

### 2.02 MATERIALS

A. Tile Carpeting, Type Basis of Design:

B. Product Type: **(CPT-1) See finish schedule.** Basis of Design
   1. Collection name: Open Ended
   2. Basis of Design Manufacturer: Interface
   3. Product Number: 131400AK00
   4. Construction: Tufted Textured Loop
   5. Fiber/Dye: 100% Solution Dyed
   6. Color: See finish schedule.
   7. Primary backing: GlasBac
   8. Product size: See finish schedule.
   9. Gauge: 1/12"
   10. Finished pile thickness: 0.10 in

### 2.03 ACCESSORIES

A. Sub-Floor Filler: ____; per written recommendations of flooring materials manufacturer.

B. Edge Strips and Thresholds: Extruded Aluminum, color as selected by Architect. Refer to drawings for details. Equal to Schluter, straight and radiused as required. Conform to ADAAG Requirements.

C. Adhesives:
   1. Compatible with materials being adhered; maximum VOC content as specified in Section 01 6116.
   2. Carpet Tile Adhesive: Per written recommendations of carpet tile manufacturer; releasable type.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify that sub-floor surfaces are smooth and flat within tolerances specified for that type of work and are ready to receive carpet tile.

B. Verify that sub-floor surfaces are dust-free and free of substances that could impair bonding of adhesive materials to sub-floor surfaces.

C. Cementitious Sub-floor Surfaces: Verify that substrates and concrete sub-floor are dry enough and ready for flooring installation by testing for moisture emission rate and pH in accordance to ASTM F 170.

1. Obtain manufacturers written instructions if test results are not within limits recommended by flooring manufacturer and adhesive manufactuer.

D. Verify that required floor-mounted utilities are in correct location.

**3.02 PREPARATION**

A. Prepare floor substrates as recommended by flooring and adhesive manufacturers written instructions.

B. Remove sub-floor ridges and bumps. Fill minor or local low spots, cracks, joints, holes, and other defects with sub-floor filler per written instructions of flooring manufacturer.

C. Vacuum clean substrate per manufacturers written instructions.

**3.03 INSTALLATION**

A. Starting installation constitutes acceptance of sub-floor conditions. Provide maunfacturers written approval of substrate prior to installation of carpet.

B. Install carpet tile in accordance with manufacturer's instructions.
1. Install using a 'releasble' glue system, 'peel and sitck', or tackable dots, in accordance with manufacturer's written instructions. Direct-glue method is unacceptable.

C. Blend carpet from different cartons to ensure minimal variation in color match.

D. Cut carpet tile clean. Fit carpet tight to intersection with vertical surfaces without gaps.

E. Lay carpet tile in as directed on finish schedule pattern, with pile direction parallel to next unit, set parallel to building lines.

F. Trim carpet tile neatly at walls and around interruptions.

G. Complete installation of edge strips, concealing exposed edges.

**3.04 ATTIC STOCK**

A. 5% of installed amount

**3.05 CLEANING**

A. Remove excess adhesive without damage, from floor, base, and wall surfaces.

B. Clean and vacuum carpet surfaces.

**END OF SECTION**

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# SECTION 09 7200
# WALL COVERINGS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Surface preparation and prime painting.

B. Wall covering and borders.

### 1.02 RELATED REQUIREMENTS

A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 09 2116 - Gypsum Board Assemblies

### 1.03 REFERENCE STANDARDS

A. ASTM D1308 - Standard Test Method for Effect of Household Chemicals on Clear and Pigmented Coating Systems; 2020.

B. ASTM F793/F793M - Standard Classification of Wall Coverings by Use Characteristics; 2015.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on wall covering and adhesive.

C. Samples: Submit two samples of wall covering, 8 x 11 inch (____by____ mm) in size illustrating color, finish, and texture.

D. Maintenance Data: Submit data on cleaning, touch-up, and repair of covered surfaces.

### 1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience.

C. Warranty: Wallcovering materials, when adhered to a sound surface using manufacturer's recommended procedures and adhesive, shall be guaranteed for a period of five (5) years.

### 1.06 DELIVERY, STORAGE, AND HANDLING

A. Inspect roll materials at arrival on site, to verify acceptability.

B. Protect packaged adhesive from temperature cycling and cold temperatures.

C. Do not store roll goods on end.

### 1.07 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the adhesive or wall covering product manufacturer.

B. Maintain these conditions 24 hours before, during, and after installation of adhesive and wall covering.

C. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surfaces.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

### 2.02 WALLCOVERINGS- SEE FINISH SCHEDULE

A. General Requirements:
   1. Surface Burning Characteristics: Flame spread/Smoke developed index of 25/50, maximum, when tested in accordance with ASTM E84.
   2. Chemical and Stain Resistance: No visible staining or discoloration and no damage to surface texture when tested in accordance with ASTM D1308.

B. Wallcovering **(VWC-1)** - Type[II]: **Equal to Maharam, Hitch 399956–010, Toffee**
   1. Conform to ASTM F793/F793M, Category V, Type II.
   2. Total Weight: 20 oz/ly (600 gr/lm)
   3. Roll Width: 54" (137cm)
   4. Backing: Polyester / Cellulose
   5. Color: See finish schedule.
   6. Repeat: Non-match
   7. Class: Type II
   8. Flammability: AS/ NZS 3837 Adhered
   9. ASTM E84 Adhered

C. Wallcovering **(VWC-2)** - Type[II]: **Equal to Maharam, Hitch 399956–009, Bronze**
   1. Conform to ASTM F793/F793M, Category V, Type II.
   2. Total Weight: 20 oz/ly (600 gr/lm)
   3. Roll Width: 54" (137cm)
   4. Backing: Polyester / Cellulose
   5. Color: See finish schedule.
   6. Repeat: Non-match
   7. Class: Type II
   8. Flammability: AS/ NZS 3837 Adhered
   9. ASTM E84 Adhered

D. Adhesive: Type recommended by wall covering manufacturer to suit application to substrate.

E. Substrate Filler: As recommended by adhesive and wall covering manufacturers; compatible with substrate.

F. Substrate Primer and Sealer: Alkyd enamel type.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify that substrate surfaces are prime painted and ready to receive work, and conform to requirements of the wallcovering manufacturer.

B. Measure moisture content of surfaces using an electronic moisture meter. Do not apply wall coverings if moisture content of substrate exceeds level recommended by wallcovering manufacturer.

C. Verify flatness tolerance of surfaces does not vary more than 1/8 inch in 10 feet (3 mm in 3 m) nor vary at a rate greater than 1/16 inch/ft (1.5 mm/300 mm).

### 3.02 PREPARATION

A. Fill cracks in substrate and smooth irregularities with filler; sand smooth.

B. Wash impervious surfaces with tetra-sodium phosphate, rinse and neutralize; wipe dry.

C. Surface Appurtenances: Remove or mask electrical plates, hardware, light fixture trim, escutcheons, and fittings prior to preparing surfaces or finishing.

D. Surfaces: Correct defects and clean surfaces that affect work of this section. Remove existing coatings that exhibit loose surface defects.

E. Marks: Seal with shellac those that may bleed through surface finishes.

F. Apply one coat of primer sealer to substrate surfaces. Allow to dry. Lightly sand smooth.

G. Vacuum clean surfaces free of loose particles.

**3.03 INSTALLATION**

A. Apply adhesive and wallcovering in accordance with manufacturer's instructions.

B. Apply adhesive to wall surface immediately prior to application of wall covering.

C. Razor trim edges on flat work table. Do not razor cut on gypsum board surfaces.

D. Horizontal seams are not acceptable.

E. Install wallcovering before installation of bases and items attached to or spaced slightly from wall surface.

F. Cover spaces above and below windows, above doors, in pattern sequence from roll.

G. Remove excess adhesive while wet from seam before proceeding to next wall covering sheet. Wipe clean with dry cloth.

**3.04 PROTECTION**

A. Do not permit construction activities at or near finished wall covering areas.

**END OF SECTION**

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# SECTION 09 8430
# SOUND-ABSORBING WALL UNITS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Acoustical wall panels

### 1.02 RELATED REQUIREMENTS

A. Section 09 5100 - Acoustical Ceilings: Ceiling suspension system.

### 1.03 REFERENCE STANDARDS

A. ASTM C423 - Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method; 2023, with Editorial Revision (2024).

B. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's data sheets for products specified.

C. Shop Drawings: Fabrication and installation details, panel layout.

D. Selection Samples: Manufacturer's color chart indicating full range of colors and patterns available.

E. Verification Samples: Fabricated samples of each type of panel specified, minimum 6" x 6"

F. Installation Instructions: Submit manufacturer’s installation instructions as referenced in Part 3.

### 1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical ceiling units to project site in original, unopened packages and store them in a fully enclosed space where they will be protected against damage from moisture, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical ceiling units, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical ceiling units carefully to avoid chipping edges or damaged units in any way.

### 1.06 WARRANTY

A. Tectum DesignArt - Lines one source manufacturer is Thirty (30) years from date of substantial completion.

## PART 2 PRODUCTS

### 2.01 SOUND-ABSORBING UNITS

A. General:
   1. Prefinished, factory assembled acoustical panels.

B. **ACOUSTICAL WALL PANEL (WP-1) SEE FINISH SCHEDULE.**
   1. Surface Texture: Coarse
   2. Composition: Aspen wood fibers bonded with inorganic hydraulic cement
   3. Color: See finish schedule.
   4. Pattern: See finish schedule.
   5. Size: See finish schedule.

6. Edge Profile: Standard: Beveled on direct-attach
7. Noise Reduction Coefficient (NRC): ASTM C 423 (A-mounting); (Standard NRC 0.40); ASTM C 423 (D-20 mounting) (Standard NRC 0.45); ASTM C 423 (C-20 mounting) (Standard NRC 0.80); ASTM C 423 (C-40 mounting) (Standard NRC 0.85) Classified with UL label.
8. Flame Spread: ASTM E 1264; Fire Class A
9. Dimensional Stability: HumiGuard Plus
10. USDA Certified Biobased Product, 98%
11. Basis of Design: **Tectum Design Art - Lines Wall Panels**, as manufactured by Armstrong World Industries

C. Mounting Accessories:
1. Item 5456GAL1_ _ _ - 1 Gallon Touch Up Paint
2. Item 8187L16 #6 X 1-5/8” Painted Head – Sharp Point screws
3. Item 8186L16 #6 X 1-5/8” Painted Head – Drill Point screws
4. Item 8189L22 2-1/4” Painted Head – CMU Screws

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Examine substrates for conditions detrimental to installation of acoustical units. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.02 INSTALLATION

A. Install acoustical units in locations as indicated, following manufacturer's installation instructions.

B. Install mounting accessories and supports in accordance with shop drawings.

C. Replace damaged and broken shapes.

### 3.03 CLEANING

A. Contractor shall remove and dispose of shipping containers and debris.

B. Clean sound-absorptive panels upon completion of installation from dust and other foreign materials, following manufacturer's instructions.

### 3.04 PROTECTION

A. Provide protection of installed acoustical panels until Date of Substantial Completion.

B. Replace panels that cannot be cleaned and repaired to satisfaction of the Architect.

**END OF SECTION**

# SECTION 09 8436
# SOUND-ABSORBING CEILING UNITS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Sound-absorbing ceiling baffles, custom-fabricated.

### 1.02 REFERENCES

A. ASTM International:
   1. ASTM C423 Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.
   2. ASTM E84 Standard Test Method for Surface Burning Characteristics of Building Materials.
   3. ASTM E795 Standard Practices for Mounting Test Specimens During Sound Absorption Tests.

### 1.03 SYSTEM DESCRIPTION

A. Performance Requirements:
   1. Surface Burning Characteristics (ASTM E84):
      a. Flame spread: 25 maximum.
      b. Smoke Developed: 450 maximum.

### 1.04 SUBMITTALS

A. General: Submit listed submittals in accordance with Conditions of the Contract and Division 1 Submittal Procedures Section.

B. Product Data: Submit product data sheet, for specified products.

C. Shop Drawings: Submit shop drawings showing layout, and baffle components, including anchorage, and colors.

D. Samples: Submit selection and verification samples of finishes and colors.

E. Test Reports: Certified test reports showing compliance with specified performance requirements:
   1. Standard Systems: Submit copies of previous test reports substantiating performance of system in lieu of retesting.

### 1.05 QUALITY ASSURANCE

A. NOTE TO SPECIFIER – Paragraph below should list obligations for compliance with specific code requirements particular to this section. General statements to comply with a particular code are typically addressed in Conditions of the Contract and Division 1 Regulatory Requirements Section. Repetitive statements should be avoided.

B. Regulatory Requirements and Approvals: Specify applicable requirements of regulatory agencies.
   1. Code agency name.
      a. Report or approval number.

### 1.06 DELIVERY, STORAGE, AND HANDLING

A. General: Comply with Division 1 Product Requirements Section.

B. Delivery: Deliver materials in manufacturer’s original, unopened, undamaged containers with identification labels intact.

C. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

**1.07 PROJECT CONDITIONS**

A. Environmental Requirements: Do not install baffles until wet work, such as concrete and plastering, is complete; the building is enclosed; and the temperature and relative humidity are stabilized at 60 - 80 degrees F (16 - 27 degrees C) and 35% MINIMUM RH and 55% MAXIMUM RH, respectively.

**PART 2 PRODUCTS**

**2.01 SOUND-ABSORBING CEILING BAFFLES**

A. Products
   1. LightArt **(AB-1) Basis of Design**
      a. lightart.com

**2.02 MANUFACTURED UNITS - SEE "AB-1" REFER TO FINISH SCHEDULE.**

A. Product equal to: LightArt Acoustic Baffle

B. Size: 4" wide - See drawings for custom lengths, heights, and spacing.
   1. Colors: See finish schedule.
   2. Installation: See interior elevations, details and reflected ceiling plan.
   3. Sound Absorption (ASTM C423): NRC as follows:
      a. Per manufacturer
   4. Mounting Accessories: Threaded Rod and provided Impaler Clips. Provide all installation components for full and complete system.
   5. Warranty: Five year

**PART 3 EXECUTION**

**3.01 MANUFACTURER'S INSTRUCTIONS**

A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions and product carton instructions for installation.

**3.02 EXAMINATION**

A. Site Verification of Conditions: Verify that substrate conditions, which have been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions.
   1. Do not install baffles until unsatisfactory conditions are corrected.

**3.03 CLEANING**

A. Follow manufacturer's instructions for cleaning baffles soiled during installation. Replace baffles that cannot be cleaned to as new condition.

B. Keep site free from accumulation of waste and debris.

**END OF SECTION**

# SECTION 09 9113
# EXTERIOR PAINTING

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints.

C. Scope: Finish exterior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated, including the following:
   1. Exposed surfaces of steel lintels and ledge angles.

D. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, and operating parts of equipment.
   5. Non-metallic roofing and flashing.
   6. Stainless steel, anodized aluminum, bronze, terne coated stainless steel, zinc, and lead.
   7. Marble, granite, slate, and other natural stones.
   8. Floors, unless specifically indicated.
   9. Ceramic and other types of tiles.
   10. Brick, glass unit masonry, architectural concrete, cast stone, integrally colored plaster and stucco.
   11. Exterior insulation and finish system (EIFS).
   12. Glass.
   13. Concealed pipes, ducts, and conduits.

### 1.02 RELATED REQUIREMENTS

A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 05 5000 - Metal Fabrications: Shop-primed items.

C. Section 09 9123 - Interior Painting.

D. Section 08 1113 - Hollow Metal Doors and Frames

E. Section 07 9005 - Joint Sealers

F. Division 32 - Painted Pavement Markings.

### 1.03 DEFINITIONS

A. Conform to ASTM D16 for interpretation of terms used in this section.

### 1.04 REFERENCE STANDARDS

A. 40 CFR 59, Subpart D - National Volatile Organic Compound Emission Standards for Architectural Coatings; U.S. Environmental Protection Agency; current edition.

B. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2019.

C. ASTM D4258 - Standard Practice for Surface Cleaning Concrete for Coating; 2023.

D. ASTM D4259 - Standard Practice for Preparation of Concrete by Abrasion Prior to Coating Application; 2024.

E. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association; Current Edition.

F. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.

G. SCAQMD 1113 - Architectural Coatings; 1977 (Amended 2016).

H. SSPC V1 (PM1) - Good Painting Practice: Painting Manual Volume 1; 2024.

I. SSPC V2 (PM2) - Systems and Specifications: Steel Structures Painting Manual Volume 2; 2021.

J. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).

K. SSPC-SP 2 - Hand Tool Cleaning; 2024.

L. SSPC-SP 3 - Power Tool Cleaning; 2024.

M. SSPC-SP 6 - Commercial Blast Cleaning; 2007.

N. SSPC-SP 13 - Surface Preparation of Concrete; 2018.

**1.05 SUBMITTALS**

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. MPI product number (e.g. MPI #47).
   3. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
   4. Manufacturer's installation instructions.
   5. If proposal of substitutions is allowed under submittal procedures, explanation of substitutions proposed.

C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches (216 by 279 mm) in size, illustrating range of colors available for each finishing product specified.
   1. Where sheen is specified, submit samples in only that sheen.
   2. Where sheen is not specified, discuss sheen options with Architect before preparing samples, to eliminate sheens definitely not required.
   3. Paint color submittals will not be considered until color submittals for major materials not to be painted, such as masonry, have been approved.

D. Certification: By manufacturer that paints and finishes comply with VOC limits specified.

E. Manufacturer's Instructions: Indicate special surface preparation procedures.

F. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.

G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.

2. Extra Paint and Finish Materials: 1 gallon (4 L) of each color; from the same product run, store where directed.
3. Label each container with color in addition to the manufacturer's label.

### 1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 3 years experience and approved by manufacturer.

### 1.07 MOCK-UP

A. See Section 01 4000 - Quality Requirements, for general requirements for mock-up.

B. Provide panel, 10 feet (____ m) long by 10 feet (____ m) wide, illustrating paint color, texture, and finish.

C. Provide door and frame assembly illustrating paint color, texture, and finish.

D. Locate where directed by Architect.

E. Mock-up may remain as part of the work.

### 1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

### 1.09 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Do not apply exterior paint and finishes during rain or snow, or when relative humidity is outside the humidity ranges required by the paint product manufacturer.

D. Minimum Application Temperatures for Latex Paints: 50 degrees F (10 degrees C) for exterior; unless required otherwise by manufacturer's instructions.

E. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.

B. Paints:
1. Benjamin Moore & Co: www.benjaminmoore.com.
2. Pittsburgh Paints: www.ppgpaints.com/#sle.
3. Sherwin-Williams Company: www.sherwin-williams.com/#sle. Basis of Design (or equal)

C. Primer Sealers: Same manufacturer as top coats.

D. Substitutions: See Section 01 6000 - Product Requirements.

**2.02 PAINTS AND FINISHES - GENERAL**

A. Paints and Finishes: Ready mixed, unless required to be a field-catalyzed paint.
   1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
   3. Supply each paint material in quantity required to complete entire project's work from a single production run.
   4. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

B. Volatile Organic Compound (VOC) Content: Comply with Section 01 6116.

C. Flammability: Comply with applicable code for surface burning characteristics.

D. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.

E. Colors: To be selected from manufacturer's full range of available colors as selected by architect during construction.
   1. Selection to be made by Architect after award of contract.

**2.03 PAINT SYSTEMS - EXTERIOR**

A. Paint CE-OP-3L - Masonry (CMU), Opaque, Latex, 3 Coat:
   1. One coat of block filler. Equal to Pro Industrial B42-150 Heavy Duty Block Filler.
   2. Two coates Equal to SW Superpaint exterior acrylic satin A89 Series

B. Paint ME-OP-3A - Ferrous Metals, Unprimed, 3 Coat:
   1. One coat of alkyd primer, equal to SW B50WZ11 Kromik Universal Metal Primer.
   2. Semi-Gloss: Two coats of waterbased alkyd enamel; equal to SW B54W00151 Industrial Urethane Alkyd Enamel. SW Pro Industrial Waterbased Alkyd Urethane Semi-Gloss B53-5150 Series

C. Paint MgE-OP-3A - Galvanized Metals, 3 Coat:
   1. One coat galvanize primer, equal to SW B66W00310 Pro Industrial Pro Cryl Universal Primer Off White.
   2. Gloss: Two coats of waterbased alkyd enamel; equal to SW B54W00151 Industrial Urethane Alkyd Enamel .Pro Industrial Waterbased Alkyd Urethane Semi-Gloss B53-5150 Series.

D. Paint Wood (Interior Exterior) -
   1. One Coat primer - SW Preprite Pro Block interior exterior B51-620 Series
   2. Semi Gloss: two coats - SW SuperPaint Exterior Acrylic A89-Series.

E. **Paint the existing aluminum exterior wall Louver on Building E : See Notes on drawings for requirements.**

**2.04 PRIMERS**

A. Primers: Provide the following unless other primer is required or recommended by manufacturer of top coats.

1. Steel, Uncoated: Anti-Corrosive Alkyd Primer for Metal.
2. Steel --Shop Primer: Interior/Exterior Quick Dry Alkyd Primer for Metal.
3. Alkyd Primer for Galvanized Metal.

### 2.05 ACCESSORY MATERIALS

A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Do not begin application of paints and finishes until substrates have been properly prepared.

B. Commencement of paint opperations indicates applicators acceptance of surfaces and conditions.

C. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

D. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.

E. Test shop-applied primer for compatibility with subsequent cover materials.

### 3.02 PREPARATION

A. Clean surfaces thoroughly and correct defects prior to application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or repair existing paints or finishes that exhibit surface defects.

D. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces for finishing.

E. Seal surfaces that might cause bleed through or staining of topcoat.

F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

G. Galvanized Surfaces:
   1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.

H. Ferrous Metal:
   1. Solvent clean according to SSPC-SP 1.
   2. Remove rust, loose mill scale, and other foreign substances using using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.

### 3.03 APPLICATION

A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".

C. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.

D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

E. Apply each coat to uniform appearance.

F. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply additional coats until complete hide is achieved.

G. Sand metal surfaces lightly between coats to achieve required finish.

H. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

I. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

**3.04 FIELD QUALITY CONTROL**

A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection.

**3.05 CLEANING**

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

**3.06 PROTECTION**

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

**END OF SECTION**

# SECTION 09 9123
# INTERIOR PAINTING

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Surface preparation.

B. Field application of paints, stains, and varnishes.

C. Scope: Finish interior surfaces exposed to view, unless fully factory-finished and unless otherwise indicated.
   1. Elevator pit ladders.
   2. Prime surfaces to receive wall coverings.
   3. Mechanical and Electrical:
      a. In finished areas, paint insulated and exposed pipes, conduit, boxes, insulated and exposed ducts, hangers, brackets, collars and supports, mechanical equipment, and electrical equipment, unless otherwise indicated.
      b. In finished areas, paint shop-primed items.
      c. Paint interior surfaces of air ducts that are visible through grilles and louvers with one coat of flat paint to visible surfaces.

D. Do Not Paint or Finish the Following Items:
   1. Items factory-finished unless otherwise indicated; materials and products having factory-applied primers are not considered factory finished.
   2. Items indicated to receive other finishes.
   3. Items indicated to remain unfinished.
   4. Fire rating labels, equipment serial number and capacity labels, bar code labels, and operating parts of equipment.
   5. Stainless steel, anodized aluminum, bronze, terne coated stainless steel, and lead items.
   6. Marble, granite, slate, and other natural stones.
   7. Floors, unless specifically indicated.
   8. Ceramic and other tiles.
   9. Brick, architectural concrete, cast stone, integrally colored plaster and stucco.
   10. Exterior insulation and finish system (EIFS).
   11. Electrical devices and plates.
   12. Door hardware and cabinet hardware.
   13. Glass.
   14. Toilet accessories and toilet partitions.
   15. Concrete masonry units in utility, mechanical, and electrical spaces.
   16. Acoustical materials, unless specifically indicated.
   17. Concealed pipes, ducts, and conduits.

### 1.02 RELATED REQUIREMENTS

A. Section 01 6116 - Volatile Organic Compound (VOC) Content Restrictions.

B. Section 05 5000 - Metal Fabrications: Shop-primed items.

C. Section 05 5100 - METAL STAIRS : Shop-primed items.

D. Section 08 1113 - Hollow Metal Doors and Frames

E. Section 09 9113 - Exterior Painting.

F. Section 07 9005 - Joint Sealants

### 1.03 DEFINITIONS

A. Conform to ASTM D16 for interpretation of terms used in this section.

### 1.04 REFERENCE STANDARDS

A. ASTM D16 - Standard Terminology for Paint, Related Coatings, Materials, and Applications; 2019.

B. ASTM D4442 - Standard Test Methods for Direct Moisture Content Measurement of Wood and Wood-Based Materials; 2020.

C. MPI (APL) - Master Painters Institute Approved Products List; Master Painters and Decorators Association; Current Edition.

D. MPI (APSM) - Master Painters Institute Architectural Painting Specification Manual; Current Edition.

E. SSPC-SP 1 - Solvent Cleaning; 2015, with Editorial Revision (2016).

F. SSPC-SP 6 - Commercial Blast Cleaning; 2007.

G. SSPC-SP 13 - Surface Preparation of Concrete; 2018.

### 1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide complete list of products to be used, with the following information for each:
   1. Manufacturer's name, product name and/or catalog number, and general product category (e.g. "alkyd enamel").
   2. Cross-reference to specified paint system(s) product is to be used in; include description of each system.
   3. Manufacturer's installation instructions.
   4. If proposal of substitutions is allowed under submittal procedures, explanation of substitutions proposed.

C. Samples: Submit three paper "draw down" samples, 8-1/2 by 11 inches (216 by 279 mm) in size, illustrating range of colors available for each finishing product specified.
   1. Where sheen is specified, submit samples in only that sheen.
   2. Where sheen is not specified, discuss sheen options with Architect before preparing samples, to eliminate sheens definitely not required.
   3. Paint color submittals will not be considered until color submittals for major materials not to be painted, such as masonry, have been approved.

D. Certification: By manufacturer that paints and finishes comply with VOC limits specified.

E. Manufacturer's Instructions: Indicate special surface preparation procedures.

F. Maintenance Data: Submit data including finish schedule showing where each product/color/finish was used, product technical data sheets, material safety data sheets (MSDS), care and cleaning instructions, touch-up procedures, repair of painted and finished surfaces, and color samples of each color and finish used.

G. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.
   2. Extra Paint and Finish Materials: 1 gallon (4 L) of each color; from the same product run, store where directed.
   3. Label each container with color in addition to the manufacturer's label.

### 1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified, with minimum three years documented experience.

B. Applicator Qualifications: Company specializing in performing the type of work specified with minimum 3 years experience and approved by manufacturer.

### 1.07 MOCK-UP

A. See Section 01 4000 - Quality Requirements, for general requirements for mock-up.

B. Provide panel, 10 feet (____ m) long by 10 feet (____ m) wide, illustrating paint color, texture, and finish of each paint color.

C. Provide door and frame assembly illustrating paint color, texture, and finish.

D. Locate where directed by Architect.

E. Mock-up may remain as part of the work.

### 1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver products to site in sealed and labeled containers; inspect to verify acceptability.

B. Container Label: Include manufacturer's name, type of paint, brand name, lot number, brand code, coverage, surface preparation, drying time, cleanup requirements, color designation, and instructions for mixing and reducing.

C. Paint Materials: Store at minimum ambient temperature of 45 degrees F (7 degrees C) and a maximum of 90 degrees F (32 degrees C), in ventilated area, and as required by manufacturer's instructions.

### 1.09 FIELD CONDITIONS

A. Do not apply materials when surface and ambient temperatures are outside the temperature ranges required by the paint product manufacturer.

B. Follow manufacturer's recommended procedures for producing best results, including testing of substrates, moisture in substrates, and humidity and temperature limitations.

C. Do not apply materials when relative humidity exceeds 85 percent; at temperatures less than 5 degrees F (3 degrees C) above the dew point; or to damp or wet surfaces.

D. Minimum Application Temperatures for Paints: 50 degrees F (10 degrees C) for interiors unless required otherwise by manufacturer's instructions.

E. Provide lighting level of 80 ft candles (860 lx) measured mid-height at substrate surface.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. Provide paints and finishes used in any individual system from the same manufacturer; no exceptions.

B. Paints:
   1. Benjamin Moore & Co: www.benjaminmoore.com.
   2. Pittsburgh Paints: www.ppgpaints.com/#sle.
   3. Sherwin-Williams Company: www.sherwin-williams.com/#sle. Basis of Design (or equal).

C. Primer Sealers: Same manufacturer as top coats.

D. Block Fillers: Same manufacturer as top coats.

E. Substitutions: See Section 01 6000 - Product Requirements.

## 2.02 PAINTS AND FINISHES - GENERAL

A. Paints and Finishes: Ready mixed, unless intended to be a field-catalyzed paint.
   1. Provide paints and finishes of a soft paste consistency, capable of being readily and uniformly dispersed to a homogeneous coating, with good flow and brushing properties, and capable of drying or curing free of streaks or sags.
   2. Provide materials that are compatible with one another and the substrates indicated under conditions of service and application, as demonstrated by manufacturer based on testing and field experience.
   3. Supply each paint material in quantity required to complete entire project's work from a single production run.
   4. Do not reduce, thin, or dilute paint or finishes or add materials unless such procedure is specifically described in manufacturer's product instructions.

B. Volatile Organic Compound (VOC) Content: Comply with Section 01 6116.

C. Flammability: Comply with applicable code for surface burning characteristics.

D. Sheens: Provide the sheens specified; where sheen is not specified, sheen will be selected later by Architect from the manufacturer's full line.

E. Colors: As indicated on drawings.
   1. In finished areas, finish pipes, ducts, conduit, and equipment the same color as the wall/ceiling they are mounted on/under or as indicated on drawings.

## 2.03 PAINT SYSTEMS - INTERIOR

A. Paint I-OP - Interior Surfaces to be Painted, Unless Otherwise Indicated: Including gypsum board, concrete, concrete masonry units, wood, plaster, uncoated steel, and shop primed steel.
   1. Two top coats and one coat primer.
   2. Top Coat Sheen:
      a. Flat: MPI gloss level 1; use this sheen for ceilings and other overhead surfaces.
      b. Eggshell: MPI gloss level 3; use this sheen at all locations.
      c. Satin: MPI gloss level 4; use this sheen for items subject to frequent touching by occupants, including door frames and railings.
      d. Semi-Gloss: MPI gloss level 5; use this sheen at opaque wood and metal..
   3. Primer: As recommended by top coat manufacturer for specific substrate.

B. Paint I-OP-DF - Dry Fall: Metals; exposed structure and overhead-mounted services in utilitarian spaces, including shop primed steel deck, structural steel, metal fabrications, galvanized ducts, galvanized conduit, and galvanized piping.
   1. Shop primer as recommended by manufacturer of top coat.
   2. Two top coats;white. Equal to B42W82 SW Pro Industrial Waterborne EggShell Dryfall (Flat, B42W181 – S/G, B42W83.

C. Paint I-TR -W - Transparent Finish on Wood.
   1. Sealer: Sanding Sealer, Clear.
      a. Products:
         1) Stain: Min wax performance series stain
         2) Equal to SW Minwax Performance Series Sanding Sealer.
         3) Substitutions: Section 01 6000 - Product Requirements.
   2. Top Coat(s): Polyurethane Varnish.
      a. Products:
      b. Equal to SW Minwax Performance Series Varnish Satin.
         1) Substitutions: Section 01 6000 - Product Requirements.

D. Paint I-TR-C - Transparent Finish on Concrete Floors.
   1. 2 coats sealer.
   2. Sealer: Water Based for Concrete Floors.
      a. Products:
         1) Equal to SW Armorseal, Rexthane B65C60. Ventilate installation area as required by manufacturer and all applicable code requirements.
         2) Substitutions: Section 01 6000 - Product Requirements.
         3) Ventilate space as req-d by all codes.

E. Paint WI-OP-2L - Wood, Opaque, Latex, 2 Coat:
   1. One coat of latex primer sealer equal to SW B51W620 ProBlock Int/Ext Latex Primer/Sealer White.
   2. Semi-Gloss: Two Coats of SW Pro Industrial Waterbased Alkyd Urethane Semi-Gloss B53-Series.

F. Paint CI-OP-3L - Concrete/Masonry, Opaque, Latex, 3 Coat:
   1. One coat of block filler equal to SW Pro Industrial Heavy Duty Block Filler B42W150.
   2. Semi-gloss: Two coats of latex enamel; equal to SW K46W151 Pro Industrial Pre-Catalyzed Water Based Epoxy..

G. Paint MI-OP-3L - Ferrous Metals, Unprimed, Latex, 3 Coat:
   1. One coat of latex primer equal to SW B66-1300 Pro Industrial Pro-Cryl Universal Primer Off White.
   2. Semi-Gloss: Two Coats of SW Pro Industrial Waterbased Alkyd Urethane Semi-Gloss B53-Series.

H. Paint MgI-OP-3L - Galvanized Metals, Latex, 3 Coat:
   1. One coat galvanize primer equal to SW B66-1300 Pro Industrial Pro-Cryl Universal Primer.
   2. Two Coats of SW Pro Industrial Waterbased Alkyd Urethane Semi-Gloss B53-Series.semi gloss

I. Paint GI-OP-3L - Gypsum Board, Latex, 3 Coat:
   1. One coat of latex primer sealer equal to SW B28-2600 ProMar 200 Zero VOC Interior Latex Primer White.
   2. Eggshell: Two coats of latex enamel; equal to SW B20W2651 ProMar 200 Zero VOC Eggshell Extra White..

### 2.04 ACCESSORY MATERIALS

A. Accessory Materials: Provide primers, sealers, cleaning agents, cleaning cloths, sanding materials, and clean-up materials as required for final completion of painted surfaces.

B. Patching Material: Latex filler.

C. Fastener Head Cover Material: Latex filler.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Do not begin application of paints and finishes until substrates have been properly prepared.

B. Commencement of paint operations indicates applicators acceptance of surfaces and conditions.

C. Verify that surfaces are ready to receive work as instructed by the product manufacturer.

D. Examine surfaces scheduled to be finished prior to commencement of work. Report any condition that may potentially effect proper application.

E. Test shop-applied primer for compatibility with subsequent cover materials.

F. Measure moisture content of surfaces using an electronic moisture meter. Do not apply finishes unless moisture content of surfaces are below the following maximums:
   1. Gypsum Wallboard: 12 percent.
   2. Plaster and Stucco: 12 percent.
   3. Masonry, Concrete, and Concrete Masonry Units : 12 percent.
   4. Interior Wood: 15 percent, measured in accordance with ASTM D4442.
   5. Concrete Floors and Traffic Surfaces: 8 percent.

**3.02 PREPARATION**

A. Clean surfaces thoroughly and correct defects prior to application.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Remove or repair existing paints or finishes that exhibit surface defects.

D. Remove or mask surface appurtenances, including electrical plates, hardware, light fixture trim, escutcheons, and fittings, prior to preparing surfaces or finishing.

E. Seal surfaces that might cause bleed through or staining of topcoat.

F. Remove mildew from impervious surfaces by scrubbing with solution of tetra-sodium phosphate and bleach. Rinse with clean water and allow surface to dry.

G. Concrete:
   1. Remove release agents, curing compounds, efflorescence, and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces to be coated exceeds that permitted in manufacturer's written instructions.
   2. Prepare surface as recommended by top coat manufacturer and according to SSPC-SP 13.

H. Masonry:
   1. Remove efflorescence and chalk. Do not coat surfaces if moisture content or alkalinity of surfaces or if alkalinity of mortar joints exceed that permitted in manufacturer's written instructions. Allow to dry.
   2. Prepare surface as recommended by top coat manufacturer.

I. Concrete Floors and Traffic Surfaces: Remove contamination, acid etch, and rinse floors with clear water. Verify required acid-alkali balance is achieved. Allow to dry.

J. Gypsum Board: Fill minor defects with filler compound. Spot prime defects after repair.

K. Plaster: Fill hairline cracks, small holes, and imperfections with latex patching plaster. Make smooth and flush with adjacent surfaces. Wash and neutralize high alkali surfaces.

L. Aluminum: Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.

M. Copper: Remove contamination by steam, high pressure water, or solvent washing.

N. Galvanized Surfaces:
   1. Remove surface contamination and oils and wash with solvent according to SSPC-SP 1.

O. Ferrous Metal:
   1. Solvent clean according to SSPC-SP 1.

2. Shop-Primed Surfaces: Sand and scrape to remove loose primer and rust. Feather edges to make touch-up patches inconspicuous. Clean surfaces with solvent. Prime bare steel surfaces. Re-prime entire shop-primed item.
3. Remove rust, loose mill scale, and other foreign substances using methods recommended in writing by paint manufacturer and blast cleaning according to SSPC-SP 6 "Commercial Blast Cleaning". Protect from corrosion until coated.

P. Wood Surfaces to Receive Opaque Finish: Wipe off dust and grit prior to priming. Seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after primer has dried; sand between coats. Back prime concealed surfaces before installation.

Q. Wood Surfaces to Receive Transparent Finish: Wipe off dust and grit prior to sealing, seal knots, pitch streaks, and sappy sections with sealer. Fill nail holes and cracks after sealer has dried; sand lightly between coats. Prime concealed surfaces with gloss varnish reduced 25 percent with thinner.

R. Metal Doors to be Painted: Prime metal door top and bottom edge surfaces.

**3.03 APPLICATION**

A. Remove unfinished louvers, grilles, covers, and access panels on mechanical and electrical components and paint separately.

B. Apply products in accordance with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual".

C. Where adjacent sealant is to be painted, do not apply finish coats until sealant is applied.

D. Do not apply finishes to surfaces that are not dry. Allow applied coats to dry before next coat is applied.

E. Apply each coat to uniform appearance in thicknesses specified by manufacturer.

F. Dark Colors and Deep Clear Colors: Regardless of number of coats specified, apply as many coats as necessary for complete hide.

G. Sand wood and metal surfaces lightly between coats to achieve required finish.

H. Vacuum clean surfaces of loose particles. Use tack cloth to remove dust and particles just prior to applying next coat.

I. Wood to Receive Transparent Finishes: Tint fillers to match wood. Work fillers into the grain before set. Wipe excess from surface.

J. Reinstall electrical cover plates, hardware, light fixture trim, escutcheons, and fittings removed prior to finishing.

**3.04 FIELD QUALITY CONTROL**

A. See Section 01 4000 - Quality Requirements, for general requirements for field inspection.

**3.05 CLEANING**

A. Collect waste material that could constitute a fire hazard, place in closed metal containers, and remove daily from site.

**3.06 PROTECTION**

A. Protect finishes until completion of project.

B. Touch-up damaged finishes after Substantial Completion.

**END OF SECTION**

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# SECTION 10 1100
# VISUAL DISPLAY UNITS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Markerboards and Tackboards.

### 1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Blocking and supports.

B. Section 09 2116 - Gypsum Board Assemblies: Concealed supports in metal stud walls.

C. Section 09 2216 - Non-Structural Metal Framing: Concealed supports in metal stud walls.

D. Section 09 2116 - Gypsum Board Assemblies: Concealed supports in metal stud walls.

E. Section 09 9000 - Painting and Coating: Finishing of wood frame and chalkrail.

### 1.03 REFERENCE STANDARDS

A. ANSI A135.4 - Basic Hardboard; 2012 (Reaffirmed 2020).

B. ANSI A208.1 - American National Standard for Particleboard; 2022.

C. ASTM A424/A424M - Standard Specification for Steel, Sheet, for Porcelain Enameling; 2009a (Reapproved 2016).

D. ASTM C208 - Standard Specification for Cellulosic Fiber Insulating Board; 2012, with Editorial Revision (2019).

E. ASTM C1396/C1396M - Standard Specification for Gypsum Board; 2017.

F. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.

G. ASTM F793/F793M - Standard Classification of Wall Coverings by Use Characteristics; 2015.

H. FS L-P-1040 - Plastic Sheets and Strips (Polyvinyl Fluoride); Federal Specifications and Standards; Revision B, 1977.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's data on markerboard, tackboard, tackboard surface covering, trim, and accessories.

C. Shop Drawings: Indicate wall elevations, dimensions, joint locations , special anchor details.

D. Samples: Submit color charts for selection of color and texture of markerboard, tackboard, tackboard surface covering, and trim.

E. Test Reports: Show conformance to specified surface burning characteristics requirements.

F. Manufacturer's printed installation instructions.

### 1.05 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years documented experience.

### 1.06 WARRANTY

A. Provide manufacturer's standard 5 year warranty.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. Visual Display Boards: Refer to drawings for locations.
   1. MooreCo, Inc: www.moorecoinc.com.
   2. Claridge Products and Equipment, Inc: www.claridgeproducts.com/#sle. Basis of Design.
   3. Polyvision Corporation (Nelson Adams): www.polyvision.com/#sle.
   4. Substitutions: See Section 01 6000 - Product Requirements.
   5. Platinum Visual Solutions, a division of ABC School Equipment, Inc.

### 2.02 VISUAL DISPLAY BOARDS

A. Markerboards - As shown on drawings with the symbol (__"-MB): Porcelain enamel on steel, laminated to core.
   1. Equal to Claridge LCS Elite based on below specifications
   2. Color: As selected from manufacturer's full range.
   3. Metal Face Sheet Thickness: 0.024 inch (24 gage) (0.61 mm).
   4. Core: Particleboard, manufacturer's standard thickness, laminated to face sheet.
   5. Backing: Aluminum foil, laminated to core.
   6. Height: 48 inches (1220 mm).
   7. Length: As indicated on drawings.
   8. Frame: No frame , with concealed fasteners.

B. Tackboards As shown on drawings with the symbol - ( __" -TB) : Fabric laminated to cork. Equal Claridge Edge Wrapped Framless Tackboard
   1. Cork Thickness: 1/4 inch (6 mm).
   2. Fabric: Vinyl coated fabric.
   3. Color: As selected from manufacturer's full range.
   4. Backing: Hardboard, 3/8 inch (9.5 mm) thick, laminated to tack surface.
   5. Surface Burning Characteristics: Flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with ASTM E84.
   6. Height: 48 inches (1220 mm).
   7. Length: As indicated on drawings.
   8. Frame: No frame , with concealed fasteners.

### 2.03 MATERIALS

A. Vinyl Coated Fabric: ASTM F 793 Category VI ; clear top overcoat of polyvinyl fluoride in accordance with FS L-P-1040 Type 1, Grade B, Class 2, 0.0005 inch thick (; clear top overcoat of polyvinyl fluoride in accordance with FS L-P-1040 Type 1, Grade B, Class 2, 0.01 mm thick).

B. Hardboard for Cores: AHA A135.4, Class 1 - Tempered, S2S (smooth two sides).

C. Particleboard: ANSI A208.1; wood chips, set with waterproof resin binder, sanded faces.

D. Foil Backing: Aluminum foil sheet, 0.005 inch thick (0.13 mm thick).

E. Steel Sheet Backing: Manufacturer's standard thickness , galvanized.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that internal wall blocking is ready to receive work and positioning dimensions are as indicated on shop drawings.

C. Verify flat wall surface for frameless adhesive-applied boards.

**3.02 INSTALLATION**

A. Install boards in accordance with manufacturer's instructions.

B. Install with bottom of perimeter frame at 34 inches above finished floor.

C. Secure units level and plumb.

D. Butt Joints: Install with tight hairline joints in boards exceeding 96" in lenght.

**3.03 CLEANING**

A. Clean board surfaces in accordance with manufacturer's instructions.

B. Cover with protective cover, taped to frame.

C. Remove temporary protective cover at date of Substantial Completion.

**3.04 SCHEDULE**

A. See drawings for locations and lengths of markerboards and tackboards.

**3.05 CONCEALED WOOD BLOCKING**

A. General Contractor to provide 2x concealed wood blocking in metal stud - gypsum board wall cavity as required for support and fastening of display boards to walls. Fastening per manufactures requirements.

**END OF SECTION**

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# SECTION 10 1423
# PANEL SIGNAGE

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Panel signage.

### 1.02 REFERENCE STANDARDS

A. ADA Standards - 2010 ADA Standards for Accessible Design; 2010.

B. ASTM A555/A555M - Standard Specification for General Requirements for Stainless Steel Wire and Wire Rods; 2023.

C. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.

D. ICC A117.1 - Accessible and Usable Buildings and Facilities; 2017.

### 1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's product literature for each type of panel sign, indicating styles, font, foreground and background colors, locations, and overall dimensions of each sign.

C. Shop Drawings:
   1. Include dimensions, locations, elevations, materials, text and graphic layout, attachment details, and schedules.
   2. Schedule: Provide information sufficient to completely define each panel sign for fabrication, including room number, room name, other text to be applied, sign and letter sizes, fonts, and colors.
      a. When room numbers to appear on signs differ from those on drawings, include the drawing room number on schedule.
      b. When content of signs is indicated to be determined later, request such information from Owner through Architect at least 2 months prior to start of fabrication; upon request, submit preliminary schedule.
      c. Submit for approval by Owner through Architect prior to fabrication.

D. Samples: Submit one sample, of size similar to that required for project, indicating sign style, font, and method of attachment.

E. Manufacturer's qualification statement.

### 1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience.

### 1.05 DELIVERY, STORAGE, AND HANDLING

A. Package signs as required to prevent damage before installation.

B. Store tape adhesive at normal room temperature.

### 1.06 FIELD CONDITIONS

A. Do not install tape adhesive when ambient temperature is lower than recommended by manufacturer.

B. Maintain minimum ambient temperature during and after installation.

### 1.07 WARRANTY

A. Manufacturer's Warranty: Provide manufacturer's 5 year warranty against fading, defects in materials, and workmanship. Letters shall be guaranteed for the life of the business against defects.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. Panel Signage: refer to L03.00 for monumental sign letters
   1. Best Sign Systems, Inc: www.bestsigns.com/#sle.
   2. Inpro Corporation: www.inprocorp.com/#sle.
   3. Takeform: www.takeform.net/#sle.
   4. Substitutions: See Section 01 6000 - Product Requirements.

B. Dimensional Letter Signs: Cast Aluminum Letters, see drawings for location and additional requirements. Refer to A04.00 for Building E signage A04.02 for Building G Signage
   1. Knight Sign Industries, 205-345-5242
   2. Architectural Signing www.archsign.com
   3. Leeds Architectural Letters of Alabama Inc. www.leedsletters.com
   4. A.R.K. Ramos

### 2.02 REGULATORY REQUIREMENTS

A. Accessibility Requirements: Comply with ADA Standards and ICC A117.1 and applicable building codes, unless otherwise indicated; in the event of conflicting requirements, comply with the most restrictive requirements.

### 2.03 PANEL SIGNAGE

A. Panel Signage Type _____:
   1. Application: Room and door, Interior directional and information signs. Refer to Drawings for additional information and requirements.
   2. Description: Flat signs with applied character panel media, tactile characters.
   3. Sign Size: As indicated on drawings.
   4. Material: As indicated on drawings.
   5. Tactile Letters: Raised 1/32 inch minimum.
   6. Braille: Grade II, ADA-compliant.

### 2.04 ACCESSORIES

A. Multiple mounting methods are described below. Refer to drawings for mounting method(s) required within the project.

B. Cable Display Systems: Sizes and configurations indicated on drawings.
   1. Manufacturers:
      a. Arakawa Hanging Systems: www.arakawagrip.com/#sle.
      b. AS Hanging Display Systems, Inc: www.ashanging.com/#sle.
      c. Nova Display Systems, Inc: www.novadisplay.com/#sle.
      d. Substitutions: See Section 01 6000 - Product Requirements.
   2. Description:
      a. Tensioned cable display system used to support shelving, panels, and artwork from walls and ceilings with the following components:
         1) Wire Cable: 7x7 construction.
            (a) Stainless Steel: ASTM A555/A555M; ASTM A666/A666M, Type 304 or Type 316.

(b) Size: 1/16-inch (1.5 mm) diameter.
(c) Cable End: Loop-End fitting.

2) Cable Gripper Fittings: Provide stainless steel fittings as indicated on drawings.

C. Concealed Screws: Noncorroding metal; stainless steel, galvanized steel, or other based on best recommended for the applicable substrate.

D. Exposed Screws: Chrome plated.

E. Tape Adhesive: Double-sided tape, permanent adhesive.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify that substrate surfaces are ready to receive work.

B. Notify Architect if conditions are not suitable for installation of signs; do not proceed until conditions are satisfactory.

### 3.02 INSTALLATION

A. Refer to drawings and part 2 of this specification section for mounting methods required by the project scope.

B. Install in accordance with manufacturer's instructions.

C. Install with horizontal edges level.

D. Locate panel signs and mount at heights indicated on drawings and in accordance with ADA Standards and ICC A117.1.

E. Protect from damage until date of substantial completion; repair or replace damaged items.

**END OF SECTION**

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# SECTION 10 2113
# PHENOLIC TOILET COMPARTMENTS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Phenolic Toilet Compartments, Over Head Braced, Floor Anchored, see finish schedule for custom colors.

B. Urinal screens.

### 1.02 RELATED REQUIREMENTS

A. Section 05 1200 - Structural Steel Framing: Concealed steel support members.

B. Section 06 1000 - Rough Carpentry: Coordination with cocealed solid wood blocking in walls to secure panels, Screens, wall posts and stiles.

C. Section 09 3000 - Tiling ( take care to not crack or damage tile when installing Partitions and Screens.

D. Section 10 2800 - Toilet, Bath, and Laundry Accessories.

### 1.03 REFERENCE STANDARDS

A. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.

### 1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate the work with placement of support framing and anchors in walls.

### 1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate partition plan, elevation views, dimensions, details of wall supports, door swings.

C. Product Data: Provide data on panel construction, hardware, and accessories.

D. Samples: Submit two samples of partition panels, 6 by 6 inch (____by____ mm) in size illustrating panel finish, color, and sheen.

E. Manufacturer's Installation Instructions: Indicate special procedures.

### 1.06 QUALITY ASSURANCE

A. A. Manufacturer: Provide products manufactured by a company with a minimum of 10 years successful experience manufacturing similar products.

B. Single Source Requirements: To the greatest extent possible provide products from a single manufacturer.

C. Accessibility Requirements: Comply with requirements applicable in the jurisdiction of the project, including but not limited to ADA and ICC/ANSI A117.1 requirements as applicable.

### 1.07 WARRANTY

A. Manufacturer’s standard 25 year limited warranty for panels, doors, and stiles against breakage, corrosion, delamination, and defects in factory workmanship. Manufacturer’s standard 10 year guarantee against defects in material and workmanship for stainless steel door hardware and mounting brackets.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. Basis-of-Design Products: Based on the quality and performance requirements of the project, specifications are based solely on the products of **Bobrick Washroom Equipment, Inc..** www.bobrick.com.

B. **Approved Manufacturers:**
   1. **Columbia Partitions**
   2. **Scranton Products**

### 2.02 PHENOLIC TOILET COMPARTMENTS

A. Toilet Compartments: Factory fabricated doors, pilasters, and divider panels made of solid phenolic core panels with integral melamine finish, floor-mounted headrail-braced. **Basis of Design** is Bobrick 1082G.67 ( Gapless) Series Compact Laminate (Solid Phenolic) Floor Anchored and 1082.67 Urinal Screen. Provide full height stainless steel partition brackets and self closing hinges. Comply with ADA. Class B Fire Rated.
   1. Custom Color: see Finish Schedule.

B. Screens: Without doors; to match compartments; mounted to wall as shown on brackets with full length brackets.

### 2.03 ACCESSORIES

A. Hardware and Accessories: Manufacturer's Institutional hardware design, Commercial Operating hardware and accessories.
   1. Material: Stainless Steel 304 standard finish

B. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel, finished to match hardware, with theft-resistant-type heads. Provide hex-type bolts for through-bolt applications. Wall hung Urinal Bracket (Stainless Steel with diagonal brace Braced

C. Provide emergency access latch & hinges., occupancy indicators.

### 2.04 FABRICATION

A. Floor-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies complete with threaded rods, lock washers, and leveling adjustment nuts at pilasters for structural connection to floor. Provide shoes at pilasters to conceal anchorage.

B. Doors: Unless otherwise indicated, provide 24-inch- (610-mm-) wide in-swinging doors for standard toilet compartments and 36-inch- (914-mm-) wide out-swinging doors with a minimum 32-inch- (813-mm-) wide clear opening for compartments indicated to be accessible to people with disabilities.
   1. Hinges: Manufacturer's Full Height Stainless Steel Hinge (self-closing type)
   2. Latch and Keeper: Manufacturer's institutional hardware surface-mounted latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with accessibility requirements of authorities having jurisdiction at compartments indicated to be accessible to people with disabilities. Complies with ADA Sections 404.2.7 and 309.4.
   3. Coat Hook: Manufacturer's stainless steel combination hook and rubber-tipped bumper, sized to prevent door from hitting compartment-mounted accessories.
   4. Door Pull: Manufacturer's institutional hardware unit at out-swinging doors that complies with accessibility requirements of authorities having jurisdiction. Provide units on both sides of doors at compartments indicated to be accessible to people with disabilities.

C. Attachments, Screws, and Bolts: Stainless steel , tamper proof type.

1. For attaching panels and pilasters to brackets: Through-bolts and nuts ; tamper proof.
2. Balanced hinges
3. Door Latch: Slide type with exterior emergency access feature.
4. Door strike and keeper with rubber bumper; mounted on pilaster in alignment with door latch.
5. Coat hook with rubber bumper; one per compartment, mounted on door.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify correct spacing of and between plumbing fixtures.

C. Verify correct location of built-in framing, anchorage, and bracing.

### 3.02 INSTALLATION

A. A. Install products in strict compliance with manufacturer's written instructions and recommendations, including the following:
   1. Verify blocking and supports in walls and ceilings have been installed properly at points of attachment.
   2. Verify location does not interfere with door swings or use of fixtures.
   3. Use stainless steel fasteners and anchors suitable for substrate and project conditions
   4. Install units rigid, straight, plumb, and level.
   5. Conceal evidence of drilling, cutting, and fitting to room finish.
   6. Test for proper operation.

B. Field touch-up of scratches or damaged finish will not be permitted. Replace damaged or scratched materials with new materials.

### 3.03 TOLERANCES

A. Maximum Variation From True Position: 1/4 inch (6 mm).

B. Maximum Variation From Plumb: 1/8 inch (3 mm).

### 3.04 ADJUSTING

A. Adjust and align hardware to uniform clearance at vertical edge of doors, not exceeding 3/16 inch (5 mm).

B. Adjust hinges to position doors in partial opening position when unlatched. Return out-swinging doors to closed position.

C. Adjust adjacent components for consistency of line or plane.

**END OF SECTION**

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# SECTION 10 2226
# OPERABLE PARTITIONS

## PART 1 – GENERAL SPECIFICATIONS

### 1.01 WORK INCLUDED

A. Operable wall system shall be furnished, installed, and serviced by wall manufacturer's authorized distributor, in compliance with the architectural drawings and specifications contained herein.

### 1.02 RELATED WORK

A. Structural Support: Structural support system required for suspending the operable wall shall be designed, installed and pre-punched by others, in accordance with ASTM E 557 and manufacturer's shop drawings.

B. Insulation: Sound insulation and baffles for the plenum area above the track system, under the permanent floor, inside air ducts passing over or around the operable wall, and in permanent walls adjoining the operable wall system shall be by others, in accordance with ASTM E 557.

C. Opening Preparation: Proper and complete preparation of the operable wall system opening shall be by others in accordance with ASTM E 557 and shall include floor leveling; plumbness of adjoining permanent walls; substrate and/or ceiling tile enclosures for the track system; and the painting and finishing of trim and other materials adjoining the head and jamb areas of the operable wall. Any permanent wall(s) receiving an adjustable or fixed wall jamb will require internal structural blocking to secure the jamb to the permanent wall. Refer to a copy of the shop drawings for additional details.

### 1.03 SYSTEM DESCRIPTION

A. The operable wall system shall consist of Hinged, Paired Panels that are top-supported by one (1) carrier. Featuring panels hinged together in evenly matched pairs (groups of two (2)), unless otherwise specified.

B. The operable wall system shall consist of acoustically rated panels tested in accordance with ASTM E 90 and ASTM E413 test procedures and shall have achieved a STC rating as specified herein (see "Acoustical Performance" article listed under Part 2 – Products).

### 1.04 QUALITY ASSURANCE

A. The operable wall shall have been tested in an independent acoustical testing laboratory in accordance with ASTM E 90 and ASTM E 413 test procedures.

B. The operable wall panel construction and finish materials shall consist of Class A rated materials (except as noted, under "Finishes" Part 2 – Products) in accordance with ASTM E 84.

C. The operable wall shall be installed by the manufacturer's authorized distributor in accordance with ASTM E 557.

### 1.05 REFERENCES

A. ASTM E 90: Laboratory Measurement of Airborne-Sound Trans-mission Loss of Building Partitions.

B. ASTM E 413: Determination of Sound Transmission Class (STC).

C. ASTM E 557: Architectural Application and Installation of Operable Partitions. ASTM E 84: Surface Burning Characteristics of Building Materials.

D. ASTM A 653: Specification for General Requirements for Steel Sheet, Alloy-Coated (Galvanneal) by the Hot Dip Process.

E. ASTM C 423: Standard Test Method for Sound Absorption and Sound Absorption Coefficients by the Reverberation Room Method.

F. CCC-W-408A: Federal Specification which applies to Vinyl Coated Wall Coverings.

G. CFFA-W-101-D: Chemical Fabrics and Film Association Quality Standard for Vinyl Coated Fabric Wall Coverings.

H. ATTM E 2190: Certification and testing for Insulated Glass inserts.

**1.06 SUBMITTALS**

A. Manufacturer shall provide written technical information and related detail drawings, which demonstrate that the products comply with contract documents for each type of operable partition specified.

B. Manufacturer shall provide detailed engineering drawings featuring track plan, panel elevation, horizontal and vertical details, and beam punching template as required.

C. Manufacturer shall provide a written test report of the indepen-dent acoustical testing laboratory certifying the attainment of the specified STC rating, upon request.

D. Manufacturer shall provide written instructions specifying the proper operation and maintenance of the operable wall system.

E. Manufacturer shall provide a color selector demonstrating the manufacturer's selections of the specified finish material.
   1. Samples shall consist of actual swatches of the specified finish material.

**1.07 DELIVERY, STORAGE, AND HANDLING**

A. Panels shall be individually wrapped in a protective plastic covering to keep panels clean during delivery, storage, and handling.

B. Panels shall be stored on edge and above the floor on cushioned blocking in a dry and ventilated area, protected from humidity and temperature extremes.

**1.08 SEQUENCING / SCHEDULING**

A. Beam Punching: Manufacturer shall provide beam punch-ing template drawing detailing the anchor locations for the suspended track system (as required for Drop Rod Mounting), as required for the fabrication and installation of structural overhead support by others.

B. Track Installation: Scheduling of operable wall track installation shall occur after structural overhead support has been properly and completely fabricated and installed by others.

C. Panel Installation: Operable wall panel installation shall occur after fixed wall substrate construction is properly and com-pletely installed by others, as required to protect panels from ongoing adjacent construction.

**1.09 WARRANTY**

A. Manufacturer shall warrant each operable wall panel and its component parts to be free from defects in material and work-manship for a period of ten (10) years from the date of delivery to the original purchaser, when installed by an authorized distributor.

**PART 2 – PRODUCT SPECIFICATIONS**

**2.01 ACCEPTABLE MANUFACTURER**

A. Operable walls shall be Series 2000, Model 2030 Hinged, Paired Panels as manufactured by KWIK-WALL Company or equal.

## 2.02 PANEL CONSTRUCTION

A. Panel Dimensions: Standard panel dimension shall be a nominal 3” 76 thick.

B. Panel Frame: Vertical steel frame members shall be minimum 18-gauge galvanneal steel, horizontal top cross member shall be minimum 12-gauge galvanneal steel, which meets or exceeds ASTM A 653 requirements. Frames shall be all-welded construction with steel corner support and cross-bracing reinforcements. Panel frames shall be Class A-rated fire-retardant, non-combustible, and non-corrosive in accordance with ASTM E 84.

C. Panel Skins: Panel skins shall be Class A rated (except Wood Veneer and High-Pressure Laminate) in accordance with ASTM E 84. Panel skin material shall be as selected by Architect.

D. Panel Hinges: Panel hinges shall be: Architectural grade, full-leaf butt hinges.
   1. Hinges shall be attached to the steel frame of the panel and reinforced with a steel backer plate.

E. Panel Weight: Maximum panel weight shall be 6.5 – 9.2 lb./ ft.2 (32 – 59 kg/m2) depending on STC rating, size, and options selected.

## 2.03 OPERATION

A. Operation shall be manually operated, consisting of panels hinged together in groups of two (2), unless otherwise spec-ified. Panels shall be top-supported by one (1) carrier in each panel.

## 2.04 STACK ARRANGEMENTS

A. Stack Type: Panel storage configuration shall be Center Stacking, consisting of panels stacked on the centerline to the wall’s installed position.
   1. Stack Quantity: Panels shall be stored at:
      a. One End: at one room end perimeter wall

## 2.05 FINISHES

A. Finish Material Type: Finish to be selected by Architect from provided finish samples. Panel finish material shall be Class A (except wood veneer and high-pressure laminate) rated in accordance with ASTM E 84.

## 2.06 PERIMETER TRIM AND SEALS

A. Vertical Trim and Seals: Panels shall have vertical astragals con-taining flexible vinyl seals and incorporate reversible tongue-and-groove-type configurations for positive interlocking with adjacent panels. Vertical astragal type shall be:
   1. Trimless Astragal: consisting of an aluminum extrusion with tongue-and-groove-type vertical astragals. Vertical trim shall not be permitted on the panel faces, resulting in a minimal groove appearance between adjacent panels.

B. Horizontal Top Trim and Seals: Top seals shall consist of flexible vinyl sweep seals installed on both sides of the panel. The seals shall consist of a compressed bulb between two (2) fingers of vinyl. Top seal type shall be:
   1. Fixed Top Seals: consisting of continuous-contact flexible vinyl sealing against the bottom flange of the overhead track.

C. Horizontal Bottom Trim and Seals: Bottom seals shall consist of multiple fingers of flexible vinyl for positive contact and sealing with various floor surfaces. Bottom seal type shall be:
   1. Adjustable Bottom Seals: consisting of field-adjustable, continuous-contact vinyl sweep seals with 2” 50.8 nominal height with 3/4” 19 of nominal adjustment.

D. Horizontal and Vertical Panel Trim: All exposed panel trim and hinges shall be of one (1) similar color as selected from manufacturer’s standard colors.

### 2.07 CLOSURE SYSTEMS

A. Initial Closure System: The lead panel (the first panel exiting the stack) shall form a seal vertically against a rigid wall surface, as accomplished by a:
   1. Bulb Seal: consisting of continuous-contact, flexible vinyl bulb seals installed along the vertical edge of the lead panel for positive compression against a rigid wall surface.

B. Final Closure System: The final closure panel (the last panel exiting the stack) shall form a seal vertically against a rigid wall surface. The type of final closure panel shall be:
   1. Hinged Panel(s) Closure: consisting of a panel hinged perma-nently and directly to a structural wall surface. The Hinged Panel(s) shall be equipped with an adjustable bottom seal, a lap-type extrusion for sealing against its adjacent panel (standard) or (optional) expander mechanism with a nominal 5” 127 of travel, activated from the face of the panel using a removable wrench, and a flush pull handle on each side of the panel.

C. Lap Closure: consisting of a pair of panels equipped with bulb seals for sealing against a rigid wall surface along one (1) vertical edge, and a lap-type extrusion that overlaps with the adjacent panel on the opposite vertical edge. The Lap Closure panels shall be equipped with adjustable bottom seals, and a flush pull handle.

### 2.08 ACOUSTICAL PERFORMANCE

A. Certification: The operable wall shall have been tested in an independent acoustical testing laboratory in accordance with ASTM E 90 and ASTM E 413 test procedures.

B. STC Rating: The operable wall acoustical performance rating shall be based on (select):
   1. Acoustical Substrate: 42 STC, 45 STC, 49 or 50 STC.

### 2.09 PANEL ACCESSORIES

A. Accessories, including Insulated Glass Unit Vision Lites; Pass Doors: Single or Double; Keyed Cylinder Locks; Concealed Door Closures; Room Viewers; Exit Signs; Dry Marker Writing Surfaces; Recessed Eraser Trays; Tack Surfaces; and Pocket Doors shall be compatible with other accessories and options, furnished and installed by the operable wall manufacturer as noted on submitted shop drawings.

### 2.10 TRACK SYSTEMS

A. Track Type: The operable wall track system shall be:
   1. Aluminum Track: extruded from structural aluminum al-loy, which prohibits deterioration caused by rust or corrosion. The aluminum track shall have a durable, anodized, clear satin finish, which resists color fading and flaking. The track shall utilize grooves and interlocking steel pins for positive alignment of adjacent track sections. The track joints shall be reinforced overhead by a heavy-duty steel bracket made of hot-rolled, 3/8” 10 thick plate steel. Aluminum track shall include an integral nut slot to accept a hardened steel square nut, to facilitate at-tachment of each steel all-rod and splice brackets to the overhead structural support.

## PART 3 – EXECUTION

### 3.01 INSPECTION

A. Proper and complete preparation of the operable wall system opening shall be by others in accordance with the architectural drawings, manufacturer’s shop drawings, and ASTM E 557. Any deviation of the actual opening from these specifications shall be called to the attention of the architect prior to the installa-tion of the operable wall.
   1. Deficiencies in the operable wall opening shall be corrected by others prior to installation of the operable wall.

### 3.02 INSTALLATION

A. The operable wall system shall be installed by manufacturer's authorized distributor.

B. The operable wall shall be installed in accordance with manu-facturer's written instructions, shop drawings, and ASTM E 557 installation guidelines.

### 3.03 ADJUSTING AND CLEANING

A. The operable wall panels and track system shall be adjusted and cleaned in accordance with manufacturers written instructions.

### 3.04 PROTECTION

A. The operable wall panels shall be stored in the stacked (retracted) position prior to acceptance by the owner's representative.

### 3.05 DEMONSTRATION

A. The operable wall manufacturer's authorized distributor shall demonstrate proper operation and explain proper and neces-sary maintenance requirements of the operable wall system to the owner's representative.

B. For additional information contact: KWIK-WALL Company 900 S. Cain St. Clinton, IL 61727; Phone: 217-522-5553 or 800-280-5945; (United States and Canada only) Fax: 217-522-1170 or 800-290-5945; (United States and Canada only) Website: www.kwik-wall.com Email: info@kwik-wall.com

**END OF SECTION**

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# SECTION 10 2800
# TOILET, BATH, AND LAUNDRY ACCESSORIES

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Commercial toilet accessories.

B. Accessories for toilet rooms and utility rooms.

C. Grab bars.

### 1.02 RELATED REQUIREMENTS

A. Section 09 3000 - Tiling: Ceramic washroom accessories.

B. Section 22 4000 - Plumbing Fixtures: Under-lavatory pipe and supply covers.

### 1.03 REFERENCE STANDARDS

A. ASTM A269/A269M - Standard Specification for Seamless and Welded Austenitic Stainless Steel Tubing for General Service; 2015a (Reapproved 2019).

B. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2025a.

C. ASTM A666/A666M - Standard Specification for Annealed or Cold-Worked Austenitic Stainless Steel Sheet, Strip, Plate, and Flat Bar; 2024.

D. ASTM B456 - Standard Specification for Electrodeposited Coatings of Copper Plus Nickel Plus Chromium and Nickel Plus Chromium; 2017.

E. GSA CID A-A-3002 - Mirrors, Glass; U.S. General Services Administration; 1996.

### 1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordinate the work with the placement of internal wall reinforcement, concealed ceiling supports, and reinforcement of toilet partitions to receive anchor attachments.

### 1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Submit data on accessories describing size, finish, details of function, and attachment methods.

C. Manufacturer's Installation Instructions: Indicate special procedures and conditions requiring special attention.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. Basis of Design: Bobrick: Refer to Drawings.

B. Commercial Toilet, Shower, and Bath Accessories:
   1. AJW Architectural Products; ____: www.ajw.com.
   2. American Specialties, Inc; ____: www.americanspecialties.com.
   3. Bradley Corporation; ____: www.bradleycorp.com.
   4. Bobrick; ____: www.bobrick.com.
   5. Substitutions: Section 01 6000 - Product Requirements.

## 2.02 MATERIALS

A. Accessories - General: Shop assembled, free of dents and scratches and packaged complete with anchors and fittings, steel anchor plates, adapters, and anchor components for installation.
   1. Grind welded joints smooth.
   2. Fabricate units made of metal sheet of seamless sheets, with flat surfaces.

B. Keys: Provide _____ keys for each accessory to Owner; master key lockable accessories.

C. Stainless Steel Sheet: ASTM A666/A666M, Type 304.

D. Stainless Steel Tubing: ASTM A269/A269M, Grade TP304 or TP316.

E. Galvanized Sheet Steel: Hot-dipped galvanized steel sheet, ASTM A653/A653M, with G90/Z275 coating.

F. Adhesive: Two component epoxy type, waterproof.

G. Fasteners, Screws, and Bolts: Hot dip galvanized; tamper-proof; security type.

H. Expansion Shields: Fiber, lead, or rubber as recommended by accessory manufacturer for component and substrate.

## 2.03 FINISHES

A. Stainless Steel: Satin finish, unless otherwise noted.

## 2.04 COMMERCIAL TOILET ACCESSORIES: REFER TO DRAWINGS FOR PRODUCT NUMBERS AND LOCATIONS UNLESS SHOWN BELOW THIS PARAGRAPH.

**Provide Concealed solid wood blocking for all toilet accessories to be installed in stud wall assemblies. Where toilet accessories are the located in CMU walls, comply with manufacturer's recommendations. Coordinate and provide filled CMU cells for anchored attachment where applicable. Mount and locate per ADA. Coordinate with all other trades. Toggle bolts are not acceptable.**

# PART 3 EXECUTION

## 3.01 EXAMINATION

A. Verify existing conditions before starting work.

B. Verify exact location of accessories for installation.

## 3.02 INSTALLATION

A. Install accessories in accordance with manufacturers' instructions in locations indicated on drawings.

B. Install plumb and level, securely and rigidly anchored to substrate.

C. Mounting Heights: As required by accessibility regulations, unless otherwise indicated.

**END OF SECTION**

# SECTION 10 4400
# FIRE PROTECTION SPECIALTIES

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Fire extinguishers.

B. Fire extinguisher cabinets.

C. Accessories.

### 1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Wood blocking product and execution requirements.

B. Section 09 2116 Gypsum Board Assemblies

C. Section 09 9123 - Interior Painting: Field paint finish.

### 1.03 REFERENCE STANDARDS

A. FM (AG) - FM Approval Guide; Current Edition.

B. NFPA 10 - Standard for Portable Fire Extinguishers; 2022.

C. UL (DIR) - Online Certifications Directory; Current Edition.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide extinguisher operational features.

C. Manufacturer's Installation Instructions: Indicate special criteria and wall opening coordination requirements.

D. Maintenance Data: Include test, refill or recharge schedules and re-certification requirements.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. Fire Extinguishers:
   1. Ansul, a Tyco Business; ____: www.ansul.com/#sle.
   2. Pyro-Chem, a Tyco Business; _____: www.pyrochem.com/#sle.
   3. Amerex Corp

B. Fire Extinguisher Cabinets and Accessories:
   1. Ansul, a Tyco Business; _____: www.ansul.com/#sle.
   2. JL Industries, Inc; _____: www.jlindustries.com.
   3. Larsen's Manufacturing Co; _____: www.larsensmfg.com/#sle.
   4. Amerex Corp
   5. Substitutions: See Section 01 6000 - Product Requirements.

### 2.02 FIRE EXTINGUISHERS

A. Fire Extinguishers - General: Comply with product requirements of NFPA 10 and applicable codes, whichever is more stringent.
   1. Provide extinguishers labeled by UL (DIR) or FM (AG) for purpose specified and as indicated.

B. Multipurpose Dry Chemical Type Fire Extinguishers: Carbon steel tank, with pressure gage.
   1. Class: A:B:C type.

2. Size: 10 pound (4.54 kg).
3. Finish: Baked polyester powder coat Red color.
4. Temperature range: Minus 40 degrees F (Minus 40 degrees C) to ___ degrees F (___ degrees C).

C. Dry Chemical Type Fire Extinguishers: Stainless steel tank, with pressure gauge.
1. Class: K type.
2. Size: 1.6 gallons (6 L).
3. Finish: Polished stainless steel.
4. Temperature range: Minus 20 degrees F (Minus 29 degrees C) to 120 degrees F (49 degrees C).

**2.03 FIRE EXTINGUISHER CABINETS**

A. Metal: Steel: Color as selectedby Architect from manufacturer's colors.

B. Cabinet Configuration: Semi-recessed type.
1. Size to accommodate accessories.

C. Door Glazing: Glass, clear, tempered, 1/8 inch (3 mm) thick float. Set in resilient channel gasket glazing.

D. Finish of Cabinet Exterior Trim and Door: No. 4 - Brushed stainless steel.

E. Finish of Cabinet Interior: White colored enamel.

**2.04 FIRE EXTINGUISHER BRACKET**

A. Standard Fire Extinguisher Bracket.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

A. If installed in metal stud wall provide solid wood blocking at top, bottom, and sides of cabinet locations prior to installation of cabinet

B. Verify rough openings for cabinet are correctly sized and located.

**3.02 INSTALLATION**

A. Install in accordance with manufacturer's instructions.

B. Place extinguishers in cabinets.

C. Position cabinet signage at as directed by architect.

**END OF SECTION**

# SECTION 10 5300
# EXTRUDED ALUMINUM WALKWAY COVERS

## PART 1 – GENERAL

### 1.01 REFERENCE STANDARDS

A. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2026.

B. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2026.

C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

### 1.02 RELATED DOCUMENTS

A. A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, shall apply to work specified in this section.

### 1.03 GENERAL DESCRIPTION OF WORK

A. Work in this section shall include design, fabrication and installation of a complete flat, gable, extruded aluminum canopy system with welded drain beams and trusses in accordance with the drawings and this specification.

B. Extruded Aluminum Walkway Cover Manufacturer shall coordinate with Electrical for proper placement of conduit and Electrical fixtures. Provide additional matching support structure for Surface mounted Ceiling Fans. Refer to Electrical drawings.

### 1.04 REFERENCES

A. Aluminum Design Manual 2000, Specifications and Guidelines for Aluminum Structures.

B. ASCE 7, Minimum Design Loads for Buildings and Other Structures.

C. American Architectural Manufacturers Association (AAMA)

D. American Society for Testing and Materials (ASTM).

### 1.05 RELATED SECTIONS

A. Concrete Work - Section 033000

B. Masonry Work - Section 042000

C. Metal Fabrication - Section 055000

D. Flashing and Sheet Metal - Section 076000

E. Joint Sealants - Section 079000

F. Signage

### 1.06 SUBMITTALS

A. Product Data: Submit manufacturer’s product information, specifications and installation instructions for components and accessories.

B. Shop Drawings: Submit complete erection drawings showing attachment system, column and gutter beam framing, transverse cross sections, covering and trim details, and optional installation details to clearly indicate proper assembly of components, sealed by a State Registered Structural Engineer in the state in which the work is being performed.

C. Design and Certification: Submit written Certification prepared and signed by a State **Registered Structural Engineer** verifying that framing design will safely resist wind uplift as computed by ANSI A58.1, IV=150, Exposure C, as well as meet indicated loading requirements of the all applicable Codes, as referenced in State of Alabama Requirements for Educational Facilities 1999 and wind loading requirements of ANSI/ASCE 7-98, live and dead loads and other load requirements.

D. Design and engineering of the walkway covers and canopy footings and attachment surfaces are covered in this specification and scope of work. Aluminum members shown on the drawings are minimal. The design engineer shall size aluminum members, design all connections, calculate the height of columns based on finished elevations and design all connections. Calculate the height of columns based on finished elevations and design all concrete foundations and applicable steel reinforcement per applicable codes and geotechnical engineering report. Comply with all local wind requirements with authorities having jurisdiction.

E. Mock-up: Provide mock-up of Roof (Beam Column, Gutter) and 2 x 2 trellis (Beams, Column, 2 x 2's).

**1.07 QUALITY ASSURANCE**

A. Codes and standards (IBC 2024): Comply with provisions of the following except as otherwise indicated: Standard building code, latest addition with amendments, if any. AWS (American Welding Society) standards for structural aluminum welding.

B. Manufacturer: Obtain aluminum covered walkway system from only one (1) manufacturer, although several may be indicated as offering products complying with requirements.

C. Installer Qualifications: Firm with not less than three (10) years experience in installation of aluminum walkway covers of type, quantity and installation methods similar to work of this section.

D. Field Measurements: Take field measurements and verify all existing conditions prior to preparation of the shop drawings and fabrication and design intent of architect, to insure proper fitting of work.

E. Coordination: Coordinate work of this section with work of other sections which interface with covered walkway system (sidewalk, curbs, building fascias, etc.).

**1.08 WARRANTY**

A. A. Provide manufactures standard one-year warranty that shall include, but not limited to, coverage for structural, water tightness and finish beginning the day of Substantial Completion of Installation. Provide 20 year warranty on finish.

**PART 2 - PRODUCT**

**2.01 MANUFACTURERS**

A. Contract documents are based on products manufactured by:

B. Tennessee Valley Metals, Inc.
   1. 190 Industrial Park Road, Oneonta, AL 35121
   2. 74.9500, fax 205.274.9501
   3. 800.551.2579
   4. sales@tvmetals.com , www.tvmetals.com

C. Interested manufacturers will be considered for substitution only when the following conditions are met: Complete details, including connections and structural calculations showing loads applied in accordance with the specification, must be submitted to the architect for review. Submit complete details with structural properties (moment of inertia, section modules, modules of elasticity, etc.) for all proposed sections (bents, columns, decking and other structural members).

D. Approved equals:
   1. Rusco Custom Canopies

**2.02 MATERIALS**

A. A. Aluminum Extrusions: All sections shall be extruded aluminum 6063 alloy, heat treated to T-6 temper.

B. B. Finishes:
   1. For fluoropolymer (Kynar) finish, specify AAMA 2605, two or three coats., PVDF (20-year warranty required).

C. Color to be selected by Architect. The intent is to match the aluminum canopies on adjacent buildings on campus.

**2.03 COMPONENTS**

A. Columns: Columns shall be radius-cornered tubular extrusion of size as per the manufacturers design engineer with cutout and internal diverter for drainage where indicated. Circular downspout opening in column is not acceptable. Provide a small weep hole at the bottom of all non-draining columns to allow for the escape of condensation.

B. Beams (when used): Beams shall be tubular extrusions of size and shape shown on drawings (open-top tubular extrusions of size and shape shown on drawings with top edges thickened for strength as necessary).

C. Deck: Deck shall be extruded self-flashing sections interlocking into a composite unit.

D. Fascia: Fascia shall be manufacturer's standard shape. Size as indicated on drawings.

E. Flashing: Flashing shall be .032” aluminum (min.). All thru-wall flashing is completed by others.

**2.04 FABRICATION**

A. Drainage: Water shall drain internally from deck to fascia to beams to columns, for discharge out of rain diverters at or below ground level as indicated on architectural drawings.

B. Deck Construction: Deck shall be manufactured of extruded modules that interlock in a self-flashing manner. Interlocking joints shall be positively fastened at 18" O.C. creating a monolithic structural unit capable of developing the full strength of the sections. The fastenings must have minimum shear strength of 350 pounds each. Deck shall be assembled with sufficient camber to offset dead load deflection.

**PART 3 – EXECUTION**

**3.01 PREPARATION**

A. Erection shall be performed after all concrete, masonry, and roofing work in the vicinity is complete and cleaned.

**3.02 INSTALLATION**

A. Column Sleeves: Column sleeves (styrofoam block-outs) or anchor bolts (if required) shall be furnished by Tennessee Valley Metals and installed by the General Contractor.
   1. Erection: Protective cover shall be erected true to line, level and plumb.

### 3.03 CLEANING

A. All protective cover components shall be cleaned promptly after installation.

### 3.04 PROTECTION

A. Extreme care shall be taken to protect materials during and after installation.

**END OF SECTION**

# SECTION 10 5311
# ROD SUPPORTED EXTRUDED ALUMINUM CANOPY

## PART 1 – GENERAL

### 1.01 REFERENCE STANDARDS

A. AAMA 2604 - Voluntary Specification, Performance Requirements and Test Procedures for High Performance Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2026.

B. AAMA 2605 - Voluntary Specification, Performance Requirements and Test Procedures for Superior Performing Organic Coatings on Aluminum Extrusions and Panels (with Coil Coating Appendix); 2026.

C. ASCE 7 - Minimum Design Loads and Associated Criteria for Buildings and Other Structures; Most Recent Edition Cited by Referring Code or Reference Standard.

### 1.02 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, shall apply to work specified in this section.

### 1.03 GENERAL DESCRIPTION OF WORK

A. Work in this section shall include design, fabrication and installation of a complete rod supported extruded aluminum canopy system in accordance with the drawings and this specification.

### 1.04 REFERENCES

A. Aluminum Design Manual 2000, Specifications & Guidelines for Aluminum Structures.

B. ASCE 7, Minimum Design Loads for Buildings and Other Structures.

C. American Architectural Manufacturers Association (AAMA)

D. American Society for Testing and Materials (ASTM)

### 1.05 RELATED SECTIONS

A. Concrete Work - Section 033000

B. Masonry Work - Section 042000

C. Metal Fabrication - Section 055000

D. Flashing and Sheet Metal - Section 076200

E. Joint Sealants - Section 079005

### 1.06 SUBMITTALS

A. Product Data: Submit manufacturer’s product information, specifications and installation instructions for components and accessories.

B. Shop Drawings: Submit complete erection drawings showing attachment system, support rods and gutter beam framing, transverse cross sections, covering and trim details, and optional installation details to clearly indicate proper assembly of components, sealed by a State of Alabama Registered Structural Engineer registered in the state in which the work is being performed..

C. Calculations: Submit complete structural design calculation sealed by State Registered Structural Engineer registered in the state in which the work is being performed.

D. Design and engineering of canopy are required in this specification and scope of work, by a licensed Alabama Structural Engineer. Engineer shall stamp and date his drawings and submit to the architect for approval.

**1.07 QUALITY ASSURANCE**

A. Codes and standards: Comply with provisions of the following except as otherwise indicated: Local building codes including the 2024 International Building Code, latest addition with amendments, if any. AWS (American Welding Society) standards for structural aluminum welding. Comply with local wind requirements with authorities having jurisdiction.

B. Manufacturer: Obtain aluminum covered walkway system from only one (1) manufacturer, although several may be indicated as offering products complying with requirements.

C. Installer Qualifications: Firm with not less than three (3) years experience in installation of aluminum walkway covers of type, quantity and installation methods similar to work of this section.

D. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication where possible, to insure proper fitting of work.

E. Coordination: Coordinate work of this section with work of other sections which interface with covered walkway system (sidewalk, curbs, building fascias, etc.).

**1.08 WARRANTY**

A. Provide manufactures standard one-year warranty that shall include, but not limited to, coverage for structural, water tightness and finish beginning the day of Substantial Completion as certified by the architect.

**PART 2 - PRODUCT**

**2.01 MANUFACTURERS**

A. A. Contract documents are based on products manufactured by:
1. Tennessee Valley Metals, Inc.
2. 190 Industrial Park Road, Oneonta, AL 35121
3. 74.9500, fax 205.274.9501
4. 800.551.2579
5. sales@tvmetals.com , www.tvmetals.com

B. Interested manufacturers will be considered for substitution only when the following conditions are met: Complete details, including sizes of all members and structural calculations showing loads applied in accordance with the specification must be submitted to the architect for review. Submit complete details with structural properties (moment of inertia, section modules, modules of elasticity, etc.) for all proposed sections (support rods, decking and other structural members).

C. Approved equals:
1. Rusco Custom Canopies

**2.02 MATERIALS**

A. A. Aluminum Extrusions: All sections shall be extruded aluminum 6063 alloy, heat treated to T-6 temper.

B. B. Finishes:

C. Fluoropolymer (Kynar) finish, AAMA 2605, two or three coats. PVDF (20 year warranty required).

D. Color to be selected by Architect. The intent is to match the aluminum canopies on adjacent buildings on campus.

**2.03 COMPONENTS**

A. Support rods: Rods shall be 2” tubular shapes as per manufacturer’s standard. (Rod and clevis are available as an option.)

B. Deck: Deck shall be extruded self-flashing sections interlocking into a composite unit.

C. Fascia: Fascia shall be manufacturer's standard shape. Size as indicated on drawings.

D. Flashing: Flashing shall be .032” aluminum (min.). All thru-wall flashing is completed by others.

E. Scuppers: Scupper plates shall be used to drain water from the canopy fascia.

F. FFasteners: All exposed fasteners shall be stainless steel.

**2.04 FABRICATION**

A. Drainage: Water shall drain directly from the fascia and be diverted by a scupper plate (or into downspout and discharged at ground level).

B. Deck Construction: Deck shall be manufactured of extruded modules that interlock in a self-flashing manner.

**PART 3 – EXECUTION**

**3.01 PREPARATION**

A. Erection shall be performed after all concrete, masonry, and roofing work in the vicinity is complete and cleaned.

B. Coordinate installation with pre-engineered metal buildings for structural sound and waterproofing installation.

**3.02 INSTALLATION**

A. Protective cover shall be erected true to line with adequate slope for drainage. Adequate framing members and/or blocking shall be provided in the wall structure (by others) to safely support the canopy.

**3.03 CLEANING**

A. A. All protective cover components shall be cleaned promptly after installation.

**3.04 PROTECTION**

A. A. Extreme care shall be taken to protect materials during and after installation.

**END OF SECTION**

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# SECTION 10 7500
# FLAGPOLES

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Aluminum Flagpoles.

### 1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Concrete base and foundation construction.

### 1.03 REFERENCE STANDARDS

A. ASTM B221 - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes; 2021.

B. ASTM B221M - Standard Specification for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes (Metric); 2021.

C. NAAMM FP 1001 - Guide Specifications for Design Loads of Metal Flagpoles; 2007.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on pole, accessories, and configurations.

C. Shop Drawings: Indicate detailed dimensions, base details, anchor requirements, and imposed loads.

D. Samples: Submit two 12" x 12" in size, illustrating pole material, color, and finish.

### 1.05 QUALITY ASSURANCE

A. Designer Qualifications: The manufacturer shall provide design the flagpole foundation under direct supervision of a Professional Structural Engineer experienced in design of this Work. Provide a professional engineers stamp. The engineer shall note that the flag Pole and foundation are designed for the geographic location of the project.

B. The Design shall be in accordance with American National Standard Institute / National Association of Architectural Metal Manufacturers (ANSI/NAAMM) Guide Specification for Design of Metal Flagpoles ANSI NAAMM FP 10001-07.

C. Design with Base wind speed (3 second gust) shall be 115 MPH or ASCE 7 - which ever is greater.

D. All poles to be designed to suppot two two ply polyester flags.

### 1.06 DELIVERY, STORAGE, AND HANDLING

A. Spiral wrap flagpole with protective covering and pack in protective shipping tubes or containers. Ship as a single flagpole component with no joints.

B. Protect flagpole and accessories from damage or moisture.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. Flagpoles:
   1. Concord American Flagpole; Internal - Independence: www.concordamericanflagpole.com/#sle.
   2. Morgan-Francis Flagpoles & Accessories: www.morgan-francis.com/#sle.
   3. Pole-Tech Co, Inc: www.poletech.com/#sle.

4. Substitutions: See Section 01 6000 - Product Requirements.

## 2.02 FLAGPOLES

A. Flagpoles: Designed in accordance with NAAMM FP 1001
   1. Material: Aluminum, .156 inch wall thickness, minimum. Brushed Satin AA-M33 directional Textured , no visable seams.
   2. Design: Cone tapered.
   3. Mounting: Ground mounted type.
   4. Nominal Height: Center one (1) pole to be 30 ft (____ m); two (2) outer poles to be 25 ft; measured from nominal ground elevation. Each to be shipped in one piece.
   5. Halyard: Internal type, manual winch operation. Aircraft grate stainless #10 wire rope cored polyester.
   6. Cap Plug: Cast aluminum threaded to accept truck and finial. Plug shall be welded water tight to top of pole. Use caulking in threads to seal inside of pole.
   7. Finial: Globe with same finish as pole and 1.5 times the diameter of the top of the pole to reduce flag damage and entanglement.
   8. Cleat: Double sided, stainless steel or aluminum cleat with locking mechanism.
   9. Flash collar: Same material and finish as pole. Must cover anchor bolts.
   10. Truck (block):
      a. Truck shall cover the entire perimeter of the top of the pole. The truck shall be designed to lift and set the pole with the finial threads or with rope rigging.
      b. Fixed with single closed or covered, metallic pully.
      c. Threaded into cap plug with internal threads to receive finial.
      d. Pully axle to be stainless steel.
   11. Flag Swivel Snap Hooks: Chrome plated steel, nickel plated steel or stainless steel with stainless springs. Nonswivel hooks are not allowed. Provide gray, vinyl snap covers to prevent flagpole damage.
   12. Screws: Stainless screws shall be used to mount all hardware to pole.
   13. All flagpoles to have a lightning ground spike.

## 2.03 POLE MATERIALS

A. Aluminum: ASTM B221 ASTM B221M , 6063 alloy , T6 temper.

## 2.04 ACCESSORIES

A. Finial Ball: Aluminum, ____ inch (____ mm)1.5 times thetop diameter of flagpole. .

B. Truck Assembly: Stainless steel; revolving, stainless steel ball bearings, non-fouling.

C. Cleats: 9 inch (230 mm) size, aluminum with galvanized steel fastenings, one per halyard.

D. Halyard: 5/16 inch (8 mm) diameter polypropylene, braided, wire core. stainlees steel wire.

## 2.05 MOUNTING COMPONENTS

A. Lighting Ground Rod: 120 inch (____ mm) long copper rod, 3/4 inch (19 mm) diameter. See electrical drawings.

B. Lightning Ground Cable: Copper No. 6 AWG minimum, soft drawn. See electrical drawings.

## 2.06 FINISHING

A. Aluminum: Mill finish.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify that concrete foundation is ready to receive work and dimensions are as indicated on shop drawings.

B. Verify that electric power is available and of the correct characteristics.

### 3.02 PREPARATION

A. Coat metal sleeve surfaces below grade and surfaces in contact with dissimilar materials with asphaltic paint.

### 3.03 INSTALLATION

A. Install flagpole , base assembly, and fittings in accordance with manufacturer's instructions.

B. Ground Sleeve Anchorage: Minimum 16 Gauge Galvanized, corrugated sleeve embedded a minimum of 15% of the pole height.

C. Fill foundation tube sleeve with concrete specified in Section 03 3000.

D. Install foundation plate and centering wedges for flagpoles base set in concrete base and fasten.

E. Mimimum Concrete thickness of 8 inches.

F. Flag Poles Bases shall be elevated a minumum of (6) inches above grade and positively drained away from pole base.

G. All Concrete shall be reinfirced with at least temperture and shinkage reinforcement to meet ACI - 318 requirements. Other reinforcement may be required by Maunufaturer's professional Engineer.

H. Concrete Cover over all reinforcementshall be 3 inches.

I. Concrete shall have 1/2 inch champher at corners.

### 3.04 ADJUSTING

A. Adjust operating devices so that halyard and flag function smoothly.

**END OF SECTION**

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# SECTION 11 3013
# RESIDENTIAL APPLIANCES

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Appliances provided by the owner.
   1. Contractor to install ice maker water to refrigerators. Refer to plumbing.
   2. Contractor to coordinate size and features of owners appliances with the Plastic Laminate Casework. Refer to drwaings.

### 1.02 RELATED REQUIREMENTS

A. Section 22 1005 - Plumbing Piping: Plumbing connections for appliances.

B. Section 26 0583 - Wiring Connections: Electrical connections for appliances.

### 1.03 REFERENCE STANDARDS

A. UL (DIR) - Online Certifications Directory; Current Edition.

### 1.04 QUALITY ASSURANCE

A. Electric Appliances: Listed and labeled by UL (DIR) and complying with NEMA Standards (National Electrical Manufacturers Association).

## PART 2 PRODUCTS

### 2.01 APPLIANCES, BY OWNER.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Contractor to verify utility rough-ins are provided and correctly located.

### 3.02 INSTALLATION BY OWNER

A. Contactor to provide electrical and plumbing, coordinate with owner.

B. Contractor to coordinate refrigerator and mirowave with cabinets dimension to assure a quality fit. .

### 3.03 ADJUSTING

A. Adjust equipment to provide efficient operation, by owner.

### 3.04 CLEANING

A. Remove packing materials from equipment and properly discard. by owner

B. Wash and clean equipment, by owner.

**END OF SECTION**

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# SECTION 12 2400
# WINDOW SHADES

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Interior **manual** roller shades.
   1. Provide roller shades at all exterior storefront frames (excluding doors) where IG-1 glazing is specified and there is no spandrel glazing. Refer to finish schedule for fabric selection.
   2. Refer to Finish Schedule.

### 1.02 RELATED REQUIREMENTS

A. Section 06 1000 - Rough Carpentry: Concealed wood blocking for attachment of headrail brackets.

### 1.03 REFERENCE STANDARDS

A. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015 (Reapproved 2021)e1.

B. NFPA 701 - Standard Methods of Fire Tests for Flame Propagation of Textiles and Films; 2015.

C. WCMA A100.1 - Safety of Corded Window Covering Products; Current Edition, Including All Revisions.

### 1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Convene one week prior to commencing work related to products of this section; require attendance of affected installers.

B. Sequencing:
   1. Do not fabricate shades until field dimensions for each opening have been taken with field conditions in place.
   2. Do not install shades until final surface finishes and painting are complete.

### 1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide manufacturer's standard catalog pages and data sheets, including materials, finishes, fabrication details, dimensions, profiles, mounting requirements, and accessories.

C. Shop Drawings: Include shade schedule indicating size, location and keys to details, head, jamb and sill details, mounting dimension requirements for each product and condition, and operation direction.

D. Selection Samples: Include fabric samples in full range of available colors and patterns.

E. Verification Samples: Minimum size 6 inches (150 mm) square, representing actual materials, color and pattern.

F. Manufacturer's Instructions: Include instructions for storage, handling, protection, examination, preparation, and installation of product.

G. Operation and Maintenance Data: List of all components with part numbers, sources of supply, and operation and maintenance instructions; include copy of shop drawings.

H. Warranty: Submit sample of manufacturer's warranty and documentation of final executed warranty completed in Owner's name and registered with manufacturer.

### 1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years of documented experience.

### 1.07 MOCK-UP

A. Mock-Up: Provide full size mock-up of window shade system complete with selected shade fabric including example of seams and batten pockets when applicable.
   1. Full-sized mock-up may become part of the final installation.

### 1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver shades in manufacturer's unopened packaging, labeled to identify each shade for each opening.

B. Handle and store shades in accordance with manufacturer's recommendations.

### 1.09 FIELD CONDITIONS

A. Do not install products under environmental conditions outside manufacturer's absolute limits.

### 1.10 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide manufacturer's warranty from Date of Substantial Completion, covering the following:
   1. Shade Hardware: 10 years.
   2. Fabric: 25 years.
   3. Aluminum and Steel Coatings: 25 years.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

A. Interior Manually Operated Roller Shades:
   1. Draper, Inc; Clutch Operated FlexShade: www.draperinc.com/#sle.
   2. MechoShade Systems LLC; Mecho/7 System: www.mechoshade.com/#sle.

### 2.02 ROLLER SHADES

A. General:
   1. Provide shade system components that are easy to remove or adjust without removal of mounted shade brackets.
   2. Provide shade system that operates smoothly when shades are raised or lowered.

B. Roller Shades:
   1. Description - Interior Roller Shades: Single roller, manually operated fabric window shade system complete with mounting brackets, roller tubes, hembars, hardware, and accessories.
      a. Drop Position: Regular roll.
      b. Roll Direction: Roll down, closed position is at window sill.
      c. Mounting: Window jamb mounted - inside, between jambs.
      d. Location and Size: Provide at all fixed glazed exterior openings.
   2. Brackets and Mounting Hardware: As recommended by manufacturer for mounting indicated and to accommodate shade fabric roll-up size and weight.
      a. Material: Stamped steel.
   3. Roller Tubes: As required for type of shade operation.
      a. Size: As recommended by manufacturer; selected for suitability for installation conditions, span, and weight of shades.

b. Fabric Attachment: Utilize extruded channel in tube to accept vinyl spline welded to fabric edge.

4. Hembars: Designed to maintain bottom of shade straight and flat.
   a. Style: Full wrap fabric covered bottom bar, flat profile with heat sealed closed ends.
5. Manual Operation for Interior Shades:
   a. Clutch Operator: Manufacturer's standard material and design, permanently lubricated.
   b. Drive Chain: Continuous loop beaded ball chain, 95 lb (43 kg) minimum breaking strength. Provide upper and lower limit stops.
   c. Chain Retainer:
      1) Chain tensioning device complying with WCMA A100.1.
   d. Fabric: See finish schedule for color.

**2.03 ROLLER SHADE FABRICATION**

A. Field measure finished openings prior to ordering or fabrication.

B. Dimensional Tolerances: Fabricate shades to fit openings within specified tolerances.
   1. Vertical Dimensions: Fill openings from head to sill with 1/2 inch (13 mm) space between bottom bar and window stool.
   2. Horizontal Dimensions - Inside Mounting: Fill openings from jamb to jamb.
   3. Horizontal Dimensions - Inside Mounting: Provide symmetrical light gaps on both sides of shade not to exceed 3/4 inch (19.05 mm) total.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

A. Examine finished openings for deficiencies that may preclude satisfactory installation.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C. Start of installation shall be considered acceptance of substrates.

**3.02 PREPARATION**

A. Prepare surfaces using methods recommended by manufacturer for achieving best result for substrate under the project conditions.

B. Coordinate with window installation and placement of concealed blocking to support shades.

**3.03 INSTALLATION**

A. Install in accordance with manufacturer's instructions and approved shop drawings, using mounting devices as indicated.

B. Replace shades that exceed specified dimensional tolerances at no extra cost to Owner.

C. Adjust level, projection, and shade centering from mounting bracket. Verify there is no telescoping of shade fabric. Ensure smooth shade operation.

**3.04 CLEANING**

A. Clean soiled shades and exposed components as recommended by manufacturer.

B. Replace shades that cannot be cleaned to "like new" condition.

**3.05 PROTECTION**

A. Protect installed products from subsequent construction operations.

B. Touch-up, repair, or replace damaged products before Substantial Completion.

**3.06 MAINTENANCE**

**END OF SECTION**

# SECTION 12 3600
# COUNTERTOPS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Countertops for architectural cabinet work.- Soild Surface

B. Countertops for casework. Refer to Section 06 4100 - Architectural Plastic Laminate Casework - Solid Surface tops and Backslashes.
   1. Wall-hung counters and vanity tops.-Solid Surface

C. Window Sills - Solid Surface

### 1.02 RELATED REQUIREMENTS

### 1.03 REFERENCE STANDARDS

A. ANSI A208.1 - American National Standard for Particleboard; 2022.

B. ASTM D635 - Standard Test Method for Rate of Burning and/or Extent and Time of Burning of Plastics in a Horizontal Position; 2022.

C. ASTM E84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2026a.

D. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards, 2nd Edition; 2014, with Errata (2016).

E. AWMAC/WI (NAAWS) - North American Architectural Woodwork Standards; 2021, with Errata.

F. PS 1 - Structural Plywood; 2023.

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Specimen warranty.

C. Shop Drawings: Complete details of materials and installation ; combine with shop drawings of cabinets and casework specified in other sections.

D. Selection Samples: For each finish product specified, color chips representing manufacturer's full range of available colors and patterns. Provide sample of builted - up counter top edge on Casework mock up.

E. Certificate: Submit labels and certificates required by quality assurance and quality control programs.

F. Installation Instructions: Manufacturer's installation instructions and recommendations.

G. Maintenance Data: Manufacturer's instructions and recommendations for maintenance and repair of countertop surfaces.

### 1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing work of the type specified in this section, with not less than three years of documented experience.

B. Quality Certification:

1. Provide labels or certificates indicating that the installed work complies with AWI/AWMAC/WI (AWS) or AWMAC/WI (NAAWS) requirements for grade or grades specified.
2. Provide designated labels on shop drawings as required by certification program.
3. Provide designated labels on installed products as required by certification program.
4. Submit certifications upon completion of installation that verifies this work is in compliance with specified requirements.

### 1.06 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

### 1.07 FIELD CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

## PART 2 PRODUCTS

### 2.01 COUNTERTOPS AND WINDOW SILLS

A. Solid Surface Tops: Solid surfacing sheet or plastic resin casting over continuous substrate. Coordinate with window details. Refer to drawings for locations of window sills and other solid surfaces tops. Refer to Finish Schedule on drawings for coloration and location.
   1. Window Sills Flat Sheet: 1/2" thickness minimum. See drawings for details.
   2. Solid Surfacing Sheet and Plastic Resin Castings: Complying with ISFA 2-01 and NEMA LD 3; acrylic or polyester resin, mineral filler, and pigments; homogenous, non-porous and capable of being worked and repaired using standard woodworking tools; no surface coating; color and pattern consistent throughout thickness.
      a. Manufacturers: **See finish schedule for color.**
         1) Avonite Surfaces;[____]: www.avonitesurfaces.com/#sle.
         2) Dupont;[____]: www.corian.com/#sle.
         3) Formica Corporation;[____]: www.formica.com/#sle.
         4) Wilsonart;[____]: www.wilsonart.com/#sle.
      b. Surface Burning Characteristics: Class I and Class A; ASTM E 84.
      c. Finish on Exposed Surfaces: Matte. Color noted on finish schedule.
   3. Other Components Thickness: [1/2] inch ([___] mm), minimum.
   4. Coordinate with other trades.

### 2.02 MATERIALS

A. Plywood for Supporting Substrate: PS 1 Exterior Grade, A-C veneer grade, minimum 5-ply; minimum 3/4 inch (19 mm) thick; join lengths using metal splines.

B. Adhesives: Chemical resistant waterproof adhesive as recommended by manufacturer of materials being joined.

C. Joint Sealant: Mildew-resistant silicone sealant, clear.

### 2.03 FABRICATION

A. Fabricate tops, splashes, and window sills in the largest sections practicable, with top surface of joints flush.
   1. Join lengths of tops using best method recommended by manufacturer.

2. Fabricate to overhang fronts and ends of cabinets 1 inch (25 mm) except where top butts against cabinet or wall.
3. **All overhanging edges at casework to be built up to 1 1/4 inch vertical height, except at sink openings, where 1/2" thickness is acceptable. See drwaings.**
4. **Provide 1/8 inch radius at all edges of countertops, backsplashes.**
5. Prepare all cutouts accurately to size; replace tops having improperly dimensioned or unnecessary cutouts or fixture holes. Coordinate with plumbing fixtures.

B. Provide back/end splash wherever counter edge abuts vertical surface unless otherwise indicated.
1. Secure to countertop with concealed fasteners and with contact surfaces set in waterproof glue.
2. Height: 4 inches (102 mm), unless otherwise indicated.

C. Wall-Mounted Counters: Provide skirts, aprons, brackets, and braces as indicated on drawings.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Do not begin installation until substrates have been properly prepared.

B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

C. Verify that wall surfaces have been finished and mechanical and electrical services and outlets are installed in proper locations.

### 3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

### 3.03 INSTALLATION

A. Securely attach countertops to cabinets using concealed fasteners. Make flat surfaces level; shim where required.

B. Scribe fit all window sills.

C. Seal joint between back/end splashes and vertical surfaces.

### 3.04 CLEANING

A. Clean countertops surfaces thoroughly.

B. Clean other solid surface material thoroughly.

### 3.05 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair or replace damaged products before Date of Substantial Completion.

**END OF SECTION**

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# SECTION 14 2001
# ELEVATOR SPECIFICATIONS FOR ELEVATOR #1

## PART 1- GENERAL

### 1.01 REFERENCE STANDARDS

A. ADAStandards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

B. ASME A17.1 - Safety Code for Elevators and Escalators; 2019.

### 1.02 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work of this section.

B. Refer to other sections of these specifications for related work, which is not work of this section, including electrical service with fused disconnect switches for elevator system, and machinery rooms with access, lighting, communications, ventilation and services.

### 1.03 SUMMARY OF WORK

A. The scope of work involves the replacement of the controls and starter; replacement of power unit; replacement of signal fixtures; replacement of hoistway wiring and traveling cables; replacement of door operator, replacement of jack seal, replace elevator cab and car doors on the hydraulic passenger elevator.

B. Prior to the Bid, the contractor is responsible for verifying the existing temporary power. The contractor shall provide any additional temporary power required for the elevator installation.

### 1.04 GENERAL

A. This specification is intended to cover the upgrade of the passenger elevators equipment, as described hereinafter, in a first-class workman-like manner, by the elevator contractor.

B. Necessary general arrangement drawings covering the elevator installation are to be provided by the elevator contractor. No work shall commence before these drawings are approved by the architect, owner or his agent.

### 1.05 WORK NOT INCLUDED IN ELEVATOR CONTRACT

A. To complete this installation, the following items will be performed or furnished by the General Contractor, if required, in accordance with governing codes:
   1. Class ABC fire extinguisher in machine room.
   2. 3 phase mainline copper power feeder to the machine room and protected, lockable “o f”, disconnects. (General contractor responsible for any wiring needed from disconnect to controller.
   3. Single phase copper 110V power feeder to each elevator controller for car lighting and exhaust fan. (Locking 110V disconnect switch by general contractor.)
   4. Building Telephone lines to elevator controller in elevator machine room. (Elevator Contractor to supply shielded pair wires in traveling cable from controller to cab for telephone service.)
   5. Proper ventilation, air-conditioning and heating of elevator machine room. Maintain minimum temperature of 55 degrees Fahrenheit (12.78 degrees Celsius), maximum 90 degrees Fahrenheit (32.22 degrees Celsius). Maintain maximum 80% relative humidity, non-condensing.
   6. Fire Alarm Signals to the elevator controller.
   7. Self-closing, self-locking elevator machine room door with appropriate signage on exterior of door.

8. Steel Grating over the existing sump pump hole in the elevator pit.
9. General Contractor shall supply elevator contractor with area near hoistway for elevator equipment.
10. Supply temporary barricades needed for hoistway during construction.

**1.06 QUALITY ASSURANCE**

A. Installer's Qualifications:
   1. Shall be either the elevator equipment manufacturer or a licensee of the manufacturer, who has not less than five (5) years'successful experience with the installation of similar equipment. The elevator contractor shall have a General Contractors License by the State of Alabama. The elevator contractor shall have an office within 50 miles (80.47 kilometers) of Montgomery, AL for the past five (5) years with a minimum of 3 service mechanics working out of that o fice and at least one mechanic in the Montgomery Area 40 hours a week. Provide the address of the office, phone number and contact persons. The elevator mechanics performing the elevator work shall be certified through the National Elevator Industry Education Program (NEIEP).
   2. The following are approved elevator companies to perform the work:
   3. Diversified Elevator Service and Equipment Company, Inc.
   4. Other Elevator Suppliers - Contractors may submit for approval to architect during the bidding process. Approvals wil be by addendum only and submittals must be made 10 days prior to bid.

**1.07 REGULATORY REQUIREMENTS**

A. Elevator Code:ASME A17.1 2019

B. Except for more stringent requirements as indicated or imposed by governing regulations (which must be complied with), comply with applicable requirements of the "American Standard Safety Code for Elevators, Dumbwaiters, Escalators and Moving Walks"(((ASME A17.1)) 2019) published by the American Society of Mechanical Engineers, hereinafter referred to as the "Code".

C. NFPACode:

D. Comply with applicable NFPA codes, and specifically with sections relating to electrical work and elevators.

E. ADA Standards for Handicapped:
   1. Except as otherwise indicated, comply with ADA"Suggested Minimum Passenger Elevator Requirements for the Handicapped".

F. Permits and Inspections
   1. The elevator contractor shall furnish all licenses and permits and shall arrange for and make all inspections and tests required thereby.

**1.08 SUBMITTALS:**

A. Product Data:
   1. Submit a list of vendors for all the major elevator components to be provided for approval by the architect. Al major elevator components must be approved by the architect before installation can begin. Submit car interior finishes.

B. Certificates and Permits:
   1. Provide Owner and architect with copies of all inspections and acceptance certificates and operating permits as required by governing authorities to a low normal, unrestricted use of elevators.

**1.09 INITIAL MAINTENANCE ANDWARRANTY:**

A. The elevator contractor at no extra cost to Owner shall guarantee the materials and workmanship of the elevators furnished by him under these specifications and he shall make good any defects not due to ordinary wear and tear or improper use or carelessness which may develop within one (1) year from the date of substantial completion of the elevator by the Owner.

B. Maintenance:
   1. At no extra cost to Owner, a quality maintenance service consisting of monthly examinations, adjustments, lubrication, and repair are required for twelve (12) months after the elevator is accepted by the owner. This service shall not be subcontracted but shall be performed by the elevator contractor. All work sha l be performed by competent employees during regular working hours of regular working days and shall include 24-hour ca lback service at no additional cost to the owner. Only genuine parts and supplies as used in the manufacture and installation of the original equipment sha l be provided.

C. Warranty:
   1. At no extra cost to Owner, provide a warranty, signed by the elevator contractor agreeing to replace
      a. /repair/restore defective materials and workmanship of elevator work during warranty period. “Defective”is hereby defined to include, but not limited to, operation, control system or component failures, performances below required minimums, excessive wear, unusual deterioration or aging of materials or finishes, unsafe conditions, the need for excessive maintenance, abnormal noise or vibration and similar unusual, unexpected and unsatisfactory conditions. The warranty period shall be 12 months starting on the date the elevator is accepted by the owner as substantially complete.

**PART 2- PRODUCTS**

**2.01 ACCEPTABLE MANUFACTURERS**

A. Elevator Control Equipment:
   1. The elevator controller shall be a Microprocessor Control with a soft start starter. The Elevator Controller Equipment shall be manufactured by one of the following (no others shall be accepted):
   2. Elevator Controls Corporation
   3. GAL Manufacturing Corp
   4. Motion Controls Engineering
   5. Virginia Controls Inc.
   6. Or as approved by architect.

B. Car Enclosure:
   1. The car enclosure shall be a steel sheet with removable raised plastic laminate panels. The car enclosure shall be manufactured by American Crescent, Canton Elevator, Columbia Elevator, Elevated Fabrication Systems or Schumacher Elevator or as approved by architect.

C. Door Operator Control Equipment:
   1. The door operator shall be a solid state controlled, high-speed, heavy-duty type. The door operator shall be manufactured by ECI, GALor Wittur or as approved by architect.

D. Signal Fixtures:
   1. The signal fixtures shall be surface mounted, stainless steel #4 finish with tamper proof/vandal resistant buttons. The signal fixtures shall be manufactured by Adams or Innovation Industries.

**2.02 PASSENGER ELEVATOR**

A. SUMMARYOF PASSENGER ELEVATOR EQUIPMENT (Contractor to verify data on existing elevators)

B. CAPACITY
   1. Elevator #1 - 2500 pound

C. SPEED
   1. Elevator #1 – Retain Existing Speed (Field Verify)

D. OPERATION
   1. Elevator #1 – Two landing Collective Control

E. CONTROLS
   1. New Microprocessor Logic with Soft-Starter

F. TRAVEL
   1. Retain Existing Travel (Field Verify)

G. LANDINGS
   1. Elevator #1 – Two (2)

H. SERVED FROM
   1. Elevator #1 – 1,2

I. NUMBER OF OPENINGS
   1. Elevator #1 – Two (2) Center Opening

J. OPENING SIZE
   1. Elevator #1 – 3’-6”X7’(Field Verify

K. TYPE OF CAR OPENINGS
   1. Elevator #1 – Center Opening

L. TYPE OF HOISTWAYOPENINGS
   1. Same as Car

M. DOOR OPERATION
   1. Power Automatic

N. CAR ENCLOSURE
   1. 14 Gauge Cold-rolled Steel Sheet. Baked Enamel on side and rear walls with plastic laminate raised panels, Baked enamel on base and reveals. Plastic laminate panels as selected by the architect.

O. CAR AND HAL BUT ONS
   1. New Tamperproof/Vandal Resistant

P. MAINTENANCE
   1. See “Initial Maintenance and Warranty”Paragraphs

Q. POWER SUPPLY
   1. 208 VOLTS 3 PHASE 60 HERTZ (field verify)

R. LIGHTING SUPPLY
   1. 120 VOLTS 1 PHASE 60 HERTZ

S. AD ITIONAL FEATURES
   1. As specified below

**2.03 MICROPROCESSOR ELEVATOR LOGIC CONTROL: NEW**

A. The operation shall be Collective control, accomplished utilizing an ASME A17.1 2019 code compliant Microprocessor Computer Logic Controller. The Elevator Control Program shall be contained in non- volatile, programmable, read only memory. Control shall be constructed such that future alterations in elevator operation may readily be made on site by altering the memory. All default parameters (such as main and alternate fire return floors) shall be job specific. The Microprocessor Elevator Logic Control shall be contained in a suitable cabinet.

B. Card Reader Provisions for #1Elevator: The logic controller shall have provisions to accept
   1. signals from future installed card reader system installed by the Security Contractor, each card reader shall have the capability of being secured with Travel to that floor and lowered only after a specific floor siganal is suppled by the card reader system. A fire alarm signal to the elevator controls shall override floor security.

**2.04 AUTOMATIC LEVELING: NEW**

A. Automatic two-way leveling shall be provided so that the car shall approach landing stops at a reduced speed from either direction of travel. The leveling device shall, within its zone, be designed to automatically stop and maintain the car approximately level with the landing, regardless of change in load.

**2.05 POWER UNIT: NEW**

A. The existing hydraulic power unit shall be replaced with a new submersible-type hydraulic power unit, specially designed and manufactured for this service, shall be furnished. It shall be enclosed with steel panels and sha l be mounted on vibration dampers to isolate the unit from the building structure. Tank shall have the capacity of holding at least 25 gallons of additional oil above what is required to safely reach the top landing.

B. Control valves, including safety check valve, up direction valve with high relief including up leveling and soft stop features, lowering valve including down leveling and manual leveling feature, shall be mounted in a compact unit assembly.

C. Apositive displacement type pump specifically manufactured for oil-hydraulic elevator service sha l be provided.

D. A standard AC motor specifica ly designed for oil-hydraulic elevator service shall be provided. Duty rating shall be selected for the existing elevator capacity and speed. Pump motors to be rated at 120 starts per hour.

E. A muffler, designed to reduce pulsation and noise which may be present in the flow of hydraulic oil, shall be provided in the oil line near the power unit.

F. Install rupture valves in pit if required by code.

G. An UP-traveling elevator shall automatically descend to the lower terminal landing if the hydraulic system does not have a sufficient reservoir of oil. The power operated elevator doors shall automatically open at the lowest terminal landing permitting passenger egress. The doors sha l automatically close and all control buttons, except the Door Open Button in the car station, shall be made ine fective.

**2.06 HYDRAULIC OIL: NEW**

A. The elevator hydraulic oil shall be designed for the new control valve system. The existing oil in the existing oil line and jack unit sha l be removed.

**2.07 MACHINE ROOMSHUT OFF VALVE: NEW**

A. A new valve, designed to shut off flow of oil between the cylinder and power unit, shall be provided in the oil line in the elevator machine room and in pit.

**2.08 JACK UNIT:**

A. Replace jack seal.

**2.09 EMERGENCYFIRE SERVICE – PHASE 1**

A. Emergency Operation to return the elevators to the designated floor by means of the key operated hall switch, or smoke sensors, shall be provided in compliance with A17.1 2010 Code and NFPACodes. Heat and smoke or products of combustion sensing devices are to be furnished by others, but the elevator contractor shall furnish terminals on the elevator controller to receive main, alternate, and hoistway signals from the sensing devices.

**2.10 EMERGENCY FIREMAN'S SERVICE – PHASE 2**

A. In-car control of each elevator during the emergency operation, by means of the existing key operated switch in the car shall be provided.

**2.11 INDEPENDENT SERVICE**

A. Independent service operation shall be provided in the controller and connected to the new switch in the new car panel.

**2.12 CAR TOP INSPECTORS OPERATING STATION: NEW**

A. Replace the existing car top inspectors operating station with new code compliant station. The station shall be mounted on the car top.

**2.13 PIT STOP SWITCH: NEW**

A. The existing elevator stop switch in the elevator pit shall be replaced with a new code compliant stop switch.

**2.14 CAR OPERATING STATION: NEW**

A. The existing car operating station shall be replaced with a new ADA compliant flush mounted car operating panel for the elevator. The panel shall contain mechanical iluminated vandal-resistant buttons marked to correspond to the landings served, inspection switch, light switch, two speed fan switch, emergency stop key switch, door open and door close buttons. An emergency alarm button shall be connected to an emergency signal alarm. Provide fire fighters' Phase I key switch, light jewel, buzzer and call cancel button in a lockable cabinet with engraved instructions filled in red on the rear of the cabinet door. The car operating station panel shall have a stainless steel #4 finish.

**2.15 ADA TELEPHONE: NEW**

A. A new ADA compliant telephone shall be provided. The phone system shall be integrated with the new car operating panel. A "PUSH TO CALL "button shall be in the new car operating panel. The telephone system shall have an automatic dialer.

**2.16 CAR DIGITAL POSITION INDICATOR: NEW**

A. The digital car position indicator and shall be located in the new car operating station.

**2.17 CAR DIRECTION LANTERNS: NEW**

A. The new vandal-resistant flush mounted lanterns which shall include directional indications and audible signal. The appropriate arrow shall illuminate corresponding to the direction the elevator is to travel. The audible signal shall alert passengers in the elevator and the landing to signal illumination, sounding once for UP and twice for DOWN. The panel shall have a stainless steel #4 finish.

**2.18 HAL PUSHBUT ON STATIONS: NEW**

A. The existing hall pushbutton stations at all floors shall be replaced with new surface mounted hall stations containing illuminating vandal-resistant pushbuttons that when pressed will signal the waiting passenger that the call has been registered. The button shall remain iluminated until the call has been answered.

**2.19 HAL DIGITAL POSITION INDICATOR: NEW**

A. The new surface mounted digital shall position indicator and shall be located above the elevator door frame at the main egress floor landing only. The panel shall have a stainless steel #4 finish.

**2.20 HOISTWAY ACCESS SWITCHES: NEW**

A. Provide hoistway access switches in the new hall pushbutton stations at the top terminal landing to permit access to the top of elevator and at the bottom terminal landing to permit access to pit. An inspection switch that will activate these hoistway access switches sha l be located in the car operating panel.

**2.21 GUIDE RAILS: REUSE EXISTING**

A. The existing car guide rails shall be retained, realigned as needed, cleaned and painted.

**2.22 SLIDE GUIDE ASSEMBLIES: REUSE EXISTING**

A. The existing slide guide assemblies located on the top and bottom of the elevator frame shall be reused. New inserts shall be installed.

**2.23 CAR SLING AND PLATFORM: REUSE EXISTING**

A. The existing car frame and platform shall be retained and reused. The crosshead, stiles, and platform support members shall be cleaned and painted. All fastenings shall be checked and tightened to establish a rigid frame. Replace wood in platform if needed for no additional cost to owner.

**2.24 CAR BUFFERS: REUSE EXISTING**

A. The existing car spring buffers shall be reused and thoroughly cleaned, painted, and inspected to insure correct operation.

**2.25 CAR ENCLOSURE:**

A. The existing elevator car enclosure shall be completely removed and replaced with a new enclosure as explained in the following:

**2.26 CANOPY:**

A. 12 Gauge Cold-rolled Steel with Hinged Exit.

**2.27 FRONT RETURN WALL :**

A. Stainless Steel # 4 Satin Finish.

**2.28 ENTRANCE COLUMN:**

A. Stainless Steel # 4 Satin Finish.

**2.29 TRANSOM**

A. Stainless Steel # 4 Satin Finish.

B. SILL
   1. Extruded Aluminum, Mill Finish.

**2.30 CAR DOOR PANEL**

A. Stainless Steel # 4 Satin Finish.

**2.31 SIDE & REAR WALLS**

A. 14 Gauge Cold-rolled Steel She l with raised plastic laminate panels. Color as selected by Architect.

**2.32 HANDRAILS**

A. New 1-1/2”Diameter Stainless steel #4 Tubular Design on rear wall.

**2.33 BASE**

A. NO. 4 Stainless steel Stain Finish.

**2.34 REVEALS**

A. Baked Enamel Reveals between the New Raised Panels (1/4" Black Paint)

**2.35 SUSPENDED CEILING:**

A. Equal to Island Drop Ceiling Clad with Stainless steel Removable Panels.

**2.36 LIGHTING:**

A. New LED Recessed Lighting above Suspended Ceiling

**2.37 VENTILATION**

A. New Two Speed Fan

**2.38 HOIST WAY ENTRANCES**

A. The existing hoistway entrance frames, strut angles, headers and si ls shall be retained and reused in place. The existing hoistway entrance frames and head and jambs at each opening shall be cladded with new stainless steel #4 cladding by Elevator Contractor. Existing hoistway entrance door panels at each landing shall be cladded with new stainless steel #4. The existing sills shall be cleaned and polished by Elevator Contractor.

**2.39 CAR DOOR OPERATOR AND HATCH DOOR EQUIPMENT: NEW**

A. Replace the existing door operator with a newsolid state gearless door operator. Reuse tracks, interlocks, door hangers with rollers, pick-up roller assemblies and gibs shall be provided at each opening. New car door clutch, track, car door hangers with rollers, gate switch and gibs shall be provided for the car door. Door restrictor shall be provided.

**2.40 CAR DOOR SAFETY EDGE DEVICE: NEW**

A. Provide new 3 D full screen infrared beam safety device. The beams shall project across the car opening detecting the presence of a passenger or object. The device shall prevent the doors from closing if the beams are obstructed and reverse the doors at normal opening speed if the beams are obstructed while the doors are closing.

**2.41 HOIST WAY ACCESS DOOR RESTRICTORS: NEW**

A. All car doors shall have a restricting device that wil limit the opening of the car door from inside the elevator when away from a floor, per current ANSI code requirements.

B. WIRING: New

C. Al new wiring and electrical interconnections shall be provided in place of all existing wiring and shall comply with the governing codes. Existing duct, conduit and signal fixture boxes sha l be reused, if possible.

D. New travel cable shall be installed with sufficient spares as per code. Travel cables shall include four (4) extra shielded pairs for future card reader and a coax for future security camera. Elevator Contractor to supply two (2) shielded pair wires in traveling cable for telephone service.

**2.42 HOISTWAYSWITCHES: NEW**

A. Al hoistway slowdown and terminal switches shall be replaced with new devices that comply with the governing codes.

**2.43 HYDRAULIC PRESSURE SAFETYTEST**

A. A safety test shall be performed for the elevator as required by Code, with a fully rated load. A metal tag showing the date of the test shall be installed on the elevator cabinet door.

**2.44 REMOVAL OF EXISTING EQUIPMENT**

A. The owner reserves the right to retain any existing equipment removed by the elevator contractor. Any equipment they choose not to retain shall become the contractor's property and shall be removed from the building and disposed of at the elevator contractor's expense.

**2.45 INSTALLATION OF ELEVATOR SYSTEM**

A. GENERAL:
   1. Comply with manufacturer's instructions and recommendations for work required during insta lation.

B. WELDED CONSTRUCTION:
   1. Provide welded connections for installation of elevator work where bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance and replacement of worn parts. Comply with AWS standards for workmanship and for qualifications of welding operators.

C. COORDINATION:
   1. Coordinate elevator work with work of other trades, for proper time and sequence to avoid construction delays. Use benchmarks, lines and levels designated by Contractor, to ensure dimensional coordination of the work.

D. SOUND ISOLATION:
   1. Mount rotating and vibrating elevator equipment and components on vibration-absorption mounts, designed to effectively prevent transmission of vibrations to structure, and thereby eliminate sources of structure-borne noise from elevator system.

E. LUBRICATE
   1. Operating parts of systems as recommended by manufacturers.

F. LEVELING TOLERANCE:
   1. 1/4"Up or Down, regardless of load and direction of travel.

G. ACCEPTANCE TESTING:
   1. Upon nominal completion of each elevator installation, and before permitting use of elevator (either temporary or permanent), perform acceptance tests as required and recommended by Code and governing regulations or agencies.

H. OPERATING TESTS:
   1. Load the elevator to its rated capacity and operate continuously for one (1) hour over its full travel distance, stopping at each level and proceeding immediately to the next. Record temperature rise of elevator machine during one (1) hour test period. Motor temperature rise sha l not exceed 50 degrees centigrade during this one (1) hour test.

2. Advise Contractor, Owner, Architect and Inspection Department of governing agencies, in advance of dates and times tests are to be performed on elevators.

I. EQUIPMENT PROTECTION:
1. At all times of the elevator work (or any portion thereof), provide suitable protective coverings, barriers, devices, signs or such other methods or procedures to protect elevator work from damage or deterioration. Maintain protective measures throughout remainder of construction period.
2. Provide similar protective measures for elevator units which shall be placed in temporary service, including inspection and maintenance service during period of temporary use.

**2.46 FINAL ACCEPTANCE**

A. Maintenance Manuals: Supply three (3) bound manuals for each elevator or group of elevators, with operating and maintenance instructions, parts listing, recommended parts inventory listing, purchase source listing for major and critical components, emergency instructions, and similar information and wiring diagrams.

B. Laminated Electrical Prints: One complete set of laminated electrical prints, minimum size 11”X17”, shall be provided in the machine room prior to final inspection.

C. Tools: All access diagnostic tools that are needed to access the computer memory for diagnostic purposes, trouble shooting, or changing the soft-start starter with the designed parameters along with all written and verbal instructions to properly and safely use these instruments sha l be provided. The diagnostic tools are considered the property of the owner and shall not have any expiration time to restrict their future use.

D. Owner Orientation: Instruct Owner’s Personnel in proper use, operation and daily maintenance of elevators. Review emergency provisions, including emergency access and procedures to be followed at time of failure in operation and other building emergencies. Train Owner’s personnel in normal procedures to be fo lowed in checking for sources of operational failures. Confer with Owner on requirements for a complete elevator maintenance program.

E. Make a final check of elevator operation, with Owner’s personnel present and just prior to date of substantial completion. Determine that control systems and operating devices are functioning properly.

**END OF SECTION**

# SECTION 210100 - GENERAL FIRE PROTECTION REQUIREMENTS

## PART 1 – GENERAL

### 1.1 SUMMARY

A. Provide the necessary interface with other Divisions to provide a complete project. Carefully check the Documents of this Division with those Documents of other Divisions. Determine the requirements of any interfacing materials or equipment being furnished and/or installed by those Sections and Divisions and provide proper installation and required interface.

B. No deviation from the Contract Documents shall be made without the written consent of the Architect and Engineer.

C. All Specifications and Drawings are to be considered together as the Contract Documents. Any work shown in one and not the other, or is implied by either, shall be provided to make a complete project. Should conflicts exist between the Specifications and Drawings or there is an item shown or noted for which is not clearly defined, immediately submit a request for clarification. Under no circumstance will conflicts between the Specifications and Drawings be grounds for additional cost to the Contract after the Contract is established.

D. The Drawings are schematic and are not intended to show the exact location of piping, equipment, etc.

E. Dimensions and information regarding accurate locations of equipment, and structural limitations and finish shall be coordinated and verified with other Divisions of Work. Be prepared to furnish dimensions and information regarding the Work of this Division to other trades.

F. The right is reserved to relocate any sprinkler head a maximum of 10’-0” before it is permanently installed without incurring additional cost to the Contract. Contractor shall provide allowance for Architect/Engineer to relocate or add an additional 10 sprinkler heads as necessary in the field.

G. This project is seeking LEED certification and the contractor is responsible for providing materials, adhesives, sealants, and equipment that meets or exceeds the LEED requirements for New Construction.

### 1.2 REFERENCE STANDARDS

A. All work shall comply with the most recently revised versions of all local, state and federal codes, ordinances of the authority having jurisdiction, laws, rules and regulations. Any modifications required by any of the above shall be made without any additional cost to the Owner. Where requirements between governing Codes and Regulations vary, the more restrictive provision shall apply.

B. Nothing contained in the Contract Documents shall be construed as authority or permission to disregard legal requirements and regulations. The Contractor shall thoroughly review the Documents and bring any such conflicts to the attention of the Architect and Engineer prior to Installation.

C. All materials, installation, and workmanship shall comply standards and/or codes of the following:

1. International Building Code – 2021 edition
2. International Mechanical Code - 2021 edition
3. International Plumbing Code - 2021 edition
4. International Gas Code - 2021 edition
5. International Fire Prevention Code - 2021 edition amendments
6. International Energy Code - 2021 edition
7. NFPA – Latest Version
8. National Electrical Code
9. National Fire Codes
10. Alabama 120-3-3
11. State of Alabama (ANSI 117.1) Handicap Code
12. ANSI - American National Standards Institute
13. ASTM - American Society of Testing and Materials
14. NEMA - National Electrical Manufacturer's Association
15. OSHA - Occupational Safety and Health Act
16. UL - Underwriter's Laboratories
17. ASHRAE - American Society of Heating and Air Conditioning Engineers
18. SMACNA - Sheet Metal and Air Conditioning Contractors' Nat'l Assoc.
19. LEED v4 Building Design and Construction: New Construction

D. All materials shall be new and shall bear the label of UL.

**1.3 DEFINITIONS**

A. Provide: to furnish, install and connect.

B. Furnish: to supply all materials, labor, equipment, testing apparatus, controls, tests, accessories and all other items customarily required for the proper and complete application.

C. Install: to join, unite, fasten, link, attach, set-up or connect together, complete, tested, and ready for normal satisfactory operation.

D. Engineer: the Engineer of record.

E. Contract Documents: the complete set of Specifications and Drawings of all Divisions.

F. Work: labor, materials, equipment, accessories, controls and other items required for a complete installation.

G. Concealed: embedded in masonry or other construction, installed in furred spaces, within double partitions or hung ceilings, in trenches, in crawl spaces or in enclosures.

H. Exposed: not installed underground or concealed.

I. Equal: equal in quality, workmanship, materials, weight, size, design and efficiency of the specified product, conforming with manufacturers.

J. Supply: to purchase, procure, acquire and deliver complete with related accessories.

K. Authority Having Jurisdiction (AHJ): applicable local, state and federal authorities having jurisdiction over any part of the Scope within this Division and other Divisions.

L. LEED: Leadership in Energy and Environmental Design

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

A. Manufacturer's names and catalog numbers specified in the Contract Documents are intended to describe the material and set the standard of quality. All bids shall be based on material specified. Request for approval of material not specified shall be considered if the request is in written form and submitted to the Architect no later than fourteen (14) days prior to the bid date. All requests shall conform to the provisions of the general and supplementary conditions.

B. When specific names are not stated, only the best available quality of material or equipment shall be submitted for review and used in the installation.

### 2.2 BASIS OF DESIGN

A. Where a product is designated as "BASIS OF DESIGN", the Contractor is notified that mechanical, electrical, structural, architectural, space conditions and/or other features of the overall project design have been based on the requirements of the "BASIS OF DESIGN" product.

B. Where a product is substituted for a "BASIS OF DESIGN" product, the Contractor is notified that changes in project design may be mandatory in order to permit use and installation of the substitute product. Shop drawing submittal for a substitute product shall include a complete schedule of changes in project design, if any, which must be made in order to permit use and installation of the substitute product. The Contractor shall bear all expenses related to the use of a substitute product.

### 2.3 SHOP DRAWINGS AND PRODUCT DATA

A. Fire sprinkler shop drawings will be prepared under the supervision of an engineer licensed in the State of Alabama and these drawings will bear their signed and dated seal.

B. The Contractor shall obtain complete shop drawings, product data and samples from the manufacturers, suppliers, vendors, and all Division 22 Subcontractors, for all materials and equipment as specified herein in various Sections of the Specifications, and shall submit data and details of such materials and equipment for review by the Architect and Engineer. Prior to submission of the shop drawings, product data and samples to the Architect and Engineer, the Contractor shall thoroughly review the shop drawings, product data and samples and certify they are in compliance with the Contract Drawings. Further, the Contractor shall check all materials and equipment upon their arrival on the Project site and verify their condition and compliance with the Contract Documents. Any Work which proceeds prior to receiving reviewed shop drawings shall be modified as required to comply with the Contract Documents and the shop drawings. A minimum period of ten (10) working days, exclusive of transmittal time, will be required in the Engineer's office each time a shop drawing, product data and/or sample is submitted or

resubmitted for review. This time period shall be considered by the Contractor when scheduling his Work. The initial shop drawing review for equipment and materials may be expedited through the mutual consent of the Contractor, Architect, Engineer, and Owner providing the Contractor agrees to submit complete, certified, documented, and coordinated shop drawings for review in accordance with the requirements of the Contract Documents.

C. The review of shop drawings, product data, and samples by the Architect and Engineer shall not relieve the Contractor of the responsibility for dimensions or errors that may be contained therein, or for deviations from requirements in the Contract Documents. It shall be clearly understood that the noting of some errors by the Engineer but overlooking others does not grant the Contractor permission to proceed in error.

D. All shop drawings and product data/submittals shall be submitted in electronic format. The entire division 22 shall be submitted as one file with bookmarks and cover pages for each specification section.

E. All product data/submittals shall bear the name of the manufacturer to be used.

F. All shop drawings and submittals shall include a stamped indication signifying that the submittal has been reviewed for compliance with the Contract Documents by the Contractor. This stamped indication also represents the fact that the Contractor has checked this submittal for its interaction with all other Divisions and certifies by his signature or initials that all coordination has taken place. The stamp shall include the date, name of the Contracting Firm, the signature of the Contractor, certification of compliance and approval. This stamp shall be on the submittal before the Engineer will review it.

G. The Engineer will review an individual submittal not more than twice. If the submittal is rejected again on the second review, the Contractor will bare all responsibility for paying for the Engineer's time for additional reviews. Such payments to the Engineer shall be withheld from the next monthly pay application.

H. Shop drawings and/or product data shall be submitted for the following for review:

1. Fire protection piping system layouts. These drawings must include associated equipment, drawn to scale based on submittals for that equipment, must be dimensioned, and must include piping and equipment elevation tags (distance above finished floor to bottom).
   The Contractor is encouraged to develop their own shop drawings, without having had the Engineer's CAD files (as previously stated, the Engineer's drawings are schematic/diagrammatic in nature). Should the Contractor insist on using the Engineer's CAD files in the procurement of shop drawings, the Contractor must pay the Engineer $150.00 per sheet for the CAD files.
   The Contractor shall give the Engineer a written release, acceptable to the Engineer, signed by a corporate officer of the Contractor. This release shall also include a copyright statement indicating that these drawings or electronic data contained will not be used on any other project. The release and payment for the files must be received PRIOR to delivery of the CAD files.
2. Equipment, including but not limited to pipe, fittings, hangers, seismic devices, sprinkler heads, valves, fire department connections, hose equipment, pumps, controllers, heat tracing, insulation, piping specialties, etc.

**2.4 AS-BUILT DRAWINGS**

A. The Contractor shall maintain on a daily basis at the Project site a complete set of "Record Drawings". The "Record Drawings" shall consist of a set of black-line or blue-line prints or AutoCAD files of the Contractor Coordination Drawings for this Division. The prints shall be marked, or the AutoCAD file electronically updated to show the precise location of all work and equipment, and all changes and deviations in the work from that shown on the Contract Documents. This requirement shall not be construed as authorization for the Contractor to make changes in the layout or work without definite instructions from the Architect or Engineer. The continuously updated coordination drawings (shop drawings previously described) shall be used to produce the final "Record Drawings" which shall be delivered to the Owner in AutoCAD electronic format (CD) upon Project completion.

B. Record dimensions shall clearly and accurately delineate the work as installed; locations shall be suitably identified by at least two dimensions to permanent structures.

C. The Contractor and Subcontractor shall mark all "Record Drawings" on the drawings with a rubber stamp impression or an AutoCAD image that states such.

### 2.5 COORDINATION DRAWINGS

A. All Provide coordination drawings at beginning of construction as outlined in Section 01 3000 for detailed coordination between mechanical, plumbing, electrical, fire protection and other trades.

B. See Section 01 3000 for detailed requirements.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

A. The equipment selections used in the preparation of the Contract Documents will fit into the physical spaces provided and indicated, allowing ample room for access, servicing, removal and replacement of parts, etc. Adequate space shall be allowed for clearance in accordance with the Code requirements and the requirements of the local Authorities having jurisdiction, and the equipment manufacturers recommendations.

B. In the preparation of Drawings, a reasonable effort to accommodate acceptable equipment manufacturer's space requirements has been made. However, since space requirements and equipment arrangement vary according to each manufacturer, the responsibility for initial access, maintenance access, code required access, and proper fit rests with the Contractor.

C. Physical dimensions and arrangements of equipment to be installed shall be subject to the Architect's and Engineer's review.

D. The General Contractor and all Subcontractors shall coordinate the installation of ductwork, conduit, busway, piping, cable trays, etc., installation with lighting fixtures, special ceiling construction, air distribution equipment, and the structure. Provide additional rises, drops and offsets as required. If after installed, new ductwork, conduit, busway, piping or cable is found to be in conflict with the architecture, structure, or other trade Work which is either existing or shown on the Contract Documents, the ductwork, conduit, busway, piping or cable shall be relocated without additional cost to the Owner.

E. No piping, equipment, etc., shall be installed in the eight (8) inch high zone directly above the ceiling in tenant areas to allow for tenant build-out and flexibility unless otherwise specifically shown on the Drawings or prior written authorization is received from the Engineer.

F. Accessibility and Clearance:

1. Piping, etc. shall be installed in accessible locations, avoiding obstructions, preserving headroom, and keeping openings and passageways clear.
2. Minor adjustments in the locations of equipment shall be made where necessary, providing such adjustments do not adversely affect functioning of the equipment.

G. Scaffolds and staging for installation of fire protection work shall be provided under the work of this Division.

## 3.2 STRUCTURAL FITTINGS

A. Furnish and install the necessary sleeves, inserts, hangers, anchor bolts, and related structural items. Install at the proper time.

B. Openings may have been indicated on the Architectural and Structural drawings. Should any additional openings or holes be required, the same shall be provided at no additional cost to the Owner.

C. Location: At a time in advance of the work, verify openings shown on the Architectural and Structural drawings, and coordinate any additional openings.

D. If the work of this Section requires modification of the Architectural or Structural drawings, furnish new instructions as to requirements for these openings. Submit for review and coordination to Architect.

E. Sleeves shall be supplied for all piping passing through walls or slabs and shall be placed before concrete is poured.

F. Equipment supports for fire protection work shall be fastened to the structure by inserts, anchor bolts, bolting to drilled and tapped structural members, or be welded to the structure.

1. Welding shall be done by the electric arc method with fully competent welders. Supporting members shall be shop coated with a suitable primer.
2. Surfaces damaged by installation of supports shall be touched up with primer to match shop coat. Any drilling of structural members shall be approved by the Architect.

G. Flashing:

1. Wherever piping passes through the roof or outer walls, base flashing and counter-flashing shall be provided.
2. Such flashing shall be properly installed by skilled workmen, and shall include grouting, mastic or tar application, or other means to insure a permanent, waterproof, neat and workmanlike installation.
3. Insofar as possible, flashing shall comply with and be similar to requirements for flashing in General Construction Work.

H. Anchor bolts and inserts shall be galvanized and of adequate size and strength for installation of electrical work and shall be placed in forms before concrete is poured.

1. Placement of bolts in bases shall be done under other Division. Furnish detail drawings, templates, and anchor bolts for bases to the General Contractor in time to avoid delaying work schedules.
2. Expansion shields shall only be used with specific approval of the Architect. Wooden or soft metal plugs shall not be used.

I. Cutting and patching:

1. All additional cutting, patching and reinforcement of construction of building, subject to review by the Architect, shall be performed under this Section.
2. Refer to appropriate Division for requirements.

## 3.3 WEATHERPROOF EQUIPMENT

A. Fire protection devices or equipment located in damp semi-exposed areas shall be weather-resistant. Enclosures shall comply with NEMA Type 3R requirements.

## 3.4 CLEANING

A. Brush and clean work prior to concealing, painting and acceptance. Perform in stages if directed.

B. Painted exposed work soiled or damaged: Clean and repair to match adjoining work before final acceptance.

C. Remove dust and debris from inside and outside of material and equipment.

## 3.5 TESTS AND DEMONSTRATIONS

A. All systems shall be tested in the presence of the Owner or an Owner designated representative upon completion of the Work and demonstrates that the installation is in accordance with the Contract Documents.

B. All motors shall be checked and adjusted for correct direction of rotation.

C. Any work found not to be in compliance with the Contract documents shall be repaired or replaced without incurring additional cost to the Contract price.

D. Provide all instruction to the Owner on maintenance and operation of all systems and equipment provided under this Division.

## 3.6 WARRANTIES

A. The warranty period for all systems, equipment, components, work, etc. shall be no less than one (1) year, unless specified otherwise hereinafter. The warranty shall include parts and labor.

B. The Contractor shall, without cost to the Owner, remedy any defects within a reasonable time to be specified in notice from the Architect. In default thereof, the Owner may have such work done and charge all costs to the Contractor.

C. The start of the Contractor's warranty period, as defined in the General Conditions, shall commence on the issue of a "Certificate of Substantial Completion", by the Owner or the Owner's Representative for each item of material, equipment or system.

D. The Subcontractor shall confer with the General Contractor prior to the bid date concerning the project schedule and determine if there is a need to operate any items of equipment or systems for temporary heating and/or cooling or other reasons prior to "Substantial Completion". All required extended warranty costs for equipment, materials, and systems shall be included in the Subcontractor's bid.

3.7 PROJECT COMMISSIONING

A. The Contractor shall work with an outside third party Commissioning Agent (CxA) and provide all services necessary for compliance with LEED Prerequisite EAp1, Fundamental Commissioning, and EAc1 Enhanced Commissioning.

3.8 SPECIAL REQUIREMENTS

A. In accordance with LEED EQc2, Low-Emitting Materials - Adhesives and Sealants, all adhesives and sealants used on the interior of the building must comply with the following requirements:
   1. Adhesives, sealants, and sealant primers must comply with South Coast Air Quality Management District (SCAQMD) Rule #1168.
   2. Aerosol adhesives must comply with Green Seal Standard for Commercial Adhesives GS-36 requirements in effect on October 19, 2000.

3.9 CONSTRUCTION WASTE MANAGEMENT

A. The Contractor shall comply with all construction and demolition waste disposal and recycling requirements outlined in LEED MRp2 and MRc5: Construction Waste Management.

**END OF SECTION 210100**

**SECTION 211100 - FIRE PROTECTION SYSTEMS**

## PART 1 – GENERAL

### 1.1 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 21 01 00, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the fire protection system. Comply with other Division 21 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the fire protection system specified herein, as indicated on the drawings, and as required to provide complete and operating systems.

### 1.2 DESCRIPTION OF WORK

A. Work Included: Provide a complete fire protection standpipe system and sprinkler system, including pipe, tube fittings, fire and jockey pumps, and appurtenances as indicated, in compliance with these Specifications and as required by local code agencies.

B. Related Work by Others: The following work shall be provided by the Contractor:

1. The Sprinkler Contractor shall pipe the discharge of the standpipe drain(s) to the exterior of the building or other location approved by the Architect.
2. The Electrical/Fire Alarm Contractor will provide a complete fire alarm system and will make connections to flow switches and gate supervisory switches from the fire panel.

C. Applications: Application of the fire protection system shall include, but are not limited to, the systems as listed below:

1. Supply mains, valves, risers, and drains.
2. Standard pattern Siamese connections per local Fire Department Regulations.
3. Fire hose stairway valves.
4. Flow switches.
5. Dry-pipe air compressor and valves
6. Hydraulically designed sprinkler system.

D. Quality Assurance:

1. Materials shall be installed in accordance with NFPA 13 and NFPA 14. Valves, fittings, sprinkler heads, and equipment shall be UL listed and FM approved Fire pumps and jockey pumps shall also be UL listed and Factory Mutual approved.
2. Hose threads shall conform to local fire department requirements.
3. Coordination Drawings: The following supplements, and does not replace, the provisions for submittals called for in Section 23 01 00, "Basic Mechanical Requirements", of this Specification.

    a. Before starting fabrication or installation of equipment, the Contractor shall submit to Architect, for his consideration, three sets of Shop Drawings noted as reviewed by the ISO for insurance rate making purposes only.

b. After Contract award and prior to releasing any equipment orders for fabrication, six sets of Shop Drawings showing dimensions, weights, performance data, structural details, and physical appearance of fire pump, jockey pump, valves, and controls shall be submitted to the Architect for review and approval.

4. Acceptable Manufacturers: The model numbers listed in the Specifications establish a level of quality and material. The following manufacturers are acceptable subject to compliance with the requirements of these Specifications:

   a. Sprinkler Equipment
      1) Viking Corporation
      2) Tyco Fire Protection Products
      3) Victaulic Corporation
      4) Reliable Automatic Sprinkler Company
   b. Fire Hose Equipment
      1) Potter Roemer, Inc.
      2) Elkhart Brass Company
      3) Badger Powhatten
      4) Croker

E. Pipe Hangers and Supports: Support fire protection pipe with UL-listed and FM approved hangers and support devices. Provide any special hangers or supports that may be required. The design, selection, spacing, and application of horizontal pipe hangers, supports, restraints, anchors, and guides shall be in accordance with the NFPA 13 and NFPA 14. Support vertical pipes at least every other floor with approved riser clamps.

F. Combination Standpipe System:

1. Install combination standpipe system in the buildings consisting of risers extended up from the lowest level with 2-1/2" hose valves on each floor in stairwells and a wet pipe sprinkler system to provide complete coverage on each floor. Completely sprinkler the entire building.
2. Install a sprinkler system in all elevator shafts and spaces housing elevator machinery or controls. All elevator shafts shall be sprinkled from top of shaft and at elevator pit.
3. System piping shall be hydraulically designed throughout areas in accordance with the rules and regulations of NFPA 13, using design densities of:

   a. Light hazard areas: 0.10 gpm per 1,500 square feet with maximum Sprinkler head spacing of 225 square feet per sprinkler head.
   b. All ordinary hazard areas: 0.20 gpm per 1,500 square feet with maximum sprinkler head spacing of 130 square feet.

4. Cross main pipe sizes shall be a minimum of 2" diameter for loop systems and 2 1/2" for single main (non-loop) systems. Generally, provide coverage at the rate required by NFPA and applicable state and local codes.
5. Sprinkler heads, valves, alarms, and similar items shall be as manufactured by Viking, Grinnell, or other approved manufacturer. Sprinkler heads shall be plain brass, up-right type in unfinished areas and concealed pendent sprinklers in areas with ceilings. Material and equipment used in the installation of the sprinkler systems and standpipes shall be listed and approved by the Underwriters' Laboratories, Inc., and shall be the latest design of the manufacturer.

G. Valves: Valves shall be UL-listed and FM approved for the pressures at which they are installed.

1. Check valves shall be swing type with iron body, bronze trim, cast iron disc, bolted cover, and screwed or flanged ends. Check valves in the pump discharge may be spring loaded, quiet type, and shall be UL-listed and FM approved. Swing check valves may be installed in horizontal pipe only.
2. Gate valves 2" and smaller shall be bronze body, OS&Y, and screwed ends. 150 psig valves shall have bronze trim, single disc, screwed bonnet, and bronze seats. 300 and 400 psig valves shall have bronze wedge disc, union bonnet, and bronze body seat rings.
3. Gate valves over 2" shall be iron body, OS&Y, bolted bonnet, bronze seats, ANSI 16.1, flanged ends. 150 psig valves shall have double or single disc, and bronze trim. 300 and 400 psig valves shall have wedge disc and brass stem.
4. Butterfly valves 2" and larger shall be grooved type. Furnish with built-in supervisory switches.
5. Supervised valves shall include valve tamper switches. Valve tamper switches shall be double-pole single-throw type with cast aluminum housing and tamperproof cover. Switch rating shall be at least 7 amperes at 125/250 volts.

## PART 2 - PRODUCTS

### 2.1 PIPING

A. Pipe: Standpipe and sprinkler piping shall be ASTM A135, Schedule 40 black steel for pipe sizes 2” and smaller. Thin-wall pipe (schedule 10), ASTM A135, may be used for sprinkler piping larger than 2”. All code approvals shall be secured before shop drawing submittal to Architect.

B. Fittings: Fittings shall be cast iron threaded sprinkler fittings ANSI B16.4 or grooved ends fittings joined by grooved couplings Victaulic Firelock or equal or welded fittings, ANSI B16.9. Flanges shall be screwed or welded neck type ANSI B16.5.

### 2.2 EQUIPMENT

A. Fire Hose Valves (Stairwells and Sprinkler Taps): Provide 2½” angle valves with 2½” x 1½” reducer a 2½” cap and chain for fire department valves in stairwells and elsewhere as required. Where the water pressure at the valve exceeds 175 psig, provide pressure regulating valves to limit the discharge pressure to 175 psig. Valve bodies shall be rated for the available system pressure. Valves for sprinkler taps shall be the same as hose valves, less cap and chain.

B. Fire Department Connection (Siamese): Wall and remote post Siamese fire department connection with chains and caps shall be polished brass or polished chrome. Verify actual material and finish with the Architect. See Civil Plans for actual location of remote mounted fire department connections.

C. Roof Manifold: Provide rough brass roof manifold on the roof above all stairwells that do not access the roof with two 2½” rough brass fire department gate valves with caps and chains.

D. Water Flow Switch: Include water flow switch, with adjustable retard feature in supply pipe to each floor of each riser for remote alarm. Switch shall be double-pole single-throw type and shall be rated at least 7 amperes at 125/250 volts.

E. Sight Flow Connection: Sight flow connection in test lines.

F. Sprinkler Heads: Brass up-right or pendant heads as required with ordinary temperature rating, except in specially designated areas of high temperature where

heads shall be rated per NFPA 13. Heads in areas with ceilings shall be concealed pendent with flat cover plate installed at finished ceiling height. Verify color of sprinkler cover plate with Architect. Pendent heads exposed to weather or freezing conditions shall be dry pendant type. Furnish spare heads equal to 1% of total number of heads installed. The heads shall be representative of, and in proportion to, the number of each type and temperature rating of heads installed. Furnish spare head cabinet and wrench for each riser. Locate cabinets as directed by Architect.

G. Dry Pipe Valve (if necessary): Viking Model C-2 or equal.

H. Accelerator: Viking Model B-1 or equal.

I. Alarm Bell: Viking Model BH-1003, 6", 120 volt AC or equal.

## PART 3 - EXECUTION

### 3.1 INSTALLATION OF PIPING SYSTEMS

A. General: Comply with the requirements of the piping section of this Specification, NFPA 13 and NFPA 14 for installation and testing of piping system and per local code.

1. Piping shall be concealed, except in mechanical equipment rooms, stairwells, or where otherwise required.
2. Grade piping to eliminate traps and pockets. Where air pockets or water traps cannot be avoided, provide hose bibs for drainage.
3. The Sprinkler Contractor shall arrange with the General Contractor to notch or pre-drill the occasional beam in order to maintain the sprinkler mains as high as possible.
4. All required sprinkler heads shall be individually dropped from the main to the ceiling. Provide each drop with a horizontal swing arm type branch run to allow future movement of the head.
5. All sprinkler heads in areas to be finished shall be installed at finished ceiling height only where the ceiling is to be installed at this time such as elevator lobbies and restrooms. Coordinate locations to ensure sprinkler heads are centered in ceiling tiles.
6. Sprinkler piping shall be installed and coordinated with the duct and other mechanical and electrical services in the ceiling cavities by this Contractor, to provide the clearances for lighting fixtures as required.
7. Sprinkler piping shall be installed so as not to impede access to mechanical, electrical, or plumbing equipment.
8. Refer to Section 21 05 53, "Fire Protection Identification" for painting, nameplates, and labeling requirements. Painting is not part of this contract scope unless otherwise specified within the contract documents.
9. Sprinkler piping shall be flushed to remove excess oils and contaminants that support the growth of microorganisms.
10. Sprinkler systems shall not be drained/flushed on finished surfaces such as sidewalks and parking lots.
11. Install a ½" Weld-o-let with plug in the main sprinkler line, on the downstream side (building side) of the flow switch for introduction of micro biocides by the Owner at a later date.

B. Protection during Construction: Provide necessary fire protection during construction and initial occupancy in accordance with NFPA and Local Codes. Provide active sprinkler systems in areas requiring sprinklers during this period before tenant finish-out. If specifically approved for this Project by the local inspector, this Contractor may install active sprinklers only in areas designated as storage areas, in public areas to be finished

with the base building, mechanical spaces, and limited other areas required by the inspector during construction. Coordinate these areas with the General Contractor.

C. Inspections and Tests: All inspections, examinations, and tests required by the authorities and/or agencies specified hereinbefore shall be arranged and paid for by this Contractor, as necessary, to obtain complete and final acceptance of the system as installed. The certificates of inspection shall be in quadruplicate and shall be delivered to the Architect for distribution.

D. Underground Fire Protection Piping: Material for pipe cushion shall comply with local codes and or the geo-technical report. In absence of local code requirements or geo-technical report, the cushion shall be bank sand or select backfill material approved by the Architect. Any material used shall pass a one-inch screen.

**END OF SECTION 211100**

22 01 00

# GENERAL PLUMBING REQUIREMENTS

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Provide the necessary interface with other Divisions to provide a complete project. Carefully check the Documents of this Division with those Documents of other Divisions. Determine the requirements of any interfacing materials or equipment being furnished and/or installed by those Sections and Divisions and provide proper installation and required interface.

B. No deviation from the Contract Documents shall be made without the written consent of the Architect and Engineer.

C. All Specifications and Drawings are to be considered together as the Contract Documents. Any work shown in one and not the other, or is implied by either, shall be provided to make a complete project. Should conflicts exist between the Specifications and Drawings or there is an item shown or noted for which is not clearly defined, immediately submit a request for clarification. Under no circumstance will conflicts between the Specifications and Drawings be grounds for additional cost to the Contract after the Contract is established.

D. The Drawings are schematic and are not intended to show the exact location of piping, equipment, etc.

E. Dimensions and information regarding accurate locations of equipment, and structural limitations and finish shall be coordinated and verified with other Divisions of Work. Be prepared to furnish dimensions and information regarding the Work of this Division to other trades. Coordination with other Divisions shall be demonstrated on the shop drawings.

F. The right is reserved to relocate any device (receptacle, switch, fire alarm, audio/visual, junction box, outlet, etc.) a maximum of 10’-0” before it is permanently installed without incurring additional cost to the Contract.

### 1.02 REFERENCE STANDARDS

A. All work shall comply with the most recently revised versions of all local, state and federal codes, ordinances of the authority having jurisdiction, laws, rules and regulations. Any modifications required by any of the above shall be made without any additional cost to the Owner. Where requirements between governing Codes and Regulations vary, the more restrictive provision shall apply.

B. Nothing contained in the Contract Documents shall be construed as authority or permission to disregard legal requirements and regulations. The Contractor shall thoroughly review the Documents and bring any such conflicts to the attention of the Architect and Engineer prior to Installation.

C. All materials, installation, and workmanship shall comply standards and/or codes of the following:
   1. International Building Code – 2021 edition
   2. International Mechanical Code - 2021 edition
   3. International Plumbing Code - 2021 edition
   4. International Fuel Gas Code - 2021 edition
   5. International Fire Code - 2021 edition
   6. International Energy Conservation Code - 2015 edition
   7. National Electrical Code, 2020 Edition
   8. National Fire Protection Association
   9. ANSI - American National Standards Institute
   10. ASTM - American Society of Testing and Materials
   11. NEMA - National Electrical Manufacturer's Association
   12. OSHA - Occupational Safety and Health Act
   13. UL - Underwriter's Laboratories
   14. ASHRAE - American Society of Heating and Air Conditioning Engineers
   15. SMACNA - Sheet Metal and Air Conditioning Contractors' Nat'l Assoc.

D. All materials shall be new and shall bear the label of UL.

1.03 EXISTING CONDITIONS

A. Where work is to be performed in an existing facility, the contractor shall visit the site prior to bid and be familiar with all existing conditions. Special attention shall be given to work to be performed above an existing ceiling.

B. Where existing slabs are to be cut or core drilled, the contractor shall x-ray the existing slabs to avoid cutting or disrupting existing conduits, cables, plumbing or structural members.

C. HVAC systems, plumbing systems, and electrical service to the building shall not be interrupted without written consent of the building owner.

D. No allowance will be made for lack of knowledge of existing conditions.

E. At the completion of the project, all work under this Division shall be completely integrated with the existing systems and left in perfect operating condition.

F. Where work under this Division disrupts the continuity of any existing to remain electrical circuit or feeder, the Contractor shall repair/replace as necessary to return to a perfectly functional and safe operating condition.

G. Prior to any demolition or construction, the Contractor shall have the existing conditions inspected by an EPA, OSHA certified asbestos abatement agency to identify the presence of asbestos. Should any asbestos be found it shall be brought to the immediate attention of the Architect and Owner and specifically identified in writing.

1.04 DEFINITIONS

A. Provide: to furnish, install and connect.

B. Furnish: to supply all materials, labor, equipment, testing apparatus, controls, tests, accessories and all other items customarily required for the proper and complete application.

C. Install: to join, unite, fasten, link, attach, set-up or connect together, complete, tested, and ready for normal satisfactory operation.

D. Engineer: The Engineer of record.

E. Contract Documents: the complete set of Specifications and Drawings of all Divisions.

F. Work: labor, materials, equipment, accessories, controls and other items required for a complete installation.

G. Concealed: embedded in masonry or other construction, installed in furred spaces, within double partitions or hung ceilings, in trenches, in crawl spaces or in enclosures.

H. Exposed: not installed underground or concealed.

I. Equal: equal in quality, workmanship, materials, weight, size, design and efficiency of the specified product, conforming with manufacturers.

J. Supply: to purchase, procure, acquire and deliver complete with related accessories.

K. Authority Having Jurisdiction (AHJ): applicable local, state and federal authorities having jurisdiction over any part of the Scope within this Division and other Divisions.

## PART 2 - PRODUCTS

### 2.01 MANUFACTURERS

A. Manufacturer's names and catalog numbers specified in the Contract Documents are intended to describe the material and set the standard of quality. All bids shall be based on material specified. Request for approval of material not specified shall be considered if the request is in written form and submitted to the Architect no later than fourteen (14) days prior to the bid date. All requests shall conform to the provisions of the general and supplementary conditions.

B. When specific names are not stated, only the best available quality of material or equipment shall be submitted for review and used in the installation.

2.02 BASIS OF DESIGN

A. Where a product is designated as "BASIS OF DESIGN", the Contractor is notified that mechanical, electrical, structural, architectural, space conditions and/or other features of the overall project design have been based on the requirements of the "BASIS OF DESIGN" product.

B. Where a product is substituted for a "BASIS OF DESIGN" product, the Contractor is notified that changes in project design may be mandatory in order to permit use and installation of the substitute product. Shop drawing submittal for a substitute product shall include a complete schedule of changes in project design, if any, which must be made in order to permit use and installation of the substitute product. The Contractor shall bear all expenses related to the use of a substitute product.

2.03 SHOP DRAWINGS AND PRODUCT DATA

A. The Contractor shall obtain complete shop drawings, product data and samples from the manufacturers, suppliers, vendors, and all Division 22 Subcontractors, for all materials and equipment as specified herein in various Sections of the Specifications, and shall submit data and details of such materials and equipment for review by the Architect and Engineer. Prior to submission of the shop drawings, product data and samples to the Architect and Engineer, the Contractor shall thoroughly review the shop drawings, product data and samples and certify they are in compliance with the Contract Drawings. Further, the Contractor shall check all materials and equipment upon their arrival on the Project site and verify their condition and compliance with the Contract Documents. Any Work which proceeds prior to receiving reviewed shop drawings shall be modified as required to comply with the Contract Documents and the shop drawings. A minimum period of ten (10) working days, exclusive of transmittal time, will be required in the Engineer’s office each time a shop drawing, product data and/or sample is submitted or resubmitted for review. This time period shall be considered by the Contractor when scheduling his Work. The initial shop drawing review for equipment and materials may be expedited through the mutual consent of the Contractor, Architect, Engineer, and Owner providing the Contractor agrees to submit complete, certified, documented, and coordinated shop drawings for review in accordance with the requirements of the Contract Documents.

B. The review of shop drawings, product data, and samples by the Architect and Engineer shall not relieve the Contractor of the responsibility for dimensions or errors that may be contained therein, or for deviations from requirements in the Contract Documents. It shall be clearly understood that the noting of some errors by the Engineer but overlooking others does not grant the Contractor permission to proceed in error.

C. All shop drawings and product data/submittals shall be submitted in compliance with the requirements of the general and supplementary conditions. No more than four (4) copies of submittal data will be reviewed. Any additional copies will be returned unmarked. The responsibility of copying review comments on any additional copies will rest solely with the Contractor.

D. All product data/submittals shall bear the name of the manufacturer to be used.

E. All shop drawings and submittals shall include a stamped indication signifying that the submittal has been reviewed for compliance with the Contract Documents by the Contractor. This stamped indication also represents the fact that the Contractor has checked this submittal for its interaction with all other Divisions and certifies by his signature or initials that all coordination has taken place. The stamp shall include the date, name of the Contracting Firm, the signature of the Contractor, certification of compliance and approval. This stamp shall be on the submittal before the Engineer will review it.

F. The Engineer will review an individual submittal not more than twice. If the submittal is rejected again on the second review, the Contractor will bare all responsibility for paying for the Engineer's time for additional reviews. Such payments to the Engineer shall be withheld from the next monthly pay application.

G. Shop drawings and/or product data shall be submitted for the following for review:
   1. Plumbing piping system layouts. These drawings must include associated equipment, drawn to scale based on submittals for that equipment, must be dimensioned, and must include piping and equipment elevation tags (distance above finished floor to bottom). The Contractor is encouraged to develop their own shop drawings, without having had the Engineer's CAD files (as previously stated, the Engineer's drawings are schematic/diagrammatic in nature). Should the Contractor insist on using the Engineer's CAD files in the procurement of shop drawings, the Contractor must pay the Engineer $150.00 per sheet for the CAD files.
      The Contractor shall give the Engineer a written release, acceptable to the Engineer, signed by a corporate officer of the Contractor. This release shall also include a copyright statement indicating that these drawings or electronic data contained will not be used on any other project. The release and payment for the files must be received PRIOR to delivery of the CAD files.
   2. Equipment, including but not limited to water heaters, plumbing fixtures, booster systems, lift stations, heat tracing, insulation, piping specialties, etc.

2.04 AS-BUILT DRAWINGS

A. The Contractor shall maintain on a daily basis at the Project site a complete set of "Record Drawings". The "Record Drawings" shall consist of a set of black-line or blue-line prints or AutoCAD files of the Contractor Coordination Drawings for this Division. The prints shall be marked, or the AutoCAD file electronically updated to show the precise location of all work and equipment, and all changes and deviations in the work from that shown on the Contract Documents. This requirement shall not be construed as authorization for the Contractor to make changes in the layout or work without definite instructions from the Architect or Engineer. The continuously updated coordination drawings (shop drawings

previously described) shall be used to produce the final "Record Drawings" which shall be delivered to the Owner in AutoCAD electronic format (CD) upon Project completion.

B. Record dimensions shall clearly and accurately delineate the work as installed; locations shall be suitably identified by at least two dimensions to permanent structures.

C. The Contractor and Subcontractor shall mark all "Record Drawings" on the drawings with a rubber stamp impression or an AutoCAD image that states such.

PART 3 - EXECUTION

3.01 INSTALLATION

A. The equipment selections used in the preparation of the Contract Documents will fit into the physical spaces provided and indicated, allowing ample room for access, servicing, removal and replacement of parts, etc. Adequate space shall be allowed for clearance in accordance with the Code requirements and the requirements of the local Authorities having jurisdiction, and the equipment manufacturer 's recommendations.

B. In the preparation of Drawings, a reasonable effort to accommodate acceptable equipment manufacturer's space requirements has been made. However, since space requirements and equipment arrangement vary according to each manufacturer, the responsibility for initial access, maintenance access, code required access, and proper fit rests with the Contractor.

C. Physical dimensions and arrangements of equipment to be installed shall be subject to the Architect's and Engineer's review.

D. The General Contractor and all Subcontractors shall coordinate the installation of ductwork, conduit, busway, piping, cable trays, etc., installation with lighting fixtures, special ceiling construction, air distribution equipment, and the structure. Provide additional rises, drops and offsets as required. If after installed, new ductwork, conduit, busway, piping or cable is found to be in conflict with the architecture, structure, or other trade Work which is either existing or shown on the Contract Documents, the ductwork, conduit, busway, piping or cable shall be relocated without additional cost to the Owner.

E. No piping, equipment, etc., shall be installed in the eight (8) inch high zone directly above the ceiling in tenant areas to allow for tenant build-out and flexibility unless otherwise specifically shown on the Drawings or prior written authorization is received from the Engineer.

F. Accessibility and Clearance:
1. Piping, etc. shall be installed in accessible locations, avoiding obstructions, preserving headroom, and keeping openings and passageways clear.

2. Minor adjustments in the locations of equipment shall be made where necessary, providing such adjustments do not adversely affect functioning of the equipment.

G. Scaffolds and staging for installation of plumbing work shall be provided under the work of this Division.

3.02 STRUCTURAL FITTINGS

A. Furnish and install the necessary sleeves, inserts, hangers, anchor bolts, and related structural items. Install at the proper time.

B. Openings may have been indicated on the Architectural and Structural drawings. Should any additional openings or holes be required, the same shall be provided at no additional cost to the Owner.

C. Location: At a time in advance of the work, verify openings shown on the Architectural and Structural drawings, and coordinate any additional openings.

D. If the work of this Section requires modification of the Architectural or Structural drawings, furnish new instructions as to requirements for these openings. Submit for review and coordination to Architect.

E. Sleeves shall be supplied for mechanical piping passing through walls or slabs and shall be placed before concrete is poured.

F. Equipment supports for mechanical work shall be fastened to the structure by inserts, anchor bolts, bolting to drilled and tapped structural members, or be welded to the structure.
1. Welding shall be done by the electric arc method with fully competent welders. Supporting members shall be shop coated with a suitable primer.
2. Surfaces damaged by installation of supports shall be touched up with primer to match shop coat. Any drilling of structural members shall be approved by the Architect.

G. Flashing:
1. Wherever piping passes through the roof or outer walls, base flashing and counterflashing shall be provided.
2. Such flashing shall be properly installed by skilled workmen, and shall include grouting, mastic or tar application, or other means to insure a permanent, waterproof, neat and workmanlike installation.
3. Insofar as possible, flashing shall comply with and be similar to requirements for flashing in General Construction Work.

H. Anchor bolts and inserts shall be galvanized and of adequate size and strength for installation of electrical work and shall be placed in forms before concrete is poured.
1. Placement of bolts in bases shall be done under other Division. Furnish detail drawings, templates, and anchor bolts for bases to the General Contractor in time to avoid delaying work schedules.

2. Expansion shields shall only be used with specific approval of the Architect. Wooden or soft metal plugs shall not be used.

I. Cutting and patching:
1. All additional cutting, patching and reinforcement of construction of building, subject to review by the Architect, shall be performed under this Section.
2. Refer to appropriate Division for requirements.

3.03 WEATHERPROOF EQUIPMENT

A. Plumbing devices or equipment located in damp; semi-exposed areas shall be weather-resistant. Enclosures shall comply with NEMA Type 3R requirements.

B. Air distribution devices located in damp areas outside shall be weather-resistant (aluminum, etc.).

3.04 CLEANING

A. Brush and clean work prior to concealing, painting and acceptance. Perform in stages if directed.

B. Painted exposed work soiled or damaged: Clean and repair to match adjoining work before final acceptance.

C. Remove dust and debris from inside and outside of material and equipment.

3.05 TESTS AND DEMONSTRATIONS

A. All systems shall be tested in the presence of the Owner or an Owner designated representative upon completion of the Work and demonstrates that the installation is in accordance with the Contract Documents.

B. All motors shall be checked and adjusted for correct direction of rotation.

C. Any work found not to be in compliance with the Contract documents shall be repaired or replaced without incurring additional cost to the Contract price.

D. Provide all instruction to the Owner on maintenance and operation of all systems and equipment provided under this Division.

3.06 WARRANTIES

A. The warranty period for all systems, equipment, components, work, etc. shall be no less than one (1) year, unless specified otherwise hereinafter and shall include at least one (1) full heating season and one (1) full cooling season. The warranty shall include parts and labor.

B. The Contractor shall, without cost to the Owner, remedy any defects within a reasonable time to be specified in notice from the Architect. In default thereof, the Owner may have such work done and charge all costs to the Contractor.

C. The start of the Contractor's warranty period, as defined in the General Conditions, shall commence on the issue of a "Certificate of Substantial Completion", by the Owner or the Owner's Representative for each item of material, equipment or system.

D. The Subcontractor shall confer with the General Contractor prior to the bid date concerning the project schedule and determine if there is a need to operate any items of equipment or systems for temporary heating and/or cooling or other reasons prior to "Substantial Completion". All required extended warranty costs for equipment, materials, and systems shall be included in the Subcontractor's bid.

END OF SECTION

# SECTION 220529 - HANGERS & SUPPORTS FOR PLUMBING PIPING & EQUIPMENT

## PART 1 – GENERAL

### 1.1 RELATED DOCUMENTS

A. The Conditions of the Contract and applicable requirements of Division 1, “General Requirements”, and Section 22 01 00 “General Plumbing Requirements”, govern this Section.

### 1.2 DESCRIPTION OF WORK

A. Work Included: Provide pipe hangers, supports, and required appurtenances as specified and indicated

### 1.3 QUALITY ASSURANCE

A. MSS Standard Compliance: Provide pipe hangers and supports of materials, design, and manufacture which comply with ANSI/MSS SP-58, SP-59, SP-89, and SP-90.

B. Acceptable Manufacturers: The model numbers listed in the Specification establish a level of quality and material. Subject to compliance with requirements, provide products and materials by the following:

1. ITT Grinnell Corporation,
2. Fee and Mason,
3. Central Iron Manufacturing Company, and
4. F&S Manufacturing Company
5. Anvil International
6. B-Line

## PART 2 – PRODUCTS

### 2.1 PIPE HANGERS AND SUPPORTS:

A. General: Provide pipe hangers and supports as specified. Comply with local codes and standards for pipe and equipment support and anchorage. Pipe supports shall be of material that will prevent electrolytic action.

B. Inserts: Provide Grinnell No. 282 inserts for concrete construction.

C. Piping in Multiple Parallel Runs: Provide Grinnell No. 45 or No. 50 with Grinnell No. 137 U-bolt pipe clamps or structural channels or angles with U-bolt clamps, supported as trapeze hangers where multiple parallel runs of piping are shown. Select and size members for weights to be carried and span dimensions between supports.

D. Piping in Single Runs: Provide Fee and Mason Fig. 239 or Grinnell No. 260 clevis hanger.

E. Hanger Rod: Provide hanger rods of required length. Rod diameters shall be as listed in the following table. Rod diameters may be adjusted after consultation with the Structural

Engineer concerning the building framing system, the method of attachment to the structure and the support rod spacing.

| Pipe Sizes | Rod Diameter |
|---|---|
| 3/4" - 2" | 3/8" |
| 2-1/2" – 3 | 1/2" |
| 4" – 5 | 5/8" |
| 6" | 3/4" |
| 8" – 12" | 7/8" |
| 14" – 18" | 1" |

F. Riser Clamps: Provide Fee and Mason Figure 241 riser clamps. Riser clamps for copper tube shall be copper-plated.

G. Saddles and Shields:

1. Saddles for Horizontal Insulated Piping without Vapor Barrier: At each hanger or support on horizontal runs, provide Grinnell No. 160 or Fee and Mason Figure 171, 1710, 1712, or 172 saddles, as applicable. Shields as described below may be used instead of the saddles. On heating water systems below 140ºF (60ºC), hangers may be sized for the pipe size and of a material compatible with the pipe. Where dissimilar materials are used, provide dielectric separation. Carry insulation over the hanger and seal where hanger is sized for pipe.
2. Shields for Horizontal Insulated Water Piping with Vapor Barrier: At each hanger or support for water piping, provide a half section of preformed 6 PCF density fiberglass or rigid calcium silicate, with jacket of adjacent insulation brought across unbroken, supported on semicircular 16 gauge shields. Shields for pipe 4" and smaller shall be 12" long; shields for pipe 5" to 8" shall be 18" long; and shields for larger pipe shall be 24" long.

H. Piping on Roof: Roof mounted pipe supports are discouraged. If roof supports are necessary, installation methods must be approved by the architect, engineer, general contractor, and the Roofing Contractor.

## PART 3 – EXECUTION

### 3.1 INSTALLATION:

A. Independent Support: Support fire sprinkler and standpipe piping independently of other piping in accordance with NFPA-approved methods and local codes and standards.

B. Provisions for Movement:

1. Movement: Install hangers and supports to allow controlled movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate the action of expansion joints, expansion loops, expansion bends, and similar units.
2. Load Distribution: Install hangers and supports so piping live and dead loading stresses from movement will not be transmitted to any pipe or connected equipment. Pipe supports shall properly transmit the weight of the pipe and its contents to the building structure, or to independent posts, piers, or foundations.
3. Pipe Slopes: Install hangers and supports to provide the indicated pipe slopes so maximum pipe deflections allowed by ANSI B31 are not exceeded.

C. Insulated Piping: Comply with the following installation requirements:

1. Clamps: Attach clamps, including spacers (if any), to piping with clamps projecting through the insulation; do not exceed pipe stresses allowed by ANSI B31.
2. Shields: Where low-compressive-strength insulation of vapor barriers are indicated on cold, chilled, or heating water piping, install coated protective shields. For pipe 8" and over, install rigid calcium silicate insulation between saddles and pipe.

D. Spacing: Install hangers and supports in piping systems to remove stress from equipment flanges and rotating equipment. Space hangers and supports as shown in the following table. Rod spacing may be adjusted after consultation with the Structural Engineer concerning the building framing system, the method of attachment to the structure and the support rod diameters.

| Trade Pipe Size | Maximum Spacing |
|---|---|
| 1/2" | 5' |
| 3/4" | 6' |
| 1" and 1-1/4" | 7' |
| 1-1/2" | 9' |
| 2" | 10' |
| 2-1/2" | 11' |
| 3" | 12' |
| 4" | 14' |
| 5" | 16' |
| 6" | 17' |
| 8" | 19' |
| 10" | 22' |
| 12" | 23' |
| 14" | 25' |
| 16" | 27' |
| 18" | 28' |

E. Saddles: Where insulation without vapor barrier is indicated, install protection saddles, or use hangers as indicated in Paragraph 2.0/H.1.

F. Guides: Install pipe guides complying with the manufacturer's published product literature. Where not otherwise indicated, install pipe guides near expansion loops, expansion joints, and ball joints.

G. Anchors: Install anchors at the proper locations to prevent stresses from exceeding those permitted by ANSI B31 and to prevent the transfer of loading and stresses to connected equipment. Anchors shall include vibration isolation in accordance with the pipe support system specified. Where the piping system is floating, the anchors shall be termed restraints or braces.

1. Where expansion compensators are indicated, install anchors in accordance with the expansion unit manufacturers written instructions, to limit movement of piping and forces to the maximums recommended by the manufacturer of each unit.
2. Where not otherwise indicated, install anchors at the ends of principal pipe runs and at intermediate points in pipe runs between expansion loops and bends. Make provisions for preset of anchors as required accommodating both expansion and contraction of piping.

H. Leveling: Adjust hangers and supports and place grout as required under supports to bring piping to proper levels and elevations.

I. Hangers: Refer to Section 23 05 48, “Vibration Isolation”, for additional information and support requirements. Pipe hangers made of wood, wire, or sheet iron shall not be permitted.

J. Riser Supports: Vertical piping shall be secured at sufficiently close intervals to keep the pipe in alignment and carry the weight of the pipe and contents.

1. Cast iron soil pipe shall be supported at the base and at each story level, but in no case at intervals greater than 10’.
2. Steel pipe shall be supported at the base and at no less than every other story level, but in no case at intervals greater than 25’.
3. Copper tube shall be supported at each story level, but in no case at intervals greater than 10’.
4. Plastic pipe shall be supported at mid point between floors and at ceiling to prevent movement, but in no case at intervals greater than 8’.

**END OF SECTION 220529**

# SECTION 220553 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

## PART 1 GENERAL

### 1.1 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 22 01 00, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the identification of equipment and piping. Comply with other Division 15 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the identification of equipment and piping specified herein and/or as indicated on the drawings.

### 1.2 DESCRIPTION OF WORK

A. Work Included: Identification of plumbing equipment shall consist of equipment labeling, pipe marking, and valve tagging as specified hereinafter.

1. In general, all equipment shall be labeled. This shall include all central plant, air handling or air conditioning equipment, and other similar and miscellaneous equipment.
2. Pipe markings shall be applied to all piping.
3. Each valve shall be identified with a stamped tag. Valves and tagging shall be scheduled typewritten on 8 ½" x 11" paper, tabulating valve number, piping system, system abbreviation, location of valve (Room or area), and service (e.g. – 2nd Floor North Domestic Hot Water). The valve schedule shall be submitted to the Engineer for approval prior to ordering or installing valve tags.
4. Labels, tags, and markers shall comply with ANSI A13.1 and other applicable state and local standards for lettering size, colors, and length of color field.
5. Equipment and device identification specified in other sections shall be provided as a part of those requirements.

### 1.3 ACCEPTABLE MANUFACTURERS

A. Labels, markings, and tags shall be manufactured by W.H. Brady, Seton, Allen, or Industrial Safety Supply.

## 2.0 PRODUCTS

### 2.1 EQUIPMENT LABELING

A. Equipment labeling shall be one of the following, unless noted or specified otherwise:

1. Permanently attached engraved brass or plastic laminated signs with 1" high lettering. Signs on exterior equipment shall be brass.
2. Stencil painted identification, 2" high letters, with standard fiberboard stencils and standard black (or other appropriate color) exterior stencil enamel.

## 2.2 PIPE MARKINGS

A. On piping less than 6” diameter, install plastic semi-rigid snap-on type, manufacturer’s standard pre-printed color-coded pipe markers extending fully around the pipe and insulation or pressure-sensitive vinyl pipe markers similar to the above. Pipe markings can also be applied with the stick type backing in lieu of he semi-rigid snap-on-type.

B. On piping and insulation 6” and greater diameter, full band as specified above or strip-type markers fastened to the pipe or insulation with laminated or bonded application or by color-coded plastic tape not less than 1 ½” wide, full circle at both ends of the marker. Pipe markings can also be applied with the stick type backing in lieu of he semi-rigid snap-on-type.

C. Arrows for direction of flow provided integral with the pipe marker or separate at each marker.

## 2.3 VALVE TAGS

A. Valve tags shall be polished brass or plastic laminate with solid brass S hook and chain. Tags shall be stamped or engraved with the appropriate abbreviation for the type of service (e.g. – CHW, HW), as well as the designated valve number.

B. A valve schedule is to be provided to the Owner. For each page of valve schedules, a glazed display frame, with screws for removable mounting on masonry walls. Provide frames of finished hardwood or extruded aluminum, with SSB-grade sheet glass.

# 3.0 EXECUTION

## 3.1 GENERAL

A. Identification labeling, marking, and tagging shall be applied after insulation and painting has been completed.

B. Coordinate names, abbreviations, and other designations used in mechanical identification work with corresponding designations shown, specified, or scheduled on drawings. Prior to ordering any labels, markings, or tags, obtain the approval of the Engineer regarding names, abbreviations, etc.

C. The Plumbing, HVAC, and Fire Protection Contractors shall coordinate labeling, marking, and tagging to ensure consistent and coordinated identification. In existing buildings, utilize similar names, abbreviations, and other designations that are currently in use to remain consistent with existing identification.

D. Equipment labeling shall consist of unit designation as shown on the drawings. Exhaust fan labeling shall also indicate service or the room or area of service.

E. Pipe and ductwork markers shall be placed on piping and ductwork on 25’ centers in mechanical rooms and concealed spaces. In locations where piping and ductwork is

exposed, place markers on 50’ centers. Flow directional arrows should be marked on the piping at taps from the main and riser.

F. Valve tags shall be placed on each valve except those intended for isolation of individual heat pumps or terminal units (e.g. - VAV boxes, fan coil units, unit heaters, etc.). Valve tag schedules shall be prepared as specified hereinbefore. Copies of one schedule shall be laminated in clear plastic and placed where directed by the Owner. Other sets shall be included in the Operating and Maintenance Manuals.

**END OF SECTION 220553**

22 07 00

# PLUMBING INSULATION

## PART 1 - GENERAL

### 1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 22 01 00, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the insulation of Plumbing piping and equipment. Comply with other Division 22 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the insulation system specified herein, as indicated on the drawings, and as required to provide complete and operating systems.

### 1.02 QUALITY ASSURANCE

A. Manufacturer: Approved manufacturers are Armstrong, Calsite, Cell-U-Foarm Corp, Ceelco, Certainteed Corp, Dow Chemical Company, Forrest Mfg Co, Foster / Chilers, Gemco, Johns Manville, Knauf Fiberglass, Midwest Fastners, Owens Corning Fiberglass, Pittsburg Corning Fiberglass, Rubatex, Trymer, and Venture Tape.

B. All insulation, jacket and adhesive shall have a fire and smoke hazard ratings as tested under ASTM E 84, NFPA 255, and UL 723 not exceeding:

| | |
|---|---|
| Flame Spread: | 25 |
| Fuel Contributed: | 50 |
| Smoke Developed: | 50 |

Exceptions: Type B Insulation and PVC Fitting Covers

### 1.03 SUBMITTALS

A. Per Section 22 01 00.

B. Product Data
1. Type A Insulation
2. Type B Insulation
3. Type C Insulation
4. Type D Insulation
5. Type E Insulation
6. Type F Insulation
7. Type G Insulation

8. Vinyl Lacquer Paint for Type B Insulation
9. Metal Jacket

1.04 DEFINITIONS

A. The phrase "Storm Drainage Conductor" refers to that portion of the storm drain interior to the building, between the roof drain body and where the pipe goes below grade.

B. The word “plenum” shall mean a ceiling space or mechanical room used for the transfer of conditioned return and/or outside air.

PART 2 - PRODUCTS

2.01 PIPING INSULATION

A. Type A – Fiberglass (indoor)
1. One Piece glass fiber, rigid molded sectional pipe covering with factory applied aluminum foil and white craft paper flame retardant vapor barrier jacket, conforming to ASTM C547, Class II, Mineral Fiber Preformed Pipe Insulation.
2. Thermal Conductivity (k) equals approximately 0.23 (BTU/HR., SF., Degree F, IN) at 75 °F.
3. Similar to Johns Manville Corp “Micro Lox 650 AP T”, or approved equal.

B. Type B - Closed Cell (indoor)
1. Closed cell, flexible foamed plastic conforming to ASTM C534, "Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form." Insulation shall be suitable for a temperature range from –40 degrees F to 220 degrees F.
2. Conductivity (k) equals approximately 0.27 (BTUHR., SF., Degree F, IN) at 75 °F.
3. Similar to Armstrong “Armaflex”, or approved equal.

C. Type C – Polyioscyanurate (outdoor)
1. Prefabricated 2 lb./cu.ft. density polyisocyanurate insulation with waterproof mastic and glass fiber jacket finished with an aluminum jacket with waterproof silicone caulk joints.
2. Conductivity (k) equals approximately 0.14 (BTUHR., SF., degrees F, IN) at 75 °F.
3. Insulation shall be applied per manufacturer’s recommendations. Joint sealants and coatings shall be as approved by the insulation manufacturer for the intended application and service temperature range.
4. Jacketing shall be an all service jacket with 1 mm aluminum foil on pipe insulation and FSK jacket on board stock applied by the manufacturer to ASTMC-1136. Jacket shall have integral flap for sealing joint.
5. Similar to Trymer 9501, or approved equal.

2.02 METAL JACKET

A. Smooth aluminum jacket 0.016 inch thick.

B. Integral polykraft or poly-surlyn moisture barrier.

C. Banded locking joints with field applied silicone weatherproof sealant.

D. Similar to Johns Manville Corp, or approved equal.

2.03 INSULATION ACCESSORIES

A. The following accessories shall be used in the application of the thermal insulations specified under this Section:
   1. PVC Fittings Covers: similar to Johns Manville Corp "Zeston", or approved equal.
   2. Pressure Sensitive polyester film tape to secure pipe insulation up to 12" outside diameter: Similar to 3M 30-80, or approved equal.
   3. Vapor Seal Mastic: Similar to Childers CP-35, or approved equal.
   4. Lagging Adhesive: Similar to Childers CP-52, or approved equal.
   5. Wire: 16 gauge soft stainless steel.
   6. Insulation Bonding Adhesive (To Metal): Similar to Childers CP-82, or approved equal.
   7. Insulating and Finishing Cement: Similar to Insulco Smooth Kote, or approved equal.
   8. Mechanical Fasteners - Welded or adhered pins with speed clip washers: Similar to Gemco Midwest Fasteners, or approved equal.
   9. Bands for Equipment:
      a. Outside diameter of insulation is less than 24 inch: 1/2 inch x 0.020-inch (25 ga.) stainless steel.
      b. Where diameter is 36 inches or larger: 3/4 inch x 0.020 inch.
   10. Bands for Piping: 1/2 inch x 0.020-inch stainless steel.
   11. Wire Mesh: 1 inch by 20-gage stainless steel hexagonal wire netting.

PART 3 - EXECUTION

3.01 INSULATION APPLICABILITY

A. Condensate Drains (except in plenums and fire partitions/floors) – Type B insulation required:

| Insulation Thickness (in) | Pipe Sizes (in) |
|---|---|
| ½ | all |

B. Condensate Drains (inside plenums and fire partitions/floors) – Type A insulation required:

| Insulation Thickness (in) | Pipe Sizes (in) |
|---|---|
| 1/2 | up to 1 |
| 3/4 | 1-1/4 and up |

C. Horizontal waste piping from electric water coolers – Type A insulation required:

| Insulation Thickness (in) | Pipe Sizes (in) |
|---|---|
| 1/2 | all |

D. Refrigerant Suction Lines & Valves (except in plenums and fire partitions/floors) – Type B

| Insulation Thickness (in) | Pipe Sizes (in) |
|---|---|
| 1 | all |

E. Refrigerant Suction Lines & Valves (in plenums and fire partitions/floors), and hot gas bypass piping – Type A insulation required:

| Insulation Thickness (in) | Pipe Sizes (in) |
|---|---|
| 1 | all |

F. Domestic Cold Water – Type A insulation required:

| Insulation Thickness (in) | Pipe Sizes (in) |
|---|---|
| 1 | all |

G. Domestic Hot Water and Tempered Water – Type A insulation required:

| Insulation Thickness (in) | Pipe Sizes (in) |
|---|---|
| 1 | up to 1-1/4 |
| 1-1/2 | 1-1/2 and up |

H. Domestic Water Heaters shall be factory insulated.

Notes:

a. The above thicknesses are the minimum required. All local codes and local energy codes shall be complied with.
b. All piping exposed to outdoors shall be insulated. All piping subject to freezing shall be provided with heat tracing. Coordinate insulation with heat trace cable and controls.
c. Insulation types and thickness are a minimum standard. Each application shall be carefully considered and insulation product type and thickness shall be appropriate for each specific application. Submit all insulation products with verification of their service intent.

## 3.02 PIPING INSULATION GENERAL REQUIREMENTS

A. Preparation
1. Do not apply insulation until piping has been leak tested.
2. All surfaces to be insulated shall be dry and free of loose scale, rust, dirt, oil or water.

B. Application:
1. Insulation shall be installed in a smooth, clean workmanlike manner. Joints shall be tight and finished smooth without fish-mouths.
2. Insulation shall fit tightly against the surface to which it is applied to prevent air circulation between the insulation and the pipe or equipment to which it is applied.
3. Insulation applied to cold piping or equipment shall be completely vapor sealed, free of pinholes or other openings.
4. Do not use wet insulation materials.
5. All longitudinal joints on vertical pipe runs shall be staggered.
6. Apply insulation so as to permit expansion or contraction of pipelines without causing damage to insulation or surface finish.
7. Do not apply mastic or adhesive until all previous applications of mastic and adhesives have thoroughly dried.
8. No bands or staples shall be provided on covering.
9. The adhesive used in connection with all covering work shall contain an approved vermin and rodent proof ingredient.
10. Provide 24-gauge sheet-metal saddle between the pipe hanger/support and the exterior of the insulation. Saddle length shall be the same as insulation inserts.

C. Application at Fittings:
1. Insulation of flanges and flanged fittings shall overlap adjacent pipe covering at least 1 inch. Valves shall be insulated up to the gland only.
2. Pipeline strainers shall be insulated in such a manner as to permit removal of strainer basket without disturbing insulation of the strainer body.
3. Insulation adjacent to un-insulated flanges shall be tapered back and neatly finished so as to allow access to and removal of bolts without injury to covering.

3.03 TYPE A INSTALLATION

A. Tightly butt together sections of insulation on pipe runs sealing longitudinal seams of jacket with a self-sealing adhesive. Seal end joints with 4-inch wide straps of matching vapor barrier tape. Seal off ends of insulation with vapor seal mastic at valves, fittings and flanges. No further finish required. Mastic shall extend onto the bare pipe and over the insulation O.D.

B. PVC fitting jackets shall be used when they are available for the particular application. When molded or routed coverings are not available, the coverings shall be fabricated in the field similar to equipment insulation. Molded or routed fitting covers are highly recommended. Order PVC pre-curled.

C. Cold Piping:
1. Cover valves, fittings and flanges with insulation having the same thickness as adjacent pipe covering, securing in place reforming tape up to 12” O.D. and ½” wide SST bands on larger O.D. Apply a PVC jacket and seal joints with PVC cement (solvent welding).

D. Hot Piping:
   1. Covers shall overlap the pipe insulation by the thickness of the insulation or 2" min. Cover valves, fittings and flanges with insulation similar to the adjacent pipe covering, securing in place with reforming tape up to 12" O.D. and ½" wide SST bands on larger O.D. Apply a PVC jacket and tape end joints to adjacent pipe insulation.
   2. Do not use PVC fitting jackets where the surface of the insulation is above 150 degrees F.

E. Exterior Piping:
   1. Exterior above grade water piping shall be finished with a weatherproof jacket and an aluminum jacket. Lap and seal joints as per manufacturer's instructions. Place laps to shed water.

3.04 TYPE B INSTALLATION

A. Type B insulation shall be slipped on the pipe prior to connection, and the butt joints shall be sealed. Where the slip on technique is not possible, the insulation shall be carefully slit and applied to the pipe.

B. All joints shall be completely butt sealed with the manufacturer's recommended adhesive.

C. Do not apply Type B insulation in multiple layers.

D. Type B insulation shall not be used in plenums nor firewall penetrations.

E. This Contractor shall paint Type B insulation exterior to the building with two coats of a vinyl acrylic paint recommended by the insulation manufacturer for protection against ultraviolet degradation and shall be flexible with no cracking. It is recommended in high humid areas to coat the insulation with a vapor barrier mastic to .037 min. DFT.

3.05 METAL JACKET INSTALLATION

A. Cover all piping insulation exposed to the exterior with metal jacket as specified herein.

3.06 HANGERS

A. Continue insulation through pipe hangers. Provide either rigid insulation inserts or sheet metal inserts at all outside pipe hangers. Provide rigid insulation inserts for piping operating below 60 °F. and sheet metal inserts for piping above 60 °F.

B. Provide rigid insulation (on non-insulated piping) or sheet metal inserts (on insulated piping) between the pipe and pipe hanger - shall be of a thickness equal to the adjoining insulation and shall be provided with vapor barrier where required. Insulation insert shall not be less than the following lengths:

| | |
|---|---|
| 1/2” to 2 1/2" pipe size | 10 Inches Long |
| 3” to 6" pipe size | 12 Inches Long |
| 8” to 10" pipe size | 16 Inches Long |
| 12” and over | 22 Inches Long |

C. Inserts for cold piping shall have a vapor barrier facing of the same material as the adjacent pipe insulation. Seal inserts into insulation with vapor seal mastic.

D. Sheet metal inserts shall be of steel sheet. Gauge shall conform to manufacturer's recommendation for pipe size. Sheet metal inserts shall have insulation filler of the same material as the adjacent pipe insulation.

3.07 PIPE SLEEVES

A. Pipe insulation and vapor barrier shall be continuous through sleeves in walls and floors.

B. Type B insulation shall not be used in sleeves through firewalls or fire rated (2-hour) floor systems. Use Type A or Type C through the sleeve instead and vapor seal the joint between the two insulations.

C. Provide 26 gauge galvanized steel or 0.020 inch aluminum jacket over insulation on pipe passing through sleeves where sealant is required.

D. Where penetrating interior walls, extend the metal jacket 2 inches out either side of the wall and secure each end with a metal band compressing the insulation slightly.

E. Where penetrating floors, extend the metal jacket 2 inches below the floor and 5 inches above the floor. Secure with metal bands.

END OF SECTION

22 10 00

# PLUMBING PIPING

## PART 1 - GENERAL

### 1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 22 01 00, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the plumbing piping systems. Comply with other Division 22 and 23 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the plumbing piping systems specified herein, as indicated on the drawings, and as required to provide complete and operating systems.

### 1.02 DESCRIPTION OF WORK

A. Work Included: Provide complete operating plumbing piping systems including pipe, tube, fittings, and appurtenances as indicated and in compliance with these Specifications.

B. Applications: Applications of piping systems include, but are not limited to, the systems as listed below:

| Working System | Operating Pressure | Temperatures |
|---|---|---|
| Domestic Cold Water | | |
| High | 350 psig | 55 to 80°F |
| Medium | 300 psig | 55 to 80°F |
| Low | 150 psig | 55 to 80°F |
| Domestic Hot Water | | |
| High | 350 psig | 90 to 120°F |
| Medium | 300 psig | 90 to 120°F |
| Low | 150 psig | 90 to 120°F |
| Makeup Water | | |
| High | 350 psig | 55 to 80°F |
| Medium | 300 psig | 55 to 80°F |
| Low | 150 psig | 55 to 80°F |
| Sanitary Drainage | -- | -- |
| Storm Drainage | -- | -- |

| | | |
|---|---|---|
| Natural Gas | -- | -- |

1.03 QUALITY ASSURANCE

A. Welding: Qualify welding procedures, welders, and operators in accordance with ANSI B31.1, Paragraph 127.5, for shop and job site welding of piping work. Make welded joints on the piping system with continuous welds, without backing rings and with pipe ends beveled before welding. Gas cuts shall be true and free from burned metal. Before welding, surfaces shall be thoroughly cleaned. The piping shall be carefully aligned and no weld metal shall project inside the pipe.

PART 2 - PRODUCTS

2.01 PIPING MATERIALS

A. General: Provide pipe and tube of type, joint, grade, size, and weight (wall thickness, schedule or class) indicated for each service. Comply with applicable governing regulations and industry standards.
   1. Steel Pipe: ASTM A53, ASTM A106, or ASTM A120, black or hot-dipped galvanized as specified.
   2. Copper Tube: ASTM B88, Types "K", Type "L", or Type "M" copper water tube as defined by the Copper and Brass Research Association.
   3. Ductile Iron Pipe: ANSI A21.51, Class 150 with bell and spigot ends for push-on joints.
   4. Cast Iron Soil Pipe: ASTM A74, standard weight, hub and spigot-type.
   5. Hubless Cast Iron Pipe: CISPI 301-78, standard weight with spigot bead ends for coupling assembly.
   6. Polyvinyl Chloride (PVC) Pipe: Sewer main SDR 41, ASTM D3034 with bell ends and pre-inserted gasket joints.
   7. Pre-insulated Steel Pipe: ASTM A53, ASTM A106, ASTM A120, and ANSI B31.1.
   8. Polyvinyl Chloride (PVC) Water Pipe: Class 150, thickwall, Schedule 80, AWWA C90 mechanical joint.
   9. Copper Drainage Pipe: DWV copper piping.
   10. Polyvinyl Chloride (PVC) Drainage Pipe: Schedule 40 PVC.
   11. Chlorinated Polyvinyl Chloride (CPVC) Drainage Pipe: Schedule 40 CPVC. Type IV Grade I with cell classification of 23447 as defined in ASTM D1784. Rated for temperatures up to and including 200°F.

2.02 PIPE / TUBE FITTINGS

A. General: Provide factory-fabricated fittings of type, materials, grade, class, and pressure rating indicated for each service and pipe size. Provide sizes and types matching pipe, tube, valve, and equipment connections. Where not otherwise indicated, comply with governing regulations, industry standards, and where applicable, with pipe manufacturer's instructions for selections.
   1. Cast Iron Flanged Fittings: ANSI B16.1, Class 125 or Class 250, black or galvanized as specified, including bolting and gasketing.

2. Cast Iron Threaded Fittings: ANSI B16.4 or ASTM A126, Class 125 or Class 250, black or galvanized as specified.
3. Malleable Iron Threaded Fittings: ANSI B16.3, Class 150 or Class 300, black or galvanized as specified.
4. Malleable Iron Threaded Unions: ANSI B16.39, select for proper piping fabrication and service requirements including style, end connections, and metal-to-metal seats (iron, bronze, or brass), plain or galvanized as specified.
5. Threaded Pipe Plugs: ANSI B16.14.
6. Steel Flanges/Fittings: ANSI B16.5, including bolting, gasketing, and butt weld end connections.
7. Forged Steel Socket-welding and Threaded Fittings: ANSI B16.11, rated to match schedule of connected pipe.
8. Wrought Steel Butt-welding Fittings: ANSI B16.9, except ANSI B16.28 for short radius elbows and returns; rated to match connected pipe.
9. Cast Iron Drainage Fittings: ANSI B16.22 galvanized with pitched threaded ends.
10. Pipe Nipples: Fabricated from same pipe as used for connected pipe, except do not use less than Schedule 80 pipe where length remaining unthreaded is less than 1/2". Do not thread nipples full length (no all-thread nipples).
11. Wrought Copper/Bronze Solder-Joint Fittings: ANSI B16.22 suitable for working pressure up to 250 psig.
12. Hub-less Cast Iron Pipe Fittings: CISPI 301-78 and comply with governing regulations.
13. Cast Iron Soil Pipe Fittings: ASTM A74.
14. Compression Gaskets: CISPI HSN-75.
15. Lead/Oakum Joint Materials: Comply with governing regulations for service use indicated.
16. Grooved End Fittings: ASTM A47 or ASTM A536 joined with Victaulic Style 77 couplings and Grade "E" gaskets.
17. Flanged Fittings: Comply with ANSI B16.15 for bolt-hole dimensioning, materials, and flange-thickness.
18. Flange Bolts: Bolts shall be carbon steel ASTM A307 Grade A hexagon head bolts and hexagonal nuts. Where one or both flanges are cast iron, furnish Grade B bolts. Cap screws utilized with flanged butterfly valves shall be ASTM A307 Grade B with hexagon heads.
19. Flange Bolt Thread Lubricant: Lubricant shall be an anti-seize compound designed for temperatures up to 1000°F and shall be Crane Anti-Seize Thread Compound or approved equal.
20. Polyvinyl Chloride (PVC) Fittings: ASTMD-2665, Lasco or Spears Manufacturing high strength sewer fittings.
21. Copper Drainage Fitting: DWV copper drainage fittings.

B. Miscellaneous Piping Materials/Products:
1. Welding Materials: Comply with ASME Boiler and Pressure Vessels Code, Section II, Part C, for welding materials.
2. Brazing Materials: American Welding Society, AWS A5.B, Classification BCup-5.

3. Gaskets for Flanged Joints: 1/8" thick gaskets. Ring-type shall be used between raised face flanges and full face-type between flat face flanges with punched bolt holes and pipe opening. Gaskets shall be Garlock Style 3400 compressed non-asbestos or equal.
4. Insulating (Dielectric) Unions: Provide dielectric unions at all pipe connections between ferrous and nonferrous piping. Unions shall be "Delvin" as made by Pipeline Seal and Insulator Company or "EPCO" as made by Epco Sales, Inc. and shall have nylon insulation or equal.
5. Gaskets for Cast Iron Soil Pipe: ASTM C 564, neoprene, compression-type.
6. Push-on-Joints: ANSI A21.11, rubber compression-type, "Tyton Joint" as manufactured by US Pipe or equal.
7. Hub-less Cast Iron Joints: CISPI 310, stainless steel corrugated shield and clamp assembly over one piece neoprene sealing sleeve.

2.03 VALVES

A. Service Valves
1. Block (Stop) Valves: Ball valves 2" and smaller shall be red brass, cast bronze, or yellow forged bronze with brass, stainless steel, or bronze ball and stem, 150 psig nonshock WOG at 200°F, Jenkins Fig. No. 900T. Valves 2 1/2" and larger shall be butterfly type, 200 psig nonshock WOG at 200°F, ANSI Class 150 with ductile iron lug body. The replaceable resilient elastomer seat shall be Buna N or EPDM. The disc shall be silicon or aluminum bronze and shaft shall be No. 316 or No. 416 stainless steel. Secondary O ring seals shall be provided at the top and bottom of the upper and lower shafts to guarantee zero leakage to the shaft.
2. Balancing Valves: Valves shall comply with the general requirements specified for block valves. Valves used for balancing shall have adjustable memory stops or position indicators.
3. Gate Valves: As a general rule, gate valves shall not be used for sizes 2 1/2" and smaller. If necessary, with prior approval from the Construction Manager, valves 2-1/2” and smaller shall be 200 psig WOG bronze body with screwed bonnet and ends. Valves 3" and larger shall be 200 psig WOG.
4. Globe Valves: Valves 2" and smaller shall be bronze body, bronze rising stem, screw in bonnet, renewable seat, and screwed or solder ends. Valves 2 1/2" and larger shall be 200 psig WOG, outside screw and yoke (OS&Y), iron body, bronze-trimmed, renewable seat, Pressure Class 125, with ANSI B16.1 flanged ends.

B. Check Valves: Domestic water pipes 2 1/2" and larger shall be spring-loaded, quiet type. Valve nonshock pressure temperature rating shall be as specified for piping in which it is installed. Valve shall be full-threaded, lug body, or flanged body. Threaded valves installed at pump discharge shall have its shaft perpendicular to the pump shaft. Valves located in pumped sewage pipes and in storm pipes shall be outside weight, 200 pounds WOG, iron body, bronze trimmed, with swing check design.

C. Relief Valve: Temperature and pressure, self-closing, lever operated with thermo-bulb extension, 3/4", ANSI B2.1 taper thread male inlet connection, 210°F (98.8°C) and 125 psig setting, ANSI Z1.22, Type No. 40XL Watts Regulator Company or similar.

D. Reduced Pressure Backflow Preventer: Backflow preventer shall be Watts Regulator No. 909 Series, 2 1/2" and larger shall be provided with dual "Y" pattern spring-loaded check valves and independent relief valve located between checks, or similar or as noted on placns. Backflow preventers shall be rated for pressure up to 150 psig working pressure at 140°F (60°C) and sized according to the maximum design flow.

E. Domestic Water Pressure Reducing Valves: Watts 223S, Clayton 90G 01, or similar or as noted on plans. Pressure and flow schedule as indicated on the Drawings.

## PART 3 - EXECUTION

### 3.01 PIPING INSTALLATION

A. General:
1. Industry Practices: Install pipe, tube, and fittings in accordance with recognized industry practices which will achieve permanently leak-proof piping systems, capable of performing each indicated service without failure or degradation of service. Install each run with a minimum of joints and couplings, but with adequate and accessible unions or flanged connections to permit disassembly for maintenance/ replacement of valves and equipment. Reduce sizes (where indicated) by use of reducing fittings. Align accurately at connections. Coordinate piping locations with other trades to avoid conflict. Give ductwork preference unless directed otherwise by the Engineer.
2. Systems: Install piping parallel or perpendicular to lines of building, true to line and grade, and with sufficient hangers to prevent sags between hangers. Provide fittings at changes in direction. Piping in finished areas shall be concealed, except in mechanical rooms. Where pipes of different sizes join, provide reducing elbows, tees, or couplings. Bushings will not be acceptable.
3. Expansion and Contraction: Install loops, offsets, sizing joints, and expansion joints, as necessary, to avoid strain resulting from expansion and contraction of piping systems on fixtures and equipment. Provide mechanical grooved connections required by the application to reduce vibration at equipment connections. Provide expansion joints in piping systems by mechanical grooved connections where required.

B. Steel Pipe: Ream steel pipe after cutting and before threading. Thread with clean-cut taper threads of length to engage all threads in fittings and leave no full-cut threads exposed after make-up.

C. Copper Pipe: Cut copper pipe square and ream to remove burrs. Clean fitting socket and pipe ends with sand cloth or wire brush.

D. PVC Pipe: Cut PVC pipe square and remove all burrs. Clean fitting and pipe butt prior to installation. Install all PVC piping in accordance with the manufacturer's recommendations.

E. Final Connections to Equipment Furnished by Owner or Under Other Divisions of These Specifications: Where equipment is to be furnished under other Divisions of these Specifications or by the Owner, such equipment will be delivered to the site, uncrated, assembled, and set in-place under those other Divisions of these Specifications or under the separate contracts. Any required automatic control valves shall also be provided under those other Divisions of these Specifications or other separate contracts. Make all final connections of hot water, condenser water, gas, domestic water, waste, and vent as required. Provide valves, unions, strainers, check valves, and traps as required for proper operation of systems and equipment. Equipment not shown on the Architectural Drawings or noted by the Architect and/or Engineer shall not be included in the scope of this requirement.

F. Excavation, Installation, and Backfill for Underground Pipe:
1. Layout: Pipes shall be laid and pipe joints made in presence of the General Contractor and field measurements, layouts, batter board alignment, grade establishments, and similar locations shall be performed by a Professional Engineer in the employ of the Contractor. The Contractor's engineer shall be on the job during all underground work. A "Bench-Mark" reference shall be provided by the General Contractor.
2. Pipe Grading: Lay and maintain all pipes at required lines and grades during the course of the Work.
3. Trench: Excavate the trench to the depth required. Properly brace and de-water the trench and keep it free of water during installation, testing pipe, and backfilling. No water shall be discharged onto the street or freeway without approval by the Owner.
4. Excavation: The trench shall be at least 18" wider than the maximum diameter of the pipe or largest bell and the pipe shall be laid in the center of the trench. The trench shall be excavated to a depth sufficient to provide for pipe cushions or supports as specified. Trench width may be increased as required and piling left in place until sufficient compacted backfill is in place. Properly sheet and brace all open trenches to render them secure and remove all such sheeting and bracing before completing the backfill. Comply with all applicable national, state, and local codes and regulations. The quantity of excavation required to install sheeting and the installation and removal of sheetings and bracings will not be regarded as Extra Work. All costs incurred for this excavation and the installation of sheeting shall be included in the Contract Price.

5. Grading: Upon completion of excavation and prior to the laying of the pipe, the trench bottom shall be brought up to the required elevation with a pipe cushion, except where the cushion has been eliminated by the General Contractor. Pipe cushions shall be select material deposited in the trench and shall be compacted, leveled off, and shaped to obtain a smooth compacted bed along the laying length of the pipe. Pipe cushion material shall be as follows:

a. Domestic Water Pipes: Material for pipe cushion shall comply with local codes and conform with the geo-technical report. In absence of local code requirements and/or geo-technical report, the cushion shall be bank sand or select backfill material approved by the General Contractor. Any material used shall pass a one-inch screen.

b. Sanitary and Storm Sewers: Material for pipe cushion shall comply with local codes and conform with the geo-technical report. In absence of local code requirements and/or geo-technical report, the cushion shall be bank sand or select backfill material approved by the General Contractor. Any material used shall pass a one-inch screen.

6. Anchors: Cast iron pipes shall have concrete anchors at each change in direction and/or as directed. Any change in direction exceeding 15 degrees shall be anchored. Concrete anchors shall rest against solid (virgin) ground with the required area of bearing on pipe and ground to provide suitable anchoring.

7. Backfill: Backfill trenches only after piping has been inspected, tested, and approved by the General Contractor. Backfill shall be provided as recommended in the geo-technical report included in these Contract Documents, or in the absence of a geo-technical report, as required by site conditions. Refer to Division 2 or elsewhere in the Contract Documents for additional trenching and backfill requirements.

8. Existing Surfaces: Restore existing streets, driveways, and sidewalks damaged during the excavation work to acceptable condition, subject to approval by the Owner.

9. Safety: Provide street and sidewalk excavations with approved barricades, warning lights, and cover plates as required by the local authorities.

## 3.02 PLUMBING SERVICES

A. Scope:

1. This Contractor shall provide the building sanitary sewer to 5 feet outside the building and shall extend the domestic water service from the main shutoff valve stubbed above floor in the building.
2. Provide storm drainage system as required to 5 feet outside the building.
3. Verify locations and conditions.

B. General: Install the various piping systems as described hereinafter, and as required by the local plumbing inspection department.

1. Slope domestic hot and cold water piping to drain and provide with hose valves (drain valves) at low points.
2. Install soil, waste, and vent piping with horizontal lines pitched in accordance with local codes, but in no case less than 1/4" per foot for pipe 2-1/2" and smaller, and 1/8" per foot for pipe 3" and larger. Install soil, waste, and vent piping with hubs of each length of piping in the upstream position.
3. Make-up lead and oakum joints with molten lead run into hubs in one continuous pour, to a minimum depth of one inch.

4. Make-up "Ty-Seal" or "Dual-Tite" gasketed joints using lubrication and joining tools as instructed by the manufacturers. Base of stacks, horizontal runs under pressure, and gasketed pipe 5" and larger shall be made up using "Lubrifast" joining material.
5. Torque "No-Hub" joints in accordance with manufacturer's instructions. Do not install "No-Hub" joints below ground.
6. Provide chrome-plated piping at each fixture installed in a finished space. Install with proper strap wrenches to avoid marking or defacing.
7. Provide proper restraints on riser and stack offsets.

C. Plumbing Connections to Fixtures and Equipment:
1. General: Provide necessary pipe and fittings. Make final connections to provide cold water make-up and natural gas supply to mechanical equipment. Locate cold water make-up and gas supply where shown and connect with suitable stop valves.
2. Cold Water Make-up: Provide cold water make-up to closed loop condenser water circulating systems, cooling tower system, and hot water heating systems.
3. Gas Supply: Provide gas supply separately metered to an approved location for future routing to kitchen locations.

D. The domestic water service shall be Class 150 AWWA cement lined C.I. with Class 250 fittings, mechanical joints or push-on rubber ring gaskets, ASTM A377-66 or PVC AWWA C900 with solvent welded fittings. Provide tie rods and thrust blocks as required.

3.03 MAKE-UP WATER PIPING SYSTEMS

A. Connections: Connect domestic water to automatic fill and manual quick-fill connections on each piping system as indicated on Drawings. Provide reduced pressure backflow preventers at each system.

B. Compatibility: Use piping and fittings of same material type as materials of the domestic water supply.

3.04 DOMESTIC HOT AND COLD WATER PIPING SYSTEMS

A. Interior Hot and Cold Water Piping:
1. Piping 3" and smaller, Type "L" copper tubing with wrought copper solder end fittings. At the Contractor's option, this piping may be as specified for piping 4" and larger.
2. Piping 4" and larger, Schedule 40, galvanized steel pipe, ASTM A120 with galvanized malleable iron fittings, or galvanized cast iron flanged fittings.
3. Provide isolation fitting whenever dissimilar materials are used.
4. Option: At the Contractor's option, for piping 3" or larger, Victaulic Style 77 couplings, Victaulic fittings and tees may be used instead of the above, if Victaulic groove depth control tool is used for field grooving. Victaulic flanges and reducing couplings shall not be installed.
5. Piping Run-outs to Fixtures: Provide piping run-outs to fixtures sized to comply with governing regulations. Each fixture shall be provided with

a shut-off valve for each supply line. Provide all shutoff valves necessary to isolate mains to each restroom. Exposed lines shall be chromium-plated.

B. Air Chambers: Provide the necessary air chambers, shock absorbers, or water hammer arrestors, specifically sized for the application to prevent water hammer.
   1. All water hammer arrestors shall be PDI certified, size A, B, C, D, E, F, as indicated and/or as appropriate for the fixtures served. Josam, Zurn, or Jay R. Smith.
   2. Water hammer arrestors shall be installed at the top of each riser, and on each fixture branch, with quick closing valves, in accordance with Plumbing and Drainage Institute Standard WH201.

## 3.05 STORM AND SANITARY DRAINAGE PIPING SYSTEMS

A. Soil, Waste, and Vent Piping Underground: Service weight cast iron soil pipe and fittings with lead and oakum joints or neoprene gasket joints made up with "Lubrifast" joining material or PVC piping with solvent welded joints. Provide and install code-approved manholes as required.
   1. Grease waste piping and/or waste piping in commercial kitchen applications shall be service weight cast iron from floor drains, floor sinks, or hub drains to connection to grease trap or connection to civil sanitary piping. PVC piping is not permitted on waste or grease waste piping in commercial kitchen applications. All grease waste piping shall be sloped per code required 2% slope.

B. Storm Drainage Piping Underground: Same as soil, waste, and vent piping underground.

C. Soil, Waste, and Vent Piping Above Ground: Service weight cast iron soil pipe and fittings with neoprene gasket joints or hub-less cast iron pipe and fittings with coupling assembly.
   1. Option: At the Contractor's option, for branch piping only, galvanized steel, Schedule 40, ASTM A53 pipe with galvanized malleable iron fittings for vent piping and galvanized cast iron drainage fitting for soil and waste piping may be used instead of the above. NOTE: Use PVC piping with solvent welded joints only where allowed by code. PVC used in return air plenums shall be wrapped with UL listed plenum wrap (UL 910 & 1887).

D. Storm Piping Above Ground: Service weight cast iron soil pipe and fittings with neoprene gasketed joints or Schedule 40, service weight hub-less cast iron soil pipe and fittings with coupling assembly, or Schedule 40 PVC pipe with PVC drainage fittings. NOTE: Use PVC only where allowed by code. PVC used in return air plenums shall be wrapped with UL listed plenum wrap (UL 910 & 1887).

E. Pump Discharge Piping: Discharge from pumps to the horizontal gravity main shall be Schedule 40 galvanized steel with galvanized cast iron drainage fittings, or Schedule 40 PVC piping and fittings where code allows. Each pump

discharge shall be carried separately to the horizontal gravity main and shall discharge into the top of the horizontal gravity main. PVC used in return air plenums shall be wrapped with UL listed plenum wrap (UL 910 & 1887).

F. Cleanouts:
1. General: Care shall be used when locating cleanouts. Wherever possible, do not place cleanouts in "finished" areas. All locations shall be approved by the Architect.
2. Finished Floor: Jay R. Smith No. 4434, cast iron adjustable assembly with nickel bronze cover and tapered thread bronze plug. Provide clamping collar when installed in floors having waterproof membrane.
3. Unfinished Areas: Jay R. Smith No. 4434 cleanout with cadmium-plated, cast iron plug.
4. Walls: Jay R. Smith No. 4434, cast iron with nickel bronze, square, smooth, access cover, vandal-proof screws.
5. Outside: Jay R. Smith No. 4434, non-slip, vandal-proof cover.
6. Locations:
   a. At base of every drainage stack
   b. Maximum distance between cleanouts is 90 feet.
   c. At turns greater than 45 degrees.
   d. Other locations required by local code.

## 3.06 NATURAL GAS PIPING SYSTEM

A. Code Compliance Products: Comply with local utility company codes and AGA regulations which require the products used for gas piping work to be selected from lists in certain published standards or coded as indicated.

B. Gas Piping: Gas piping intended for operation at pressures of 5 psig or greater shall be ASTM A53, Schedule 40, black steel joined by Schedule 40, black welding fittings. Gas piping intended for operation at pressures less than 5 psig shall be ASTM A53, Schedule 40, black steel joined by Schedule 40, black welded fittings or Class 150 pounds, banded, black malleable iron, threaded fittings. Paint piping safety yellow.

C. Concealed Piping and Protection: Gas piping run concealed in walls, chases, or above ceilings shall be installed as required by local codes and the serving utility company.

D. Underground Piping: Gas piping installed below grade shall be coated with Republic Steel Corporation (US) "X-Tru-Coat" high density polyethylene extruded coating, factory-applied with a fluid mastic to a minimum thickness of 0.040". Field welds, joints, and fittings shall be protected with mastic undercoat and by wrapping at least two layers of "X-Tru-Tape" installed as instructed by manufacturer. Polyethylene piping and fittings may be used if approved by the local authorities.

3.07 ACID WASTE & VENT PIPING

A. The corrosive waste drainage system, conforming to ASTM F1412, shall be flame retardant pipe and fittings. Pipe and fittings shall be joined by fusion system conforming to ASTM D2657. The pipe shall be supplied in 10-ft lengths. The fittings shall meet or exceed schedule 40 dimensions. The polypropylene material shall conform to ASTM D4101.

3.08 CLEANING, FLUSHING, TESTING, AND INSPECTING

A. Cleaning: Clean exterior surfaces of installed piping systems and prepare surface for application of any required coatings.

B. Flushing: Flush piping systems with clean water prior to performing any required tests.

C. Piping Tests:

1. General: Blank off equipment during tests. Perform tests before piping is enclosed in walls, floors, partitions or in any other way concealed from view. Tests may be performed in sections. Tests shall be witnessed by the General Contractor and local inspectors and the test results presented to the Engineer for acceptance and approval prior to concealing piping from view. Provide all necessary equipment for testing, including pumps and gauges. Note: All test results are to be submitted to the Engineer as specified in Section 22 01 00.
2. Domestic Water Systems: Test hot and cold water systems hydrostatically to a pressure of 150 psig or 1-1/2 times working pressure, whichever is greater, for a period of 4 hours. Repair all leaks, replacing materials as necessary, and repeat tests until systems are proven tight.
3. Soil, Waste, and Vent Piping System: Test soil, waste, and vent piping by plugging all openings and filling system to height required by City Plumbing Inspector, but not less than 10', except the top floor. Inspect all joints for leaks, repair all leaks found, and retest until piping is demonstrated to be free from leaks. In addition to water test, apply peppermint or smoke tests, if required by local code. All underground main piping shall be inspected with a camera and the taped test results submitted to the Owner. Provide test tees throughout the system to test the system in sections if plastic piping is used above grade.
4. Storm Drainage Piping System: Test storm drainage piping same as specified for Soil, Waste, and Vent Piping System.
5. Natural Gas Piping System: Test natural gas piping with compressed air or nitrogen at 5 times service pressure but not less than 100 psig for 24 hours and in accordance with the requirements of the local codes and the serving utility company. Repair all leaks, replacing materials as necessary, and repeat test until systems are proven tight.
6. Disinfecting of Water Systems: Disinfect as required by code. Where code does not dictate tests to be conducted, at a minimum disinfect the hot and cold water systems as follows: Fill systems with water solution containing 50 ppm available chlorine; allow to stand for 4 hours, opening

and closing all valves several times during this period; thoroughly flush; refill and place system in service; ensure a chlorine content of 2.5 ppm.

7. Cleaning and Adjusting: Thoroughly clean and disinfect all plumbing fixtures, including all exposed trim. Adjust all flush valves for proper flushing, but without excess use of water.

D. Inspecting: Visually inspect each run of each system for completion of joints, adequate hangers, supports, and inclusion of accessories.

END OF SECTION

# SECTION 221123 - PLUMBING PUMPS

## PART 1 – GENERAL

### 1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 23 01 00, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the pump systems. Comply with other Division 23 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the plumbing pump systems specified herein, as indicated on the drawings, and as required to provide complete and operating systems.

### 1.02 DESCRIPTION OF WORK

A. Work Included: Provide pumps as specified and indicated.

### 1.03 QUALITY ASSURANCE

A. Manufacturers: Provide products by one of the following:

1. Hyfab
2. Bell and Gossett, ITT Division
3. Crane Company
4. Grunfoss.
5. Weil Pump Company
6. SyncroFlo, Inc.
7. PACO Pumps
8. Taco, Inc.
9. Armstrong Pumps, Inc.
10. Myers

B. Electrical Standards: Provide electric motors and products which have been listed and labeled by Underwriters' Laboratories, Inc. (UL) and comply with National Electrical Manufacturers' Association (NEMA) standards.

C. Certification, Pump Performance: Provide pumps whose performance, under specified conditions, is certified by the manufacturer.

## 2.0 PRODUCTS

### 2.01 SUBMERGED SUMP PUMPS

A. General: Sump pumps shall be of the type, capacity, and duty required by the application. The pumps shall have a cast iron casing and shall be equipped with bronze enclosed impellers dynamically balanced for all hydraulic loads within the operating range of the pump. Tripod support shall be integrally cast with pump casing. The design of the pump shall permit removal of motor shaft/impeller assembly without the need to disconnect the discharge piping or remove the pump casing from the basin. Pumps shall be capable of handling drainage containing sand and a water temperature of 105°F.

B. Sumps and Covers: Sump pits shall be constructed under Division 3, "Concrete". This Contractor shall furnish and install a steel cover plate and ring for each sump pit. Cover plate shall have 1 1/2" x 1 1/2" x 1/4" structural steel angle reinforcement on the underside gasketed gastight, bolted manhole, and threaded or flanged vent connection.

C. Controls: Provide a float switch with gastight rubber bellows, bronze float and rods, alternator, high level automatic alarm switch with gastight rubber bellows, and provisions for activation of a local and remote alarm in the Engineer's office. Control panel shall be a factory-wired NEMA Type 1 enclosure and shall include a disconnect switch, alternator, FVNR motor starter with circuit breaker, control panel-mounted high level alarm bell, control power transformer with fused disconnect switch tapped from the line side of the pump disconnect switch, and pump running lights. Alarm switch and all controls shall be rated for 120 volt, 60 Hz alternating current.

D. Motors: Motors shall be of the oil-filled, totally enclosed, immersible design. Each motor shall be of the ball-bearing type, equipped with a stainless-steel shaft, expansion diaphragm, and a face-type seal on output shaft to seal motor from the liquid being pumped. Each motor shall be supplied with not less than 10' of immersible unitized cable.

E. Building EMS Interface: Provide pumps with monitoring contacts for EMS to monitor status and provide alarms. Coordinate interface with controls subcontractor.

### 2.02 CIRCULATING PUMPS

A. General: In-line circulating pumps shall be stainless steel or bronze body construction of the size, type, and capacity required by the application. Pumps shall be fitted with a dynamically balanced, brass enclosed type impeller with mechanical seal. Motor shall have a maximum speed of 1750 rpm. Pumps, casings, flanges, and seals shall be suitable for operation with the working pressures and temperatures required and shall be listed for potable water usage. The working pressure applies to the entire pump assembly.

B. Building EMS Interface: Provide pumps with input and output contacts for EMS to control, monitor status and provide alarms. EMS shall enable and disable the circulating pump with building occupancy. Coordinate interface with controls subcontractor.

### 2.03 REMOTE ALARM ANNUNCIATION

A. General: The following alarms for the pumping systems are to be annunciated. If a Building Automation System is provided in the building, these alarms shall be integrated into the automation system.

1. Sump pump high level alarms for each sump pump

2. Sewage ejector high level alarms for each sewage ejector

3. Boiler low water level alarm for each boiler

B. Labeling: Each alarm lamp shall be labeled with an engraved nameplate identifying the alarm indicated.

C. Power Source: The remote annunciator shall be served by a dedicated 120 volt emergency power branch circuit.

## 3.0 EXECUTION

### 3.01 INSPECTION

A. General: Installer shall examine the bases upon which and conditions under which pumps are to be installed and notify Contractor in writing of conditions detrimental to proper and timely completion of the Work. Do not proceed with the Work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

### 3.02 PUMP INSTALLATION

A. General: Install pumps in accordance with manufacturer's written instructions and recognized industry practices to ensure that pumps comply with requirements and serve intended purposes. Comply with NEMA standards and requirements of NEC.

B. Alignment: Check alignment and, where necessary, realign shafts of motors and pumps within tolerances recommended by manufacturer.

C. Vibration Isolation: Install units on vibration mounts as required or specified. Comply with manufacturer's indicated installation method and with other applicable Sections of this Division.

### 3.03 ELECTRICAL CONNECTIONS

A. Grounding: Provide positive electrical pump and motor grounding in accordance with applicable requirements of the NEC.

### 3.04 QUALITY CONTROL

A. Field Test: Upon completion of pump installation and after motor has been energized from normal power source, bleed air from pump casing and test pump to demonstrate compliance with requirements. When possible, field-correct malfunctioning units then retest to demonstrate compliance. Replace units that cannot be satisfactorily corrected.

### 3.05 SUMP PUMPS AND SEWAGE EJECTORS

A. Construction Pumping: All construction drainage pumping shall be done with temporary equipment. After building is completely closed in and lower floors are broom clean and dry, the sumps shall be emptied and cleaned to the concrete surface of the bottom of the pit. At that time, permanent sump and sewage pumps shall be installed, lubricated, adjusted, checked, and placed in service.

B. Valves: Discharge check and gate valves shall not be smaller than the size of pump discharge.

**END OF SECTION 231123**

# 224000
# PLUMBING FIXTURES

## PART 1 – GENERAL

### 1.1 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 22 01 00, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the water source heat pump systems. Comply with other Division 22 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the water source heat pump systems specified herein, as indicated on the drawings, and as required to provide complete and operating systems.

D. This project is seeking LEED certification and the contractor is responsible for providing materials, adhesives, sealants, and equipment that meets or exceed the LEED requirements for New Construction.

### 1.2 DESCRIPTION OF WORK

A. LEED: Plumbing fixtures shall meet or exceed Water Efficiency credits for LEED v4.

B. Acceptable Manufacturers: The model numbers listed in the Specifications establish a level of quality and material. The following manufacturers are acceptable subject to compliance with the requirements of these Specifications.

1. Fixtures
   a. Zurn Industries, Inc.
   b. American Standard
   c. Kohler Company
   d. Crane Company
   e. Toto
2. Faucets
   a. Chicago Faucet Company
   b. Speakman Company
   c. T & S Brass and Bronze Works, Inc.
   d. Delta
   e. Zurn Industries, Inc.
3. Flush Valves
   a. Sloan Valve Company
   b. Delany Flush Valves
   c. Zurn Industries, Inc.
4. Seats
   a. Church Products, Forbes-Wright Ind., Inc.
   b. Olsonite Corporation
   c. Beneke Corporation
   d. Bemis

5. Carriers
   a. Zurn Industries, Inc.
   b. J. R. Smith Mfg. Co.
   c. Wade Div./Tyler Pipe
6. Drinking Fountains
   a. Halsey Taylor - Div. Household Int. Co.
   b. Elkay Mfg. Company
   c. Ebco/Oasis
7. Stainless Steel Sinks
   a. Elkay Mfg. Company
   b. Just Mfg. Company

## PART 2 - PRODUCTS

See drawings for Fixture Schedule

## PART 3 - EXECUTION

### 3.1 INSTALLATION

A. Heights: Set fixtures at heights as shown on the Architect's Drawings.

B. Caulking: This Contractor shall caulk the joint between the finished wall surface and all plumbing fixtures. Verify colors with the Architect. Caulking material shall comply with the appropriate section of these Specifications.

C. Carriers: Water closets shall be installed on 3-bolt chair carriers. Wall hung lavatories shall be installed on concealed arm carriers.

D. Emergency Shower: Install an emergency shower and eye wash adjacent to the chemical treatment feeder system, and in other locations as required by code or as indicated on the drawings. Pipe domestic cold water to shower.

E. Each fixture shall be provided with a shut-off valve for each supply line. All exposed lines shall be chromium plated.

**END OF SECTION 224000**

23 01 00

# GENERAL MECHANICAL REQUIREMENTS

## PART 1 - GENERAL

### 1.01 SUMMARY

A. Division 23 includes Division 23 01 00 of the Specifications and Mechanical Drawings (HVAC). Elements of the Scope of Work include, but are not limited to, labor, materials, equipment, supplies, storage, transportation and all required permits, fees and licenses. Division 23 does not stand alone, but is part of the complete project and its Documents. Requirements of the General Conditions and Division 1 apply to all work in the Division.

B. Provide the necessary interface with other Divisions to provide a complete project. Carefully check the Documents of this Division with those Documents of other Divisions. Determine the requirements of any interfacing materials or equipment being furnished and/or installed by those Sections and Divisions, and provide proper installation and required interface.

C. No deviation from the Contract Documents shall be made without the written consent of the Architect and Engineer.

D. All Specifications and Drawings are to be considered together as the Contract Documents. Any work shown in one and not the other, or is implied by either, shall be provided to make a complete project. Should conflicts exist between the Specifications and Drawings or there is an item shown or noted for which is not clearly defined, immediately submit a request for clarification. Under no circumstance will conflicts between the Specifications and Drawings be grounds for additional cost to the Contract after the Contract is established.

E. The Drawings are schematic and are not intended to show the exact location of duct, piping, equipment, etc.

F. Dimensions and information regarding accurate locations of equipment, and structural limitations and finish shall be coordinated and verified with other Divisions of Work. Be prepared to furnish dimensions and information regarding the Work of this Division to other trades.

G. The right is reserved to relocate any device (receptacle, switch, fire alarm, audio/visual, junction box, outlet, etc.) a maximum of 10’-0” before it is permanently installed without incurring additional cost to the Contract.

### 1.02 REFERENCE STANDARDS

A. All work shall comply with the most recently revised versions of all local, state and federal codes, ordinances of the authority having jurisdiction, laws, rules and regulations. Any modifications required by any of the above shall be made

without any additional cost to the Owner. Where requirements between governing Codes and Regulations vary, the more restrictive provision shall apply.

B. Nothing contained in the Contract Documents shall be construed as authority or permission to disregard legal requirements and regulations. The Contractor shall thoroughly review the Documents and bring any such conflicts to the attention of the Architect and Engineer prior to Installation.

C. All materials, installation, and workmanship shall comply standards and/or codes of the following:
1. International Building Code – 2021 edition
2. International Mechanical Code - 2021 edition
3. International Plumbing Code – 2021 edition
4. International Fuel Gas Code - 2021 edition
5. International Energy Conservation Code - 2018 edition
6. National Electrical Code, 2020 edition
7. National Fire Protection Association
8. ANSI - American National Standards Institute
9. ASTM - American Society of Testing and Materials
10. NEMA - National Electrical Manufacturer's Association
11. OSHA - Occupational Safety and Health Act
12. UL - Underwriter's Laboratories
13. ASHRAE - American Society of Heating and Air Conditioning Engineers
14. SMACNA - Sheet Metal and Air Conditioning Contractors' Nat'l Assoc.

D. All materials shall be new and shall bear the label of UL.

1.03 EXISTING CONDITIONS

A. Where work is to be performed in an existing facility, the contractor shall visit the site prior to bid and be familiar with all existing conditions. Special attention shall be given to work to be performed above an existing ceiling.

B. Where existing slabs are to be cut or core drilled, the contractor shall x-ray the existing slabs to avoid cutting or disrupting existing conduits, cables, plumbing or structural members.

C. HVAC systems, plumbing systems, and electrical service to the building shall not be interrupted without written consent of the building owner.

D. No allowance will be made for lack of knowledge of existing conditions.

E. At the completion of the project, all work under this Division shall be completely integrated with the existing systems and left in perfect operating condition.

F. Where work under this Division disrupts the continuity of any existing to remain electrical circuit or feeder, the Contractor shall repair/replace as necessary to return to a perfectly functional and safe operating condition.

G. Prior to any demolition or construction the Contractor shall have the existing conditions inspected by an EPA, OSHA certified asbestos abatement agency to identify the presence of asbestos. Should any asbestos be found it shall be brought to the immediate attention of the Architect and Owner and specifically identified in writing.

1.04 DEFINITIONS

A. Provide: to furnish, install and connect.

B. Furnish: to supply all materials, labor, equipment, testing apparatus, controls, tests, accessories and all other items customarily required for the proper and complete application.

C. Install: to join, unite, fasten, link, attach, set-up or connect together, complete, tested, and ready for normal satisfactory operation.

D. Engineer: the Engineer of record.

E. Contract Documents: the complete set of Specifications and Drawings of all Divisions.

F. Work: labor, materials, equipment, accessories, controls and other items required for a complete installation.

G. Concealed: embedded in masonry or other construction, installed in furred spaces, within double partitions or hung ceilings, in trenches, in crawl spaces or in enclosures.

H. Exposed: not installed underground or concealed.

I. Equal: equal in quality, workmanship, materials, weight, size, design and efficiency of the specified product, conforming with manufacturers.

J. Supply: to purchase, procure, acquire and deliver complete with related accessories.

K. Authority Having Jurisdiction (AHJ): applicable local, state and federal authorities having jurisdiction over any part of the Scope within this Division and other Divisions.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

A. Manufacturer’s names and catalog numbers specified in the Contract Documents are intended to describe the material and set the standard of quality. All bids shall be based on material specified. Request for approval of material not specified shall be considered if the request is in written form and submitted to the

Architect no later than fourteen (14) days prior to the bid date. All requests shall conform to the provisions of the general and supplementary conditions.

B. When specific names are not stated, only the best available quality of material or equipment shall be submitted for review and used in the installation.

2.02 BASIS OF DESIGN

A. Where a product is designated as "BASIS OF DESIGN", the Contractor is notified that mechanical, electrical, structural, architectural, space conditions and/or other features of the overall project design have been based on the requirements of the "BASIS OF DESIGN" product.

B. Where a product is substituted for a "BASIS OF DESIGN" product, the Contractor shall notify the design team that changes in project design may be mandatory in order to permit use and installation of the substitute product. Shop drawing submittal for a substitute product shall include a complete schedule of changes in project design, if any, which must be made in order to permit use and installation of the substitute product. The Contractor shall be responsible for the coordination of all trades for use of the substituted product. The Contractor shall bear all expenses related to the use of a substitute product.

2.03 SHOP DRAWINGS AND PRODUCT DATA

A. The Contractor shall obtain complete shop drawings, product data and samples from the manufacturers, suppliers, vendors, and all Division 23 Subcontractors, for all materials and equipment as specified herein in various Sections of the Specifications, and shall submit data and details of such materials and equipment for review by the Architect and Engineer. Prior to submission of the shop drawings, product data and samples to the Architect and Engineer, the Contractor shall thoroughly review the shop drawings, product data and samples and certify they are in compliance with the Contract Drawings. Further, the Contractor shall check all materials and equipment upon their arrival on the Project site and verify their condition and compliance with the Contract Documents. Any Work which proceeds prior to receiving reviewed shop drawings shall be modified as required to comply with the Contract Documents and the shop drawings. A minimum period of ten (10) working days, exclusive of transmittal time, will be required in the Engineer’s office each time a shop drawing, product data and/or sample is submitted or resubmitted for review. This time period shall be considered by the Contractor when scheduling his Work. The initial shop drawing review for equipment and materials may be expedited through the mutual consent of the Contractor, Architect, Engineer, and Owner providing the Contractor agrees to submit complete, certified, documented, and coordinated shop drawings for review in accordance with the requirements of the Contract Documents.

B. The review of shop drawings, product data, and samples by the Architect and Engineer shall not relieve the Contractor of the responsibility for dimensions or errors that may be contained therein, or for deviations from requirements in the Contract Documents. It shall be clearly understood that the noting of some errors by the Engineer but overlooking others does not grant the Contractor permission to proceed in error.

C. All shop drawings and product data/submittals shall be submitted in compliance with the requirements of the general and supplementary conditions. No more than four (4) copies of submittal data will be reviewed. Any additional copies will be returned unmarked. The responsibility of copying review comments on any additional copies will rest solely with the Contractor.

D. All product data/submittals shall bear the name of the manufacturer to be used.

E. All shop drawings and submittals shall include a stamped indication signifying that the submittal has been reviewed for compliance with the Contract Documents by the Contractor. This stamped indication also represents the fact that the Contractor has checked this submittal for its interaction with all other Divisions and certifies by his signature or initials that all coordination has taken place. The stamp shall include the date, name of the Contracting Firm, the signature of the Contractor, certification of compliance and approval. This stamp shall be on the submittal before the Engineer will review it.

F. The Engineer will review an individual submittal not more than twice. If the submittal is rejected again on the second review, the Contractor will bare all responsibility for paying for the Engineer's time for additional reviews. Such payments to the Engineer shall be withheld from the next monthly pay application.

G. Shop drawings and/or product data shall be submitted for the following for review:

1. HVAC duct system layouts, including supply air, return air, exhaust air, and outside air. HVAC piping system layouts. These drawings must include associated equipment, drawn to scale based on submittals for that equipment, must be dimensioned, and must include duct, piping and equipment elevation tags (distance above finished floor to bottom).
   The Contractor is encouraged to develop their own shop drawings, without having have had the Engineer's CAD files (as previously stated, the Engineer's drawings are schematic/diagrammatic in nature). Should the Contractor insist on using the Engineer's CAD files in the procurement of shop drawings, the Contractor must pay the Engineer $ 150.00 per sheet for the CAD files.
   The Contractor shall give the Engineer a written release, acceptable to the Engineer, signed by a corporate officer of the Contractor. This release shall also include a copyright statement indicating that these drawings or electronic data contained will not be used on any other project. The release and payment for the files must be received PRIOR to delivery of the CAD files.
2. Equipment, including but not limited to: chillers, cooling towers, boilers, pumps, heat exchangers, rooftop units, split systems, fans, heaters, water-cooled self-contained units, water-source heat pumps, coils, air distribution devices (diffusers, etc.), air terminal units (PIU's, etc.), ductwork accessories, louvers, hoods, heat tracing, insulation, piping specialties, etc.

2.04 AS-BUILT DRAWINGS

A. The Contractor shall maintain on a daily basis at the Project site a complete set of "Record Drawings". The "Record Drawings" shall consist of a set of black-line or blue-line prints or AutoCAD files of the Contractor Coordination Drawings for this Division. The prints shall be marked or the AutoCAD file electronically updated to show the precise location of all work and equipment, and all changes and deviations in the work from that shown on the Contract Documents. This requirement shall not be construed as authorization for the Contractor to make changes in the layout or work without definite instructions from the Architect or Engineer. The continuously updated coordination drawings (shop drawings previously described) shall be used to produce the final "Record Drawings" which shall be delivered to the Owner in AutoCAD electronic format (CD) upon Project completion.

B. Record dimensions shall clearly and accurately delineate the work as installed; locations shall be suitably identified by at least two dimensions to permanent structures.

C. The Contractor and Subcontractor shall mark all "Record Drawings" on the drawings with a rubber stamp impression or an AutoCAD image that states such.

PART 3 - EXECUTION

3.01 INSTALLATION

A. The equipment selections used in the preparation of the Contract Documents will fit into the physical spaces provided and indicated, allowing ample room for access, servicing, removal and replacement of parts, etc. Adequate space shall be allowed for clearance in accordance with the Code requirements and the requirements of the local Authorities having jurisdiction, and the equipment manufacturer's recommendations.

B. In the preparation of Drawings, a reasonable effort to accommodate acceptable equipment manufacturer's space requirements has been made. However, since space requirements and equipment arrangement vary according to each manufacturer, the responsibility for initial access, maintenance access, code required access, and proper fit rests with the Contractor.

C. Physical dimensions and arrangements of equipment to be installed shall be subject to the Architect's and Engineer's review.

D. The General Contractor and all Subcontractors shall coordinate the installation of ductwork, conduit, busway, piping, cable trays, etc., installation with lighting fixtures, special ceiling construction, air distribution equipment, and the structure. Provide additional rises, drops and offsets as required. If after installed, new ductwork, conduit, busway, piping or cable is found to be in conflict with the architecture, structure, or other trade Work which is either existing or shown on the Contract Documents, the ductwork, conduit, busway, piping or cable shall be relocated without additional cost to the Owner.

E. No ductwork, piping, equipment, etc., shall be installed in the eight (8) inch high zone directly above the ceiling in tenant areas to allow for tenant build-out and flexibility unless otherwise specifically shown on the Drawings or prior written authorization is received from the Engineer.

F. Accessibility and Clearance:
1. Mechanical equipment, ductwork, piping, etc. shall be installed in accessible locations, avoiding obstructions, preserving headroom, and keeping openings and passageways clear.
2. Minor adjustments in the locations of equipment shall be made where necessary, providing such adjustments do not adversely affect functioning of the equipment.

G. Scaffolds and staging for installation of mechanical work shall be provided under the work of this Division.

3.02 STRUCTURAL FITTINGS

A. Furnish and install the necessary sleeves, inserts, hangers, anchor bolts, and related structural items. Install at the proper time.

B. Openings may have been indicated on the Architectural and Structural drawings. Should any additional openings or holes be required, the same shall be provided at no additional cost to the Owner.

C. Location: At a time in advance of the work, verify openings shown on the Architectural and Structural drawings, and coordinate any additional openings.

D. If the work of this Section requires modification of the Architectural or Structural drawings, furnish new instructions as to requirements for these openings. Submit for review and coordination to Architect.

E. Sleeves shall be supplied for mechanical piping passing through walls or slabs and shall be placed before concrete is poured.

F. Equipment supports for mechanical work shall be fastened to the structure by inserts, anchor bolts, bolting to drilled and tapped structural members, or be welded to the structure.
1. Welding shall be done by the electric arc method with fully competent welders. Supporting members shall be shop coated with a suitable primer.
2. Surfaces damaged by installation of supports shall be touched up with primer to match shop coat. Any drilling of structural members shall be approved by the Architect.

G. Flashing:
1. Wherever ductwork and/or piping pass through the roof or outer walls, base flashing and counter-flashing shall be provided.
2. Such flashing shall be properly installed by skilled workmen, and shall include grouting, mastic or tar application, or other means to insure a permanent, waterproof, neat and workmanlike installation.

3. Insofar as possible, flashing shall comply with and be similar to requirements for flashing in General Construction Work.

H. Anchor bolts and inserts shall be galvanized and of adequate size and strength for installation of electrical work and shall be placed in forms before concrete is poured.
1. Placement of bolts in bases shall be done under other Division. Furnish detail drawings, templates, and anchor bolts for bases to the General Contractor in time to avoid delaying work schedules.
2. Expansion shields shall only be used with specific approval of the Architect. Wooden or soft metal plugs shall not be used.

I. Cutting and patching:
1. All additional cutting, patching and reinforcement of construction of building, subject to review by the Architect, shall be performed under this Section.
2. Refer to appropriate Division for requirements.

3.03 WEATHERPROOF EQUIPMENT

A. Mechanical devices or equipment located in damp, semi-exposed areas shall be weather-resistant. Enclosures shall comply with NEMA Type 3R requirements.

B. Air distribution devices located in damp areas outside shall be weather-resistant (aluminum, etc.).

3.04 CLEANING

A. Brush and clean work prior to concealing, painting and acceptance. Perform in stages if directed.

B. Painted exposed work soiled or damaged: Clean and repair to match adjoining work before final acceptance.

C. Remove dust and debris from inside and outside of material and equipment.

3.05 TESTS AND DEMONSTRATIONS

A. All systems shall be tested in the presence of the Owner or an Owner designated representative upon completion of the Work and demonstrates that the installation is in accordance with the Contract Documents.

B. All motors shall be checked and adjusted for correct direction of rotation.

C. Any work found not to be in compliance with the Contract documents shall be repaired or replaced without incurring additional cost to the Contract price.

D. Provide all instruction to the Owner on maintenance and operation of all systems and equipment provided under this Division.

3.06 WARRANTIES

A. The warranty period for all systems, equipment, components, work, etc. shall be no less than one (1) year, unless specified otherwise hereinafter and shall include at least one (1) full heating season and one (1) full cooling season. The warranty shall include parts and labor.

B. The Contractor shall, without cost to the Owner, remedy any defects within a reasonable time to be specified in notice from the Architect. In default thereof, the Owner may have such work done and charge all costs to the Contractor.

C. The start of the Contractor's warranty period, as defined in the General Conditions, shall commence on the issue of a "Certificate of Substantial Completion", by the Owner or the Owner's Representative for each item of material, equipment or system.

D. The Subcontractor shall confer with the General Contractor prior to the bid date concerning the project schedule and determine if there is a need to operate any items of equipment or systems for temporary heating and/or cooling or other reasons prior to "Substantial Completion". All required extended warranty costs for equipment, materials, and systems shall be included in the Subcontractor's bid.

END OF SECTION

23 05 29

# HANGERS & SUPPORTS FOR HVAC

# PIPING & EQUIPMENT

## PART 1 – GENERAL

### 1.01 RELATED DOCUMENTS

A. The Conditions of the Contract and applicable requirements of Division 1, "General Requirements", and Section 23 01 00 "General Mechanical Requirements", govern this Section.

### 1.02 DESCRIPTION OF WORK

A. Work Included: Provide pipe hangers, supports, and required appurtenances as specified and indicated

### 1.03 QUALITY ASSURANCE

A. MSS Standard Compliance: Provide pipe hangers and supports of materials, design, and manufacture which comply with ANSI/MSS SP-58, SP-59, SP-89, and SP-90.

B. Acceptable Manufacturers: The model numbers listed in the Specification establish a level of quality and material. Subject to compliance with requirements, provide products and materials by the following:
   1. Anvil International,
   2. Fee and Mason,
   3. Central Iron Manufacturing Company, and
   4. F& S Manufacturing Company
   5. B-Line

## PART 2 – PRODUCTS

### 2.01 PIPE HANGERS AND SUPPORTS:

A. General: Provide pipe hangers and supports as specified. Comply with local codes and standards for pipe and equipment support and anchorage. Pipe supports shall be of material that will prevent electrolytic action.

B. Inserts: Provide Anvil No. 282 inserts for concrete construction.

C. Piping in Multiple Parallel Runs: Provide Anvil No. 45 or No. 50 with Anvil No. 137 U-bolt pipe clamps or structural channels or angles with U-bolt clamps, supported as trapeze hangers where multiple parallel runs of piping are shown. Select and size members for weights to be carried and span dimensions between supports.

D. Piping in Single Runs: Provide Fee and Mason Fig. 239 or Anvil No. 260 clevis hanger.

E. Hanger Rod: Provide hanger rods of required length. Rod diameters shall be as listed in the following table. Rod diameters may be adjusted after consultation with the Structural Engineer concerning the building framing system, the method of attachment to the structure and the support rod spacing.

| Pipe Sizes | Rod Diameter |
|---|---|
| 3/4" - 2" | 3/8" |
| 2-1/2" – 3 | 1/2" |
| 4" – 5 | 5/8" |
| 6" | 3/4" |
| 8" – 12" | 7/8" |
| 14" – 18" | 1" |

F. Riser Clamps: Provide Fee and Mason Figure 241 riser clamps. Riser clamps for copper tube shall be copper-plated.

G. Saddles and Shields:
1. Saddles for Horizontal Insulated Piping without Vapor Barrier: At each hanger or support on horizontal runs, provide Anvil No. 160 or Fee and Mason Figure 171, 1710, 1712, or 172 saddles, as applicable. Shields as described below may be used instead of the saddles. On heating water systems below 140ºF (60ºC), hangers may be sized for the pipe size and of a material compatible with the pipe. Where dissimilar materials are used, provide dielectric separation. Carry insulation over the hanger and seal where hanger is sized for pipe.
2. Shields for Horizontal Insulated Water Piping with Vapor Barrier: At each hanger or support for water piping, provide a half section of preformed 6 PCF density fiberglass or rigid calcium silicate, with jacket of adjacent insulation brought across unbroken, supported on semicircular 16 gauge shields. Shields for pipe 4" and smaller shall be 12" long; shields for pipe 5" to 8" shall be 18" long; and shields for larger pipe shall be 24" long.

H. Piping on Roof: Roof mounted pipe supports are discouraged. If roof supports are necessary, installation methods must be approved by the architect, engineer, general contractor and the Roofing Contractor.

## PART 3 – EXECUTION

### 3.01 INSTALLATION:

A. Independent Support: Support fire sprinkler and standpipe piping independently of other piping in accordance with NFPA-approved methods and local codes and standards.

B. Provisions for Movement:
1. Movement: Install hangers and supports to allow controlled movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate

the action of expansion joints, expansion loops, expansion bends, and similar units.

2. Load Distribution: Install hangers and supports so piping live and dead loading stresses from movement will not be transmitted to any pipe or connected equipment. Pipe supports shall properly transmit the weight of the pipe and its contents to the building structure, or to independent posts, piers, or foundations.
3. Pipe Slopes: Install hangers and supports to provide the indicated pipe slopes so maximum pipe deflections allowed by ANSI B31 are not exceeded.

C. Insulated Piping: Comply with the following installation requirements:

1. Clamps: Attach clamps, including spacers (if any), to piping with clamps projecting through the insulation; do not exceed pipe stresses allowed by ANSI B31.
2. Shields: Where low-compressive-strength insulation of vapor barriers are indicated on cold, chilled, or heating water piping, install coated protective shields. For pipe 8” and over, install rigid calcium silicate insulation between saddles and pipe.

D. Spacing: Install hangers and supports in piping systems to remove stress from equipment flanges and rotating equipment. Space hangers and supports as shown in the following table. Rod spacing may be adjusted after consultation with the Structural Engineer concerning the building framing system, the method of attachment to the structure and the support rod diameters.

| Trade Pipe Size | Maximum Spacing |
|---|---|
| 1/2" | 5' |
| 3/4" | 6' |
| 1" and 1-1/4" | 7' |
| 1-1/2" | 9' |
| 2" | 10' |
| 2-1/2" | 11' |
| 3" | 12' |
| 4" | 14' |
| 5" | 16' |
| 6" | 17' |
| 8" | 19' |
| 10" | 22' |
| 12" | 23' |
| 14" | 25' |
| 16" | 27' |
| 18" | 28' |

E. Saddles: Where insulation without vapor barrier is indicated, install protection saddles, or use hangers as indicated in Paragraph 2.0/H.1.

F. Guides: Install pipe guides complying with the manufacturer's published product literature. Where not otherwise indicated, install pipe guides near expansion loops, expansion joints, and ball joints.

G. Anchors: Install anchors at the proper locations to prevent stresses from exceeding those permitted by ANSI B31 and to prevent the transfer of loading and stresses to connected equipment. Anchors shall include vibration isolation in accordance with the pipe support system specified. Where the piping system is floating, the anchors shall be termed restraints or braces.

1. Where expansion compensators are indicated, install anchors in accordance with the expansion unit manufacturers written instructions, to limit movement of piping and forces to the maximums recommended by the manufacturer of each unit.
2. Where not otherwise indicated, install anchors at the ends of principal pipe runs and at intermediate points in pipe runs between expansion loops and bends. Make provisions for preset of anchors as required accommodating both expansion and contraction of piping.

H. Leveling: Adjust hangers and supports and place grout as required under supports to bring piping to proper levels and elevations.

I. Hangers: Refer to Section 23 05 48, “Vibration Isolation”, for additional information and support requirements. Pipe hangers made of wood, wire, or sheet iron shall not be permitted.

J. Riser Supports: Vertical piping shall be secured at sufficiently close intervals to keep the pipe in alignment and carry the weight of the pipe and contents.
1. Cast iron soil pipe shall be supported at the base and at each story level, but in no case at intervals greater than 10’.
2. Steel pipe shall be supported at the base and at no less than every other story level, but in no case at intervals greater than 25’.
3. Copper tube shall be supported at each story level, but in no case at intervals greater than 10’.
4. Plastic pipe shall be supported at mid point between floors and at ceiling to prevent movement, but in no case at intervals greater than 8’.

END OF SECTION

23 05 48

# VIBRATION ISOLATION

## PART 1 - GENERAL

### 1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 23 01 00, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the vibration isolation systems. Comply with other Division 23 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the vibration isolation systems specified herein, as indicated on the drawings, and as required to provide complete and operating systems.

### 1.02 DESCRIPTION OF WORK

A. Work Included: Provide vibration isolation work as specified and indicated, including the following:
1. Support isolation for motor-driven mechanical equipment
2. Inertia base frames in conjunction with equipment isolation
3. Support isolation of air-handling housings
4. Isolation including support isolation for piping risers
5. Support isolation of piping
6. Flexible ductwork connections

### 1.03 QUALITY ASSURANCE

A. General: Except as otherwise indicated, obtain support isolation units from a single manufacturer.

B. Supervision: Manufacturer shall provide technical supervision of the installation of support isolation units produced by him and of associated inertia bases.

C. Manufacturers: Provide vibration isolation support units manufactured by one of the following or an approved equal: Amber-Booth, Vibrations Mounting and Controls, Inc., Korfund Dynamics Corporation, Consolidated Kinetics Corporation.

## PART 2 - PRODUCTS

2.01 MATERIALS

A. Chilled, Condenser and Heating Hot Water Pumps: Provide concrete inertia bases with structural steel pouring forms sized and reinforced as required for the intended service. Size bases to support the piping elbow supports and furnish with Type RSW recessed spring isolators properly sized for one-inch static deflection. Mount springs on concrete bases 3-1/2" high. Inertia base is not required for pumps installed on slabs on grade.

B. Suspended Fans: Isolate with not less than four combination spring and rubber-in-shear vibration isolators.

C. Cooling Towers: Design and coordinate the structural supports with the Structural Engineer. Isolate towers with spring isolators with springs sized for 2" static deflection. Isolator housing to be hot-dipped galvanized springs to be neoprene-coated. Provide tie-down adjustment to prevent excessive movement when tower is drained. Towers located on grade do not require vibration isolation.

D. Fluid Cooler Mounted on Ground: System is internally isolated; no special vibration isolation is required.

E. Suspended Heat Pump Units: Unit shall be isolated with hanger and vibration isolation kit supplied by unit manufacturer or a vibration isolation manufacturer.

F. Suspended Fan & Coil Unit: Isolate with not less than four combination spring and rubber “in-shear” vibration isolators.

G. Flexible Pipe Connections at Cooling Tower: Isolate supply and return piping to the cooling tower with flanged rubber, spherical double-arch expansion joints.

H. Flexible Pipe Connections at Rotating Equipment: Isolate supply and return piping to each pump with braided metal hose connectors between pump and valve.

I. Flexible Ductwork Connections to Equipment: Install flexible connections between sheet metal ductwork and equipment or fan collar. Locate as close to fan as possible. Isolate the duct system from the equipment by at least 1”.

J. Roof Mounted Air Handling Units: Provide housed spring type isolators with vertical limit stops. Provide with 1” deflection (0 to 500 rpm) or .75” deflection (501 and over rpm).

PART 3 - EXECUTION

3.01 ISOLATOR PERFORMANCE

A. General: Comply with the minimum static deflections recommended by the American Society of Heating, Refrigerating and Air Conditioning Engineers, including the definitions of critical and non-critical locations, for the selection and application of vibration isolation materials and units as indicated.

B. Manufacturer's Recommendations: Except as otherwise indicated, comply with manufacturer's instructions for selection and application of vibration isolation materials and units.

3.02 RELATED WORK EXAMINATION

A. Examination and Reporting: Installer of vibration isolation work shall observe the installation of other work related to and connected to vibration isolation work. After completion of other related work (but before equipment start-up), installer shall furnish a written report to the Contractor, with a copy to the Engineer, listing observed inadequacies for proper operation and performance of vibration isolation work.

B. Correction and Start-up: Do not start-up equipment until inadequacies have been corrected in a manner acceptable to the vibration isolation Installer.

3.03 EQUAL LOADING

A. General: Equipment installed on vibration isolating mountings shall be level after load is applied. Further vibration isolating mountings shall be selected and installed to compensate for unequal loading. Spring isolators with coils touching during equipment start-up or operation will not be acceptable.

END OF SECTION

23 05 53

# HVAC EQUIPMENT AND PIPING IDENTIFICATION

## PART 1 - GENERAL

### 1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 23 01 00, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the identification of equipment and piping. Comply with other Division 23 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the identification of equipment and piping specified herein and/or as indicated on the drawings.

### 1.02 DESCRIPTION OF WORK

A. Work Included: Identification of mechanical equipment shall consist of equipment labeling, pipe marking, and valve tagging as specified hereinafter.

1. In general, all equipment shall be labeled. This shall include all central plant, air handling or air conditioning equipment, and other similar and miscellaneous equipment.
2. Pipe markings shall be applied to all piping.
3. Each valve shall be identified with a stamped tag. Valves and tagging shall be scheduled typewritten on 8 ½" x 11" paper, tabulating valve number, piping system, system abbreviation, location of valve (Room or area), and service (e.g. – 2nd Floor North Domestic Hot Water). The valve schedule shall be submitted to the Engineer for approval prior to ordering or installing valve tags. See Section 23 01 00, "General Mechanical Requirements" for information and requirements regarding Operation and Maintenance Manuals.
   Labels, tags, and markers shall comply with ANSI A13.1 and other applicable state and local standards for lettering size, colors, and length of color field.
4. Equipment and device identification specified in other sections shall be provided as a part of those requirements.

### 1.03 ACCEPTABLE MANUFACTURERS

A. Labels, markings, and tags shall be manufactured by W.H. Brady, Seton, Allen, or Industrial Safety Supply.

## PART 2 - PRODUCTS

2.01 EQUIPMENT LABELING

A. Equipment labeling shall be one of the following, unless noted or specified otherwise:
   1. Permanently attached engraved brass or plastic laminated signs with 1" high lettering. Signs on exterior equipment shall be brass.
   2. Stencil painted identification, 2" high letters, with standard fiberboard stencils and standard black (or other appropriate color) exterior stencil enamel.

2.02 PIPE MARKINGS

A. On piping less than 6" diameter, install plastic semi-rigid snap-on type, manufacturer's standard pre-printed color-coded pipe markers extending fully around the pipe and insulation or pressure-sensitive vinyl pipe markers similar to the above. Pipe markings can also be applied with the stick type backing in lieu of he semi-rigid snap-on-type.

B. On piping and insulation 6" and greater diameter, full band as specified above or strip-type markers fastened to the pipe or insulation with laminated or bonded application or by color-coded plastic tape not less than 1 ½" wide, full circle at both ends of the marker. Pipe markings can also be applied with the stick type backing in lieu of the semi-rigid snap-on-type.

C. Arrows for direction of flow provided integral with the pipe marker or separate at each marker.

2.03 VALVE TAGS

A. Valve tags shall be polished brass or plastic laminate with solid brass S hook and chain. Tags shall be stamped or engraved with the appropriate abbreviation for the type of service (e.g. – CHW, HW), as well as the designated valve number.

B. A valve schedule is to be provided to the Owner. For each page of valve schedules, a glazed display frame, with screws for removable mounting on masonry walls. Provide frames of finished hardwood or extruded aluminum, with SSB-grade sheet glass.

PART 3 - EXECUTION

3.01 GENERAL

A. Identification labeling, marking, and tagging shall be applied after insulation and painting has been completed.

B. Coordinate names, abbreviations, and other designations used in mechanical identification work with corresponding designations shown, specified, or

scheduled on drawings. Prior to ordering any labels, markings, or tags, obtain the approval of the Engineer regarding names, abbreviations, etc.

C. The Plumbing, HVAC, and Fire Protection Contractors shall coordinate labeling, marking, and tagging to ensure consistent and coordinated identification. In existing buildings, utilize similar names, abbreviations, and other designations that are currently in use to remain consistent with existing identification.

D. Equipment labeling shall consist of unit designation as shown on the drawings. Exhaust fan labeling shall also indicate service or the room or area of service.

E. Pipe and ductwork markers shall be placed on piping and ductwork on 25' centers in mechanical rooms and concealed spaces. In locations where piping and ductwork is exposed, place markers on 50' centers. Flow directional arrows should be marked on the piping at taps from the main and riser.

F. Valve tags shall be placed on each valve except those intended for isolation of individual heat pumps or terminal units (e.g. - VAV boxes, fan coil units, unit heaters, etc.). Valve tag schedules shall be prepared as specified hereinbefore. Copies of one schedule shall be laminated in clear plastic and placed where directed by the Owner. Other sets shall be included in the Operating and Maintenance Manuals.

END OF SECTION

23 05 93

# TESTING, ADJUSTING, AND BALANCING

## PART 1 - GENERAL

### 1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 23 01 00, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the testing, adjusting, and balancing of HVAC systems. Comply with other Division 23 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Provide testing, adjusting, and balancing specified herein, as indicated on the drawings, and as required to provide complete and operating systems.

### 1.02 DESCRIPTION OF WORK

A. Work Included:
1. All air and water systems shall be tested, adjusted, and balanced to optimize operating and comfort conditions. Record test data as outlined hereinafter and submit for review and approval. Systems shall be fully tested and balanced prior to Building commissioning and acceptance.
2. Conduct tests as specified herein, and as required by authorities having jurisdiction, including Local Inspection Department or Construction Manger.
3. Repair or replace defects discovered or resulting from the required tests to a like new condition.
4. All tenant finish air balancing will be by the tenant finish contractor. All air and water moving equipment installed under the shell building contracts will be balanced by the shell contractor.

### 1.03 QUALITY ASSURANCE

A. Personnel: Submit evidence to show that the personnel who will actually balance the systems are qualified. Evidence showing that the personnel have passed the tests required by the Associated Air Balance Council (AABC) or the National Environmental Balancing Bureau (NEBB) will be sufficient.

## PART 2 - PRODUCTS

Not applicable.

## PART 3 - EXECUTION

3.01 TEST DATA

A. General: Record test data after balancing has been completed and deliver recorded data to the Engineer for review and evaluation. Should deficiencies or discrepancies be found, repeat balancing procedures to achieve correct test data results. Certify the test and balancing data as being true and correct over the Contractor's signature. Execute the Certification by an authorized officer if the contracting firm is a corporation, by a partner if the firm is a partnership, by the firm's owner if the firm is a sole proprietorship, or by the authorized representative if the firm is a joint venture. Include a copy of the approved test and balancing data in the Owner's Manual.

B. Test Forms: Record and submit test and balancing data on forms similar to those of the AABC or NEBB.

3.02 CALIBRATION TEST

A. Submit evidence to show that the balancing devices are properly calibrated before proceeding with system balancing.

3.03 PRELIMINARY AIR TESTING

A. General: Preliminary air tests shall be performed before duct work or equipment is enclosed in walls, floors, ceilings, chases, or in any other way concealed from view. Tests may be conducted on individual systems. Submit notification when systems are ready for preliminary air tests. Condenser water shall not be required for preliminary air tests. Make necessary arrangements to energize fan motors for the tests. Where possible, conduct the tests before the application of exterior duct insulation and installation of grilles or diffusers. Remove section of duct to allow design airflow at design static pressure where necessary.

B. Tests: Demonstrate that there is no excessive leakage of the duct work by visual inspection, that fans are operating at essentially the correct speed, that motors will not overload, and that equipment delivers design cfm. Correct any deficiencies found. Repeat preliminary air tests until tests have proven satisfactory.

C. Inspection: Inspection and acceptance of the Work shall, in addition to the foregoing requirements, be subject to the following conditions:
   1. Instruments: Test instruments, devices, and similar items, their accuracy and the methods by which instruments are employed, shall be approved by AABC or NEBB for use at the job site.

3.04 PRESSURE TESTING FOR SMOKE CONTROL SYSTEMS

A. General: Pressure tests shall be performed before duct work or equipment is enclosed in walls, floors, ceilings, chases, or in any other way concealed from view. Pressure tests shall be conducted on all individual systems. Submit notification when systems are ready for pressure tests and all testing methods and results shall be documented.

B. Tests: Demonstrate that leakage does not exceed 5% of the design airflow for each system (Smoke Exhaust, Make-up Air, Stairwell Pressurization, Atrium Exhaust, etc.)

when tested at a minimum of 1.5 times the scheduled static pressure. Correct any deficiencies found. Repeat pressure tests until tests have proven satisfactory.

3.05 FINAL AIR BALANCE

A. General: When tests have been completed and systems are complete and ready for operation, perform the following steps of final air balance and record the results.

B. Motors: Verify correct rotation of rotating equipment. Verify that properly sized thermal heater elements are installed in starters. Verify that properly sized duel-element fuses, where specified, are installed in disconnect switches.

C. Filters: Check air filters or filter media. Balance system only with clean filters or filter media.

D. Airflow at Each Unit: Read and record return and/or outside air, supply air cfm, and temperature at each fan and blower.

E. Water flow at Each Unit: Set thermostat for full cooling and for full heating loads. Measure and record supply and return water flow at each cooling/heating coil.

F. Coil Temperatures: Set thermostat for full cooling and for full heating loads. Read and record entering and leaving dry bulb and wet bulb temperatures at each cooling and heating coil.

G. Outlet Airflow: Adjust each air exhaust inlet and supply diffuser, register, and grille to within 10% of design air cfm. Dampers in diffusers (if specified) may be used for only 10% adjustment from full open airflow. Include terminal points of air supply and points of exhaust.

END OF SECTION

23 07 00

# HVAC INSULATION

## PART 1 - GENERAL

### 1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 23 01 00, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the insulation of HVAC and Plumbing piping, duct, and equipment. Comply with other Division 23 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the insulation system specified herein, as indicated on the drawings, and as required to provide complete and operating systems.

### 1.02 QUALITY ASSURANCE

A. Manufacturer: Approved manufacturers are Armstrong, Calsite, Cell-U-Foarm Corp, Ceelco, Certainteed Corp, Dow Chemical Company, Forrest Mfg Co, Foster / Chilers, Gemco, Johns Manville, Knauf Fiberglass, Midwest Fastners, Owens Corning Fiberglass, Pittsburg Corning Fiberglass, Rubatex, Trymer, and Venture Tape.

B. All insulation, jacket and adhesive shall have a fire and smoke hazard ratings as tested under ASTM E 84, NFPA 255, and UL 723 not exceeding:

| | |
|---|---|
| Flame Spread: | 25 |
| Fuel Contributed: | 50 |
| Smoke Developed: | 50 |

Exceptions: Type B Insulation and PVC Fitting Covers

### 1.03 SUBMITTALS

A. Per Section 23 01 00.

B. Product Data
1. Type A Insulation
2. Type B Insulation
3. Type C Insulation
4. Type D Insulation
5. Type E Insulation
6. Type F Insulation
7. Type G Insulation
8. Vinyl Lacquer Paint for Type B Insulation
9. Metal Jacket

### 1.04 DEFINITIONS

A. The phrase "Storm Drainage Conductor" refers to that portion of the storm drain interior to the building, between the roof drain body and where the pipe goes below grade.

B. The word “plenum” shall mean a ceiling space or mechanical room used for the transfer of conditioned return and/or outside air.

PART 2 - PRODUCTS

2.01 PIPING INSULATION

A. Type A – Fiberglass (indoor)
1. One Piece glass fiber, rigid molded sectional pipe covering with factory applied aluminum foil and white craft paper flame retardant vapor barrier jacket, conforming to ASTM C547, Class II, Mineral Fiber Preformed Pipe Insulation.
2. Thermal Conductivity (k) equals approximately 0.23 (BTU/HR., SF., Degree F, IN) at 75 °F.
3. Similar to Johns Manville Corp “Micro Lox 650 AP T”, or approved equal.

B. Type B - Closed Cell (indoor)
1. Closed cell, flexible foamed plastic conforming to ASTM C534, "Preformed Flexible Elastomeric Cellular Thermal Insulation in Sheet and Tubular Form." Insulation shall be suitable for a temperature range from –40 degrees F to 220 degrees F.
2. Conductivity (k) equals approximately 0.27 (BTUHR., SF., Degree F, IN) at 75 °F.
3. Similar to Armstrong “Armaflex”, or approved equal.

C. Type C – Polyisocyanurate (outdoor)
1. Prefabricated 2 lb./cu.ft. density polyisocyanurate insulation with waterproof mastic and glass fiber jacket finished with an aluminum jacket with waterproof silicone caulk joints.
2. Conductivity (k) equals approximately 0.14 (BTUHR., SF., degrees F, IN) at 75 °F.
3. Insulation shall be applied per manufacturer’s recommendations. Joint sealants and coatings shall be as approved by the insulation manufacturer for the intended application and service temperature range.
4. Jacketing shall be an all service jacket with 1 mm aluminum foil on pipe insulation and FSK jacket on board stock applied by the manufacturer to ASTMC-1136. Jacket shall have integral flap for sealing joint.
5. Similar to Trymer 9501, or approved equal.

2.02 EQUIPMENT INSULATION

A. Type Dh - Fiberglass Board (Hot Equipment)
1. Semi-rigid intermediate service fibrous glass board for operating temperatures greater than 850 degrees F.
2. Conductivity (k) equals approximately 0.23 (BTU/HR., SF., degrees F, IN) at 75 °F. Minimum density of 4.25 lb / cu ft.
3. Similar to Johns Manville Corp “Spin Glass”, or approved equal.

B. Type Dc - Foamed Plastic (Cold Equipment)
1. Foamed plastic sheet suitable for operating temperatures between –40 degrees F and 22- degrees F.
2. Conductivity (k) equals approximately 0.27 (BTU/HR., SF., Degree F, IN) at 75 °F.
3. Similar to Armstrong “Armaflex”, or approved equal.

C. Type E
1. Calcium silicate block conforming to ASTM C 553, Type I (1200 degrees F. max), asbestos free.
2. Conductivity (k) equals approximately 0.42 (BTU IN/HR., SF., degree F) per inch thickness at 200 °F.
3. Similar to Calsilite, or approved equal.

2.03 DUCTWORK INSULATION

A. Type F – Duct Wrap
1. Duct insulation shall be 2" thick, minimum 3/4 lb. density fiberglass with an FSKL aluminum foil jacket, reinforced with fiberglass scrim.
2. Conductivity (k) equals approximately 0.24 (BTUHR., SF., degrees F, IN) at 75 °F.
3. Integral UL rated vapor barrier of:
   a. Aluminum foil reinforced with fiberglass scrim laminated to 30-lb. kraft paper.
   b. Class I white vinyl 0.004 inch thick, where specified.
4. Similar to Johns Manville Corp “Microlite”, or approved equal.

B. Type G - Duct Liner
1. ASTM C1071, Type II, Grade 2, R-6, 1-1/2" thickness, 1.5 lb. Density for low pressure ductwork and 3.0 lb density for medium pressure ductwork, bonded mat of glass fiber coated with black fire resistant and microbial resistant coating, complying with TIMS AHC 101. Moisture adsorption shall not be greater than 0.5% moisture by volume when exposed to moisture-laden air at 120°F and 96% RH, per ASTM C553. Insulation shall be Schuller “Permacote Linacoustic” R-300, "Aeroflex Ductliner" as manufactured by Owens Corning Fiberglass Corp. or "Ultralite with Certa Edge" by Certainteed Corp. or equal by Knauf Fiberglass.
2. Duct liner adhesive shall comply with ASTM C916 "Specifications for Adhesives for Duct Thermal Insulation".
3. Liner Fasteners: Mechanical or weld secured fasteners for duct liner where finish of duct is not exposed. For exposed ductwork, except in mechanical rooms, provide adhesively secured fasteners. Position fasteners are recommended by SMACNA.
4. Minimum Sound Absorption coefficients shall be:

| | 125 | 250 | 500 | 1000 | 2000 | 4000 |
|---|---|---|---|---|---|---|
| Coefficient | 0.34 | 0.42 | 0.47 | 0.64 | 0.80 | 0.79 |
| Attenuation* | 3 | 5 | 12 | 24 | 21 | 17 |

* Attenuation in dB per 10 lineal feet, per ASTM E477

2.04 METAL JACKET

A. Smooth aluminum jacket 0.016 inch thick.

B. Integral polykraft or poly-surlyn moisture barrier.

C. Banded locking joints with field applied silicone weatherproof sealant.

D. Similar to Johns Manville Corp, or approved equal.

2.05 INSULATION ACCESSORIES

A. The following accessories shall be used in the application of the thermal insulations specified under this Section:
   1. PVC Fittings Covers: similar to Johns Manville Corp “Zeston”, or approved equal.
   2. Pressure Sensitive polyester film tape to secure pipe insulation up to 12” outside diameter: Similar to 3M 30-80, or approved equal.
   3. Vapor Seal Mastic: Similar to Childers CP-35, or approved equal.
   4. Lagging Adhesive: Similar to Childers CP-52, or approved equal.
   5. Wire: 16 gauge soft stainless steel.
   6. Insulation Bonding Adhesive (To Metal): Similar to Childers CP-82, or approved equal.
   7. Insulating and Finishing Cement: Similar to Insulco Smooth Kote, or approved equal.
   8. Mechanical Fasteners - Welded or adhered pins with speed clip washers: Similar to Gemco Midwest Fasteners, or approved equal.
   9. Bands for Equipment:
      a. Outside diameter of insulation is less than 24 inch: 1/2 inch x 0.020-inch (25 ga.) stainless steel.
      b. Where diameter is 36 inches or larger: 3/4 inch x 0.020 inch.
   10. Bands for Piping: 1/2 inch x 0.020-inch stainless steel.
   11. Wire Mesh: 1 inch by 20-gage stainless steel hexagonal wire netting.

PART 3 - EXECUTION

3.01 INSULATION APPLICABILITY

A. Heat Pump loop piping (tempered): No insulation required (except where exposed to freezing temperatures—see exterior piping for condenser water below for this condition).

B. Interior Hot Water, Chilled Water, and Condenser Water - Type A insulation required:

| Insulation Thickness (in) | Pipe Sizes (in) |
|---|---|
| 1 | up to 1-1/4 |
| 1-1/2 | 1-1/2 to 3 |
| 2 | 4 and up |

C. Exterior Hot Water, Chilled Water, and Condenser Water – Type C insulation required:

| Insulation Thickness (in) | Pipe Sizes (in) |
|---|---|
| 1 | up to 2-1/2 |
| 2 | 3 and up |

D. Condensate Drains (except in plenums and fire partitions/floors) – Type B insulation required:

| Insulation Thickness (in) | Pipe Sizes (in) |
|---|---|
| ½ | all |

E. Condensate Drains (inside plenums and fire partitions/floors) – Type A insulation required:

| Insulation Thickness (in) | Pipe Sizes (in) |
|---|---|
| 1/2 | up to 1 |
| 3/4 | 1-1/4 and up |

F. Horizontal storm leaders, roof drain bodies, and underside of drains receiving condensate from cooling coils – Type F insulation required:

| Insulation Thickness (in) | Pipe Sizes (in) |
|---|---|
| 2 | all |

G. Horizontal waste piping from electric water coolers – Type A insulation required:

| Insulation Thickness (in) | Pipe Sizes (in) |
|---|---|
| 1/2 | all |

H. Refrigerant Suction (and Liquid where required by system and/or manufacturer) Lines & Valves (except in plenums and fire partitions/floors) – Type B

| Insulation Thickness (in) | Pipe Sizes (in) |
|---|---|
| 1 | all |

I. Refrigerant Suction (and Liquid where required by system and/or manufacturer)Lines & Valves (in plenums and fire partitions/floors), and hot gas bypass piping – Type A insulation required:

| Insulation Thickness (in) | Pipe Sizes (in) |
|---|---|
| 1 | all |

J. Outdoor cooling tower make-up water – Type C insulation required:

| Insulation Thickness (in) | Pipe Sizes (in) |
|---|---|
| 2 | all |

K. Boiler stack, breeching and converter – Type E insulation required:

| Insulation Thickness (in) | Pipe Sizes (in) |
|---|---|
| 4 | all |

L. Emergency Generator Exhaust Piping and Muffler – Type E insulation required:

| Insulation Thickness (in) | Pipe Sizes (in) |
|---|---|
| 4 | all |

M. Medium Pressure Supply Ducts – Type F insulation required

| Insulation Thickness (in) | Duct Sizes (in) |
|---|---|
| 2 | all |

N. Low Pressure Supply Ducts – Type F insulation required

| Insulation Thickness (in) | Duct Sizes (in) |
|---|---|
| 2 | all |

O. Outside air ductwork: No insulation required (except when air is pre-cooled below dew point of air surrounding duct).

P. Domestic Water Heaters shall be factory insulated.

Q. Cold equipment – Type Dc insulation required, minimum 1/2". Consult with equipment manufacturer as thickness may vary depending on service application and equipment manufacturer installation recommendations.

R. Hot equipment – Type Dh insulation required, minimum 2". Consult with equipment manufacturer as thickness may vary depending on service application and equipment manufacturer installation recommendations.

Notes:

a. Exhaust ductwork, stairwell pressurization and dedicated smoke evacuation ductwork is not insulated, unless otherwise noted.
b. Exposed supply and return ductwork will be double wall, internally lined.
c. All duct connected to equipment without compressors must be internally lined with Type G duct liner for a distance not less than 5 feet from the equipment connection.
d. All duct connected to equipment that contains compressors must be internally lined with Type G duct liner for a distance not less than 10 feet from the equipment connection.
e. The above thicknesses are the minimum required. All local codes and local energy codes shall be complied with.
f. All piping exposed to outdoors shall be insulated. All piping subject to freezing shall be provided with heat tracing. Coordinate insulation with heat trace cable and controls.
g. Insulation types and thickness are a minimum standard. Each application shall be carefully considered and insulation product type and thickness shall be appropriate for each specific application. Submit all insulation products with verification of their service intent.

h. Insulation may be omitted on condenser water piping located within mechanical rooms.

3.02 PIPING INSULATION GENERAL REQUIREMENTS

A. Preparation
1. Do not apply insulation until piping has been leak tested.
2. All surfaces to be insulated shall be dry and free of loose scale, rust, dirt, oil or water.

B. Application:
1. Insulation shall be installed in a smooth, clean workmanlike manner. Joints shall be tight and finished smooth without fish-mouths.
2. Insulation shall fit tightly against the surface to which it is applied to prevent air circulation between the insulation and the pipe or equipment to which it is applied.
3. Insulation applied to cold piping or equipment shall be completely vapor sealed, free of pinholes or other openings.
4. Do not use wet insulation materials.
5. All longitudinal joints on vertical pipe runs shall be staggered.
6. Apply insulation so as to permit expansion or contraction of pipelines without causing damage to insulation or surface finish.
7. Do not apply mastic or adhesive until all previous applications of mastic and adhesives have thoroughly dried.
8. No bands or staples shall be provided on covering.
9. The adhesive used in connection with all covering work shall contain an approved vermin and rodent proof ingredient.
10. Provide 24-gauge sheet-metal saddle between the pipe hanger/support and the exterior of the insulation. Saddle length shall be the same as insulation inserts.

C. Application at Fittings:
1. Insulation of flanges and flanged fittings shall overlap adjacent pipe covering at least 1 inch. Valves shall be insulated up to the gland only.
2. Pipeline strainers shall be insulated in such a manner as to permit removal of strainer basket without disturbing insulation of the strainer body.
3. Insulation adjacent to un-insulated flanges shall be tapered back and neatly finished so as to allow access to and removal of bolts without injury to covering.

3.03 TYPE A INSTALLATION

A. Tightly butt together sections of insulation on pipe runs sealing longitudinal seams of jacket with a self-sealing adhesive. Seal end joints with 4-inch wide straps of matching vapor barrier tape. Seal off ends of insulation with vapor seal mastic at valves, fittings and flanges. No further finish required. Mastic shall extend onto the bare pipe and over the insulation O.D.

B. PVC fitting jackets shall be used when they are available for the particular application. When molded or routed coverings are not available, the coverings shall be fabricated in the field similar to equipment insulation. Molded or routed fitting covers are highly recommended. Order PVC pre-curled.

C. Cold Piping:
1. Cover valves, fittings and flanges with insulation having the same thickness as adjacent pipe covering, securing in place reforming tape up to 12" O.D. and ½" wide SST bands on larger O.D. Apply a PVC jacket and seal joints with PVC cement (solvent welding).

D. Hot Piping:
1. Covers shall overlap the pipe insulation by the thickness of the insulation or 2" min. Cover valves, fittings and flanges with insulation similar to the adjacent pipe covering, securing in place with reforming tape up to 12" O.D. and ½" wide SST bands on larger O.D. Apply a PVC jacket and tape end joints to adjacent pipe insulation.
2. Do not use PVC fitting jackets where the surface of the insulation is above 150 degrees F.

E. Exterior Piping:
1. Exterior above grade water piping shall be finished with a weatherproof jacket and an aluminum jacket. Lap and seal joints as per manufacturer's instructions. Place laps to shed water.

3.04 TYPE B INSTALLATION

A. Type B insulation shall be slipped on the pipe prior to connection, and the butt joints shall be sealed. Where the slip on technique is not possible, the insulation shall be carefully slit and applied to the pipe.

B. All joints shall be completely butt sealed with the manufacturer's recommended adhesive.

C. Do not apply Type B insulation in multiple layers.

D. Type B insulation shall not be used in plenums nor firewall penetrations.

E. This Contractor shall paint Type B insulation exterior to the building with two coats of a vinyl acrylic paint recommended by the insulation manufacturer for protection against ultraviolet degradation and shall be flexible with no cracking. It is recommended in high humid areas to coat the insulation with a vapor barrier mastic to .037 min. DFT.

3.05 TYPE C INSTALLATION

A. Exterior
1. Butter joints of insulation with non-setting adhesive. Secure with factory applied Self-Seal laps. Installation shall be as per manufacturer's guidelines.
2. Finish shall be factory applied All Service Jackets. All fittings shall be finished with vapor seal mastic reinforced with white glass mesh. Minimum 0.037 thick DFT of mastic.
3. Piping exposed in machine rooms shall be finished with vapor seal mastic and open weave membrane 10 x 10.
4. Piping exposed to weather shall be finished with all service jacket and additional finish of 0.16 thick aluminum jacket. Aluminum jacket shall be secured with stainless bands located on maximum centers of 12 inches and at the overlap. No screws or pop rivets shall be used.

5. Fittings and valves shall be finished with vapor seal mastic, reinforced with minimum 0.037" DFT of mastic, glass mesh and aluminum preformed fitting covers.

3.06 TYPE D AND E INSTALLATION

A. Equipment Insulation Application:
1. Apply insulation to fit as closely as possible to equipment.
2. Stagger joints where possible.
3. Bevel insulation around nameplates, ASME stamp and access plates.
4. Insulation on equipment that must be opened periodically shall be constructed so insulation can be removed and replaced without damage.
5. Do not install Type E insulation on aluminum surfaces or with aluminum jacket.

B. Hot Equipment:
1. Install 3/4-inch expanded metal over equipment with standing ribs or seams prior to applying insulation to eliminate ribs or seams penetrating through the insulation.
2. Secure the insulation with steel bands spaced on 12-inch centers.
3. Where required, use welded studs, clips or angles as anchors for wire or bands on flat surfaces.
4. Seal joints with insulating cement.
5. Over the insulation stretch 1-inch hexagonal mesh wire and lace the edges together.
6. Apply a 1/4-inch thick coat of finishing cement and trowel smooth.
7. Smooth insulation with lagging adhesive, cover with glass cloth and a final coat of lagging adhesive.
8. On small equipment where it is not practical, omit the wire mesh and finishing cement on Type D insulation.

C. Cold Equipment
1. Cover irregular surfaces with a smoothing coat of insulating cement.
2. Secure insulation with wire or with stainless bands spaced on 12-inch centers.
3. Seal joints with vapor seal mastic.
4. Embed a layer of glass into a 1/16-inch coating of vapor seal mastic. Then coat the outside of the glass cloth with a 1/16-inch coating of vapor seal mastic.

D. Roof Drain Bodies
1. Insulate similar to cold equipment.
2. Insulated boxes around roof drain bodies are not acceptable.

3.07 TYPE F INSTALLATION

A. Ductwork Insulation Application:
1. Apply insulation tightly and smoothly to duct.
2. Secure insulation on the bottom of ducts and plenums and on the sides of plenums and other places where the insulation will sag and max 3" from any corner.
3. Impale insulation over pins or anchors located not more than 18 inches apart and hold in place with washers and clips.

4. Cut off protruding pin after clips are secured and seal with 2-mil. aluminum foil backed pressure sensitive tape.
5. Apply insulation with joints tightly butted.
6. Seal all ductwork joints, punctures and fittings with a mastic type sealant containing a vapor barrier.
7. Cover all breaks, joints, punctures and voids with a vapor seal mastic and cover with a vapor barrier material identical to vapor barrier on the insulation, where gaps exceed 2".
8. Bevel insulation around nameplates, access plates and doors.
9. Insulation shall be continuous through walls and floors except at fire dampers.

3.08 TYPE G INSTALLATION

A. Internal Lining Insulation Application:
1. Apply where specified herein.
2. Apply liner in accordance with SMACNA Duct Liner Application Standard, later edition.
3. Provide metal liner for the sound lining. Metal liner to be 24 gauge galvanized sheet metal with perforation of 3/32" diameter holes on 3/16" center. Properly fasten liner to the duct so that liner does not sag or vibrate.

3.09 METAL JACKET INSTALLATION

A. Cover all piping insulation exposed to the exterior with metal jacket as specified herein.

3.10 FLEX DUCT

A. Flexible ductwork runouts to diffusers and grilles shall be wrapped in fiberglass insulation and sheathed in reinforced, metallized polyester jacket. Minimum insulated value of R=6.0.

3.11 HANGERS

A. Continue insulation through pipe hangers. Provide either rigid insulation inserts or sheet metal inserts at all outside pipe hangers. Provide rigid insulation inserts for piping operating below 60 °F. and sheet metal inserts for piping above 60 °F.

B. Provide rigid insulation (on non-insulated piping) or sheet metal inserts (on insulated piping) between the pipe and pipe hanger - shall be of a thickness equal to the adjoining insulation and shall be provided with vapor barrier where required. Insulation insert shall not be less than the following lengths:

| | |
|---|---|
| 1/2" to 2 1/2" pipe size | 10 Inches Long |
| 3" to 6" pipe size | 12 Inches Long |
| 8" to 10" pipe size | 16 Inches Long |
| 12" and over | 22 Inches Long |

C. Inserts for cold piping shall have a vapor barrier facing of the same material as the adjacent pipe insulation. Seal inserts into insulation with vapor seal mastic.

D. Sheet metal inserts shall be of steel sheet. Gauge shall conform to manufacturer's recommendation for pipe size. Sheet metal inserts shall have insulation filler of the same material as the adjacent pipe insulation.

3.12 PIPE SLEEVES

A. Pipe insulation and vapor barrier shall be continuous through sleeves in walls and floors.

B. Type B insulation shall not be used in sleeves through firewalls or fire rated (2-hour) floor systems. Use Type A or Type C through the sleeve instead and vapor seal the joint between the two insulations.

C. Provide 26 gauge galvanized steel or 0.020 inch aluminum jacket over insulation on pipe passing through sleeves where sealant is required.

D. Where penetrating interior walls, extend the metal jacket 2 inches out either side of the wall and secure each end with a metal band compressing the insulation slightly.

E. Where penetrating floors, extend the metal jacket 2 inches below the floor and 5 inches above the floor. Secure with metal bands.

END OF SECTION

23 09 00

# DIRECT DIGITAL CONTROLS

## PART 1 - GENERAL

### 1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 23 01 00, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the direct digital control system. Comply with other Division 23 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the direct digital control system specified herein, as indicated on the drawings, and as required to provide complete and operating systems.

### 1.02 CAMPUS ENTERPRISE SYSTEM – GENERAL DESCRIPTION

A. This project scope shall include new direct digital control systems for each of the following buildings at the Trenholm State Executive Park Campus: Building A, Building B, Building C, and Building D.

B. Provide an Enterprise Operator Interface System with the required building controllers to integrate and control all mechanical equipment associated with this project as listed in the project plans and specifications.

C. The Enterprise operator interface is a web-based, systems integration solution that provides facility managers an online, enterprise-wide view and control over of all their buildings and systems, from any device with a web browser on the network. (PC, laptop, tablet, smart phone).

D. The system shall collect and display data from other systems via BACnet™ IP, providing users the critical information needed to make enterprise-wide decisions for optimized performance

E. The Enterprise operator web interface shall be accessible via a web browser without requiring any “plug-ins” (i.e. JAVA Runtime Environment (JRE), Adobe Flash).

F. The Enterprise operator interface software shall be provided as a cloud-based service, the manufacture shall include a two-year cloud base service as part of this contract.

G. The Enterprise operator interface software shall be installed on a local server provided by the building owner. The server hardware and any System level controllers are to reside on the building owner’s network. The central server hardware, associated server operating system software, network cabling and switches is to be provided by others.

H. Prepare individual hardware layouts, interconnection drawings, and software configuration from project design data.

I. Design, provide, and install all equipment cabinets, panels, data communication network cables needed, and all associated hardware.

J. Provide and install all interconnecting cables between supplied cabinets, application controllers, and input/output devices.

K. Provide supervisory specialists and technicians at the job site to assist in all phases of system installation, startup, and commissioning.

L. Provide a comprehensive operator and technician training program as described herein.

M. Provide as-built documentation, operator's terminal software, diagrams, and all other associated project operational documentation (such as technical manuals) on approved media, the sum total of which accurately represents the final system.

N. Provide new sensors, dampers, valves, and install only new electronic actuators. No used components shall be used as any part or piece of installed system.

1.03 BUILDING AUTOMATION SYSTEM - GENERAL DESCRIPTION

A. Provide the existing Building Automation System (BAS) to integrate and control all mechanical equipment associated with this project.

B. The Building Automation System shall be as indicated on the drawings and described in these specifications. System must be fully integrated and coordinated with mechanical equipment DDC controllers furnished and installed in the equipment manufacturer's factory as specified in those sections. The intent of the BAS is to integrate all mechanical equipment into one system for global monitoring, control, and alarming associated with the building. It is the BAS manufacturer's responsibility to provide all the design, engineering, and field coordination required to ensure all equipment sequence of operations are met as specified and the designated BAS operators have the capability of managing the building mechanical system to ensure occupant comfort while maintaining energy efficiency.

C. The BAS shall meet open standard protocol communication standards (As defined in System Communications Section) to ensure the system maintains "interoperability" to avoid proprietary arrangements that will make it difficult for the Owner to consider other BAS manufacturers in future projects.

D. Direct Digital Control (DDC) technology shall be used to provide the functions necessary for control of mechanical systems and terminal devices on this project.

E. The BAS shall accommodate simultaneous multiple user operation. Access to the control system data should be limited only by the security permissions of the operator role. Multiple users shall have access to all valid system data. An operator shall be able to log onto any workstation on the control system and have access to all appropriate

1.04 APPROVED MANUFACTURER

A. The basis of design shall be the Trane Tracer®.

B. Alternate manufacturers shall be approved by the engineer and owner prior to bid.

1.05 QUALITY ASSURANCE

A. Responsibility: The supplier of the EMCS shall be responsible for inspection and Quality Assurance (QA) for all materials and workmanship furnished.

B. Component Testing: Maximum reliability shall be achieved through extensive use of high-quality, pre-tested components. Each and every controller, sensor, and all other DDC components shall be individually tested by the manufacturer prior to shipment.

C. Tools, Testing and Calibration Equipment: The EMCS supplier shall provide all tools, testing, and calibration equipment necessary to ensure reliability and accuracy of the system.

D. The systems control contractor shall have been in business a minimum of five years and be the authorized installing contractor for the manufacturer of the BACnet components.

1.06 REFERENCE STANDARDS

A. The latest edition of the following standards and codes in effect and amended as of supplier's proposal date, and any applicable subsections thereof , shall govern design and selection of equipment and material supplied:
1. American Society of Heating, Refrigerating and Air Conditioning Engineers (ASHRAE).
2. ANSI/ASHRAE Standard 135-2001, BACnet.
3. Uniform Building Code (UBC), including local amendments.
4. UL 916 Underwriters Laboratories Standard for Energy Management Equipment. Canada and the US.
5. National Electrical Code (NEC).
6. FCC Part 15, Subpart J, Class A
7. EMC Directive 89/336/EEC (European CE Mark)

B. City, county, state, and federal regulations and codes in effect as of contract date.

C. Except as otherwise indicated the system supplier shall secure and pay for all permits, inspections, and certifications required for his work and arrange for necessary approvals by the governing authorities.

1.07 SUBMITTALS

A. Drawings
1. The system supplier shall submit engineered drawings, control sequence, and bill of materials for approval.
2. Drawings shall be submitted in the for of PDF documents.

B. System Documentation

Include the following in submittal package:
1. System configuration diagrams in simplified block format.
2. All input/output object listings and an alarm point summary listing.
3. Electrical drawings that show all system internal and external connection points, terminal block layouts, and terminal identification.
4. Complete bill of materials, valve schedule and damper schedule.
5. Manufacturer's instructions and drawings for installation, maintenance, and

operation of all purchased items.

6. Overall system operation and maintenance instructions—including preventive maintenance and troubleshooting instructions.

C. Project Management

1. The vendor shall provide a detailed project design and installation schedule with time markings and details for hardware items and software development phases. Schedule shall show all the target dates for transmission of project information and documents and shall indicate timing and dates for system installation, debugging, and commissioning.

1.08 WARRANTY

A. Warranty shall cover all costs for parts, labor, associated travel, and expenses for a period of TWO years from completion of system acceptance.

B. This warranty shall apply equally to both hardware and software.

1.09 RELATED WORK IN OTHER SECTIONS

A. Refer to Division 0 and Division 1 for related contractual requirements.

B. Refer to Section 23 01 00 for General Mechanical Provisions

PART 2 – BAS - SYSTEM COMMUNICATION

2.01 System Communications

A. Each workstation, building controller, and equipment/plant controller communication interface shall utilize the BACnet™ protocol with an Ethernet (IEEE 802.3, 802.11) or RS485 (EIA-485) physical interface and an appropriate data link technology as defined in ANSI®/ASHRAE® Standard 135-2012. (e.g. BACnet IP, BACnet IPv6, BACnet MS/TP).

B. All system controllers shall be BTL listed as a BACnet Building Controller (B-BC) as defined in ANSI®/ASHRAE® Standard 135-2012.

C. All documented status and control points, schedule, alarm, and data-log services or objects shall be available as standard object types as defined in ANSI®/ASHRAE® Standard 135-2012.

D. Each System Controller shall communicate with a network of Custom Application and Application Specific Controllers utilizing one or more of the interfaces documented within Field Bus Communications below.

E. For minimally managed IP networks, BACnet communication shall support BACnet Secure Connect (BACnet/SC), a secure and encrypted datalink layer specifically designed for those networks.

2.02 Field Bus Communications

A. BACnet™

a. All equipment and plant controllers shall be BTL listed as a BACnet Application Specific Controller (B-ASC) or a BACnet Advanced Application Controller (B-AAC) as defined in ANSI®/ASHRAE® Standard 135-2012.

b. All communication shall conform to ANSI®/ASHRAE® Standard 135-2012.

c. System Controller shall function as a BACnet router to each unit controller providing a globally unique BACnet Device ID for all BACnet controllers within the system.

d. BACnet MS/TP

i. Communication between System Controller and equipment/plant controllers shall utilize BACnet MS/TP as defined in ANSI®/ASHRAE® Standard 135-2012.

2.03 BAS - OPERATOR INTERFACE

A. Provide Building Operator Web Interface

1. Manufacturer shall provide a user interface with time-of-day schedules, data collection, dashboards, reports and building summary, system applications, and self-expiring timed overrides. Manufacturer shall provide a published user and applications guide(s) that detail the system application operation, configuration, setup and troubleshooting.

2. The building operator web interface shall be accessible via a web browser without requiring any “plug-ins” (i.e. JAVA Runtime Environment (JRE), Adobe Flash).

3. User Roles

a. The system shall include pre-defined “roles” that allow a system administrator to quickly assign permissions to a user.

b. User logon/logoff attempts shall be recorded.

c. The system shall protect itself from unauthorized use by automatically logging off following the last keystroke. The delay time shall be user definable.

4. On-Line Help and Training

a. Provide a context sensitive, on line help system to assist the operator in operation and configuration of the system.

b. On-line help shall be available for all system functions and shall provide the relevant data for each particular screen.

5. Equipment and Application Pages

a. The building operator web interface shall include standard pages for all equipment and applications. These pages shall allow an operator to obtain information relevant to the operation of the equipment and/or application, including:

i. Animated Equipment Graphics for each major piece of equipment and floor plan in the System. This includes:

1. These graphics shall show all points dynamically as specified in the points list.

2. Animation capabilities shall include the ability to show a sequence of images reflecting the position of analog outputs, such as valve or damper positions. Graphics shall be capable of launching other web pages.

ii. Alarms relevant to the equipment or application without requiring a user to navigate to an alarm page and perform a filter.

iii. Historical Data (As defined in Trend Logs section of CONTROLLER SOFTWARE) for the equipment or application without requiring a user to navigate to a Data Log page and perform a filter.

1. System Graphics. Building operator web interface shall be graphically based and shall include at least one graphic per piece of equipment or occupied zone, graphics for each chilled water and hot water system, and graphics that summarize conditions on each floor of each building included in this contract. Indicate thermal comfort on floor plan summary graphics using colors to represent zone temperature relative to zone set point.

a. Graphic imagery – graphics shall use 3D images for all standard and custom graphics. The only allowable exceptions will be photo images, maps, schematic drawings, and selected floor plans.

b. Animation. Graphics shall be able to animate by displaying different Image lies for changed object status.

c. Alarm Indication. Indicate areas or equipment in an alarm condition using color or other visual indicator.

2. Graphics Library. Furnish a library of standard HVAC equipment such as chillers, air handlers, terminals, fan coils, unit ventilators, rooftop units, and VAV boxes, in 3-dimensional graphic depictions. The library shall be furnished in a file format compatible with the graphics generation package program.

3. Manual Control and Override

a. Point Control. Provide a method for a user to view, override, and edit if applicable, the status of any object and property in the system. The point

status shall be available by menu, on graphics or through custom programs.

b. Temporary Overrides. The user shall be able to perform a temporary override wherever an override is allowed, automatically removing the override after a specified period of time.

c. Override Owners. The system shall convey to the user the owner of each override for all priorities that an override exists.

d. Provide a specific icon to show timed override or operator override, when a point, unit controller or application has been overridden manually.

4. Scheduling. - The scheduling application shall provide graphical representation of the day, week, month and exception events.

5. Alarm/Event Notification

a. Alarm/Event Log. The operator shall be able to view all logged system alarms/events from any building operator web interface.

i. The operator shall be able to sort and filter alarms from events. Alarms shall be sorted in a minimum of 4 categories based on severity.

ii. The operator shall be able to acknowledge and add comments to alarms

iii. Alarm/event messages shall use full language, easily recognized descriptors.

b. Alarm Suppression. Alarms shall be able to be suppressed based on load/source relationships to present the likely root cause to the building operator as described in ASHRAE Guideline 36. Load/Source relationships shall be configurable by the user through a web interface.

6. Reports and Logs.

a. The building operator web interface shall provide a reporting package that allows the operator to select reports.

b. The building operator web interface shall provide the ability to schedule reports to run at specified intervals of time.

c. The following standard reports shall be available without requiring a user to manually configure the report:

i. All Points in Alarm Report: Provide an on demand report showing all current alarms.

ii. All Points in Override Report: Provide an on demand report showing all overrides in effect.

iii. Commissioning Report: Provide a one-time report that lists all equipment with the unit configuration and present operation.

iv. Points report: Provide a report that lists the current value of all points

d. The controls vendor shall provide a hardening report that summarizes the port configuration details to ensure sites have not been exposed to the Internet in alignment with Cyber Security best practices.

B. Provide Mobile App Interface

1. Provide mobile (smart phone or tablet) interfaces to the building automation system, compatible with iOS and Android™ operating systems.

2. Controls manufacturer shall provide a phone/tablet interface with the ability to view/override status and setpoints, view/change schedules, view/acknowledge/comment on alarms, and view graphics for all spaces and equipment.

3. This phone/tablet interface shall resize itself appropriately for the size of the interface (i.e. no "pinching and zooming" required).

4. This phone/tablet interface shall function remotely from the facility while following IT security best practices (e.g. no ports exposed to the internet).

5. The operator interface shall support system access on a mobile device via a mobile app to:

a. Alarm log

b. System Status

c. Equipment status

d. Space Status

e. Standard Equipment graphics

f. Override set points

g. Override occupancy

h. Acknowledge Alarms

i. Add Comment(s) to Alarms

2.04 BAS - BUILDING / SYSTEM CONTROLLERS

A. There shall be one or more independent, standalone microprocessor based System Controllers to manage the global strategies described in CONTROLLER SOFTWARE section.

1. The controller shall provide a USB communications port for connection to a PC.

2. The operating system of the Controller shall manage the input and output communications signals to allow distributed controllers to share real and virtual point information and allow central monitoring and alarms.

3. All System Controllers shall have a real time clock and shall be able to accept a BACnet time synchronization command for automatic time synchronization.

4. Data shall be shared between networked System Controllers and integrated into Tracer Ensemble for campus control.

5. Serviceability – The System Controller shall have a display on the main board that indicates the current operating mode of the controller.

B. Controls manufacturer shall provide secure remote access to the Building Automation System (BAS). Secure remote access shall not require IP ports to be "exposed" (i.e. port-forwarded or external public IP addresses) to the Internet. Controls manufacturer shall update secure remote access software as necessary to follow cyber security best practices and respond to cyber security events.

2.05 BAS - CONTROLLER SOFTWARE

A. Manufacturer shall provide standard applications to deliver HVAC system control. Standard applications include Time of Day Scheduling with Optimal Start/Stop, VAV Air Systems Control, Chiller Plant Control, Historical Trend Logs and Trim and Respond. Manufacturer shall provide system optimization strategies for functions such as fan pressure optimization and ventilation optimization.

B. Furnish the following applications software for building and energy management. All software applications shall reside and run in the system controllers. Editing of applications shall occur at the building operator interface.

1. Trend Logs

a. The system shall harvest trend logs for defined key measurements for each controlled HVAC device and HVAC application. Trend logs shall be captured for a minimum of 5 key operating points for each piece of HVAC equipment and HVAC application and stored for no less than 1 year at 15-minute intervals. Data Logs shall be capable of being configured on an interval or change of value basis.

i. Air Handling Unit/Rooftop (CV)

1. Discharge Air Temperature

2. Space Temperature Active

3. Space Temperature Setpoint Active

4. Cooling Capacity Status

5. Heating Capacity Primary Status

6. Outdoor Air Damper Position

2.06 BAS - SOFTWARE SERVICE TOOLS

A. Provide one copy of software service tool to enable controller back-up/restore, configuration, firmware update, diagnostics, and equipment status that is specifically compatible with the BACnet unit level controllers being installed as part of this project. This software shall be registered to the Owner at project completion. Manufacturer shall provide subscription to service tool for 5 years that entitles free software updates.

PART 3 - EXECUTION

3.01 EXAMINATION

A. Prior to starting work, carefully inspect installed work of other trades and verify that such work is complete to the point where work of this Section may properly commence.

B. Notify the owners' representative in writing of conditions detrimental to the proper and timely completion of the work.

C. Do not begin work until all unsatisfactory conditions are resolved.

3.02 INSTALLATION (GENERAL)

A. Install in accordance with manufacturer's instructions.

B. Provide all miscellaneous devices, hardware, software, interconnections installation and programming required to ensure a complete operating system in accordance with the sequences of operation and point schedules.

3.03 LOCATION AND INSTALLATION OF COMPONENTS

A. Locate and install components for easy accessibility; in general, mount 48 inches above floor with minimum 3'-0" clear access space in front of units. Obtain approval on locations from owner’s representative prior to installation.

B. All instruments, switches, transmitters, etc., shall be suitably wired and mounted to protect them from vibration, moisture and high or low temperatures.

C. Identify all equipment and panels. Provide permanently mounted tags for all panels.

3.04 INTERLOCKING AND CONTROL WIRING

A. Provide all interlock and control wiring. All wiring shall be installed neatly and professionally, in accordance with Specification Division 26 and all national, state and local electrical codes.

B. Provide wiring as required by functions as specified and as recommended by equipment manufacturers, to serve specified control functions. Provide shielded low capacitance wire for all communications trunks.

C. Control wiring shall not be installed in power circuit raceways. Magnetic starters and disconnect switches shall not be used as junction boxes. Provide auxiliary junction boxes as required. Coordinate location and arrangement of all control equipment with the owner's representative prior to rough-in.

D. Provide auxiliary pilot duty relays on motor starters as required for control function.

E. Provide power for all control components from nearest electrical control panel or as indicated on the electrical drawings—coordinate with electrical contractor.

F. All control wiring in the mechanical, electrical, telephone and boiler rooms to be installed in raceways. All other wiring to be installed neatly and inconspicuously per local code

requirements.

3.05 FIELD SERVICES

A. Prepare and start logic control system under provisions of this section.

B. Start-up and commission systems. Allow sufficient time for start-up and commissioning prior to placing control systems in permanent operation.

C. Provide the capability for off-site monitoring at control contractor's local or main office. At a minimum, off-site facility shall be capable of system diagnostics and software download. Owner shall provide phone line for this service for 1 year or as specified.

D. Provide Owner's Representative with spare parts list. Identify equipment critical to maintaining the integrity of the operating system.

3.06 AS BUILT DOCUMENTATION REQUIRED

A. Final as-built drawings shall be provided in addition to all operations and maintenance documents. Documents shall be provided on one flash drive.

3.07 TRAINING

A. Provide application engineer to instruct owner in operation of systems and equipment.

B. Provide system operator’s training to include (but not limited to) such items as the following: modification of data displays, alarm and status descriptors, requesting data, execution of commands and request of logs.

3.08 DEMONSTRATION

A. Provide systems demonstration under provisions of Section 23 01 00.

B. Demonstrate complete operating system to owner's representative.

C. Provide certificate stating that control system has been tested and adjusted for proper operation.

PART 4 - SEQUENCE OF OPERATIONS

4.01 SEE PLANS FOR SEQUENCES

END OF SECTION

# 23 2113
# HVAC PIPING

## 1.0 GENERAL

## 1.1 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 23 01 00, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the HVAC piping systems. Comply with other Division 23 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the HVAC piping systems specified herein, as indicated on the drawings, and as required to provide complete and operating systems.

D. Refer to Section 23 25 00, “Water Treatment Systems”, for information regarding required chemicals, etc.

## 1.2 DESCRIPTION OF WORK

A. Work Included: Provide complete operating mechanical piping systems including pipe, tube, fittings, and appurtenances as indicated and in compliance with these Specifications.

B. Applications: Applications of piping systems include, but are not limited to, the systems as listed below:

| System | Working Pressure | Operating Temperatures |
|---|---|---|
| [Condenser Water] | | |
| High | 350 psig | 65 to 100°F |
| Medium | 300 psig | 65 to 100°F |
| Low | 150 psig | 65 to 100°F |
| [Chilled Water] | | |
| High | 350 psig | 65 to 100°F |
| Medium | 300 psig | 65 to 100°F |
| Low | 150 psig | 65 to 100°F |
| [Heating Water] | | |
| High | 350 psig | 100 to 180°F |
| Medium | 300 psig | 100 to 180°F |
| Low | 150 psig | 100 to 180°F |
| [Condensate Drainage] | -- | 40 to 60°F |

## 1.3 QUALITY ASSURANCE

A. Welding: Qualify welding procedures, welders, and operators in accordance with ANSI B31.1, Paragraph 127.5, for shop and job site welding of piping work. Make welded

joints on the piping system with continuous welds, without backing rings and with pipe ends beveled before welding. Gas cuts shall be true and free from burned metal. Before welding, surfaces shall be thoroughly cleaned. The piping shall be carefully aligned, and no weld metal shall project inside the pipe.

## 2.0 PRODUCTS

### 2.1 PIPING MATERIALS

A. General: Provide pipe and tube of type, joint, grade, size, and weight (wall thickness, schedule or class) indicated for each service. Comply with applicable governing regulations and industry standards.

1. Steel Pipe: ASTM A53, ASTM A106, or ASTM A120, black or hot-dipped galvanized as specified.

2. Copper Tube: ASTM B88, Types "K", Type "L", or Type "M" copper water tube as defined by the Copper and Brass Research Association.

3. Pre-insulated Steel Pipe: ASTM A53, ASTM A106, ASTM A120, and ANSI B31.1.

### 2.2 PIPING / TUBING FITTINGS

A. General: Provide factory-fabricated fittings of type, materials, grade, class, and pressure rating indicated for each service and pipe size. Provide sizes and types matching pipe, tube, valve, and equipment connections. Where not otherwise indicated, comply with governing regulations, industry standards, and where applicable, with pipe manufacturer's instructions for selections.

1. Cast Iron Flanged Fittings: ANSI B16.1, Class 125 or Class 250, black or galvanized as specified, including bolting and gasketing.

2. Cast Iron Threaded Fittings: ANSI B16.4 or ASTM A126, Class 125 or Class 250, black or galvanized as specified.

3. Malleable Iron Threaded Fittings: ANSI B16.3, Class 150 or Class 300, black or galvanized as specified.

4. Malleable Iron Threaded Unions: ANSI B16.39, select for proper piping fabrication and service requirements including style, end connections, and metal-to-metal seats (iron, bronze, or brass), plain or galvanized as specified.

5. Threaded Pipe Plugs: ANSI B16.14.

6. Steel Flanges/Fittings: ANSI B16.5, including bolting, gasketing, and butt weld end connections.

7. Forged Steel Socket-welding and Threaded Fittings: ANSI B16.11, rated to match schedule of connected pipe.

8. Wrought Steel Butt-welding Fittings: ANSI B16.9, except ANSI B16.28 for short radius elbows and returns; rated to match connected pipe.

9. Pipe Nipples: Fabricated from same pipe as used for connected pipe, except do not use less than Schedule 80 pipe where length remaining unthreaded is less than 1/2". Do not thread nipples full length (no all-thread nipples).

10. Wrought Copper/Bronze Solder-Joint Fittings: ANSI B16.22 suitable for working pressure up to 250 psig.

11. Grooved End Fittings: ASTM A47 or ASTM A536 joined with Victaulic Style 77 couplings and Grade "E" gaskets.

12. Flanged Fittings: Comply with ANSI B16.15 for bolt-hole dimensioning, materials, and flange-thickness.

13. Flange Bolts: Bolts shall be carbon steel ASTM A307 Grade A hexagon head bolts and hexagonal nuts. Where one or both flanges are cast iron, furnish Grade B bolts. Cap screws utilized with flanged butterfly valves shall be ASTM A307 Grade B with hexagon heads.

14. Flange Bolt Thread Lubricant: Lubricant shall be an anti-seize compound designed for temperatures up to 1000°F and shall be Crane Anti-Seize Thread Compound or approved equal.

15. Polyvinyl Chloride (PVC) Fittings: ASTM D2665, Carlon, Vylon "Z" high strength sewer fittings.

16. Copper Drainage Fitting: DWV copper drainage fittings.

B. Miscellaneous Piping Materials/Products:

1. Welding Materials: Comply with ASME Boiler and Pressure Vessels Code, Section II, Part C, for welding materials.

2. Brazing Materials: American Welding Society, AWS A5.B, Classification BCup-5.

3. Gaskets for Flanged Joints: 1/8" thick gaskets. Ring-type shall be used between raised face flanges and full face-type between flat face flanges with punched bolt holes and pipe opening. Gaskets shall be Garlock Style 3400 compressed non-asbestos or equal.

4. Insulating (Dielectric) Unions: Provide dielectric unions at all pipe connections between ferrous and nonferrous piping. Unions shall be "Delvin" as made by Pipeline Seal and Insulator Company or "EPCO" as made by Epco Sales, Inc. and shall have nylon insulation or equal.

5. Push-on-Joints: ANSI A21.11, rubber compression-type, "Tyton Joint" as manufactured by US Pipe or equal.

## 3.0 EXECUTION

### 3.1 PIPING INSTALLATION

A. General:

1. Industry Practices: Install pipe, tube, and fittings in accordance with recognized industry practices which will achieve permanently leak-proof piping systems,

capable of performing each indicated service without failure or degradation of service. Install each run with a minimum of joints and couplings, but with adequate and accessible unions or flanged connections to permit disassembly for maintenance/ replacement of valves and equipment. Reduce sizes (where indicated) by use of reducing fittings. Align accurately at connections. Coordinate piping locations with other trades to avoid conflict. Give ductwork preference unless directed otherwise by the Engineer.

2. Systems: Install piping parallel or perpendicular to lines of building, true to line and grade, and with sufficient hangers to prevent sags between hangers. Provide fittings at changes in direction. Piping in finished areas shall be concealed, except in mechanical rooms. Where pipes of different sizes join, provide reducing elbows, tees, or couplings. Bushings will not be acceptable.

3. Expansion and Contraction: Install loops, offsets, sizing joints, and expansion joints, as necessary, to avoid strain resulting from expansion and contraction of piping systems on fixtures and equipment. Provide mechanical grooved connections required by the application to reduce vibration at equipment connections. Provide expansion joints in piping systems by mechanical grooved connections where required.

4. Piping in Shafts: Mechanical joints for mechanical piping systems are not to be installed in locations that will not be accessible after construction is complete. (i.e. victaulic fittings are not to be used on piping systems in shafts. The piping in this area is to be welded.)

5. Provide pressure/temperature (P/T) plugs on the entering and leaving side of all AHU coils.

6. Provide pressure/temperature (P/T) plugs adjacent to all pipe control sensors ***for*** testing and verification.

B. Steel Pipe: Ream steel pipe after cutting and before threading. Thread with clean-cut taper threads of length to engage all threads in fittings and leave no full-cut threads exposed after makeup.

C. Copper Pipe: Cut copper pipe square and ream to remove burrs. Clean fitting socket and pipe ends with sand cloth or wire brush.

E. Final Connections to Equipment Furnished by Owner or Under Other Divisions of These Specifications: Where equipment is to be furnished under other Divisions of these Specifications or by the Owner, such equipment will be delivered to the site, uncrated, assembled, and set in-place under those other Divisions of these Specifications or under the separate contracts. Any required automatic control valves shall also be provided under those other Divisions of these Specifications or other separate contracts. Make all final connections of hot water, condenser water, gas, domestic water, waste, and vent as required. Provide valves, unions, strainers, check valves, and traps as required for proper operation of systems and equipment. Equipment not shown on the Architectural Drawings or noted by the Architect or Engineer shall not be included in the scope of this requirement.

F. Excavation, Installation, and Backfill for Underground Pipe:

1. Layout: Pipes shall be laid, and pipe joints made in presence of the General Contractor and field measurements, layouts, batter board alignment, grade establishments, and similar locations shall be performed by a Professional

Engineer in the employ of the Contractor. The Contractor's engineer shall be on the job during all underground work. A "Bench-Mark" reference shall be provided by the General Contractor.

2. Pipe Grading: Lay and maintain all pipes at required lines and grades during the course of the Work.

3. Trench: Excavate the trench to the depth required. Properly brace and de-water the trench and keep it free of water during installation, testing pipe, and backfilling. No water shall be discharged onto the street or freeway without approval by the Owner.

4. Excavation: The trench shall be at least 18" wider than the maximum diameter of the pipe or largest bell and the pipe shall be laid in the center of the trench. The trench shall be excavated to a depth sufficient to provide for pipe cushions or supports as specified. Trench width may be increased as required and piling left in place until sufficient compacted backfill is in place. Properly sheet and brace all open trenches to render them secure and remove all such sheeting and bracing before completing the backfill. Comply with all applicable national, state, and local codes and regulations. The quantity of excavation required to install sheeting and the installation and removal of sheetings, and bracings will not be regarded as Extra Work. All costs incurred for this excavation and the installation of sheeting shall be included in the Contract Price.

5. Grading: Upon completion of excavation and prior to the laying of the pipe, the trench bottom shall be brought up to the required elevation with a pipe cushion, except where the cushion has been eliminated by the General Contractor. Pipe cushions shall be select material deposited in the trench and shall be compacted, leveled off, and shaped to obtain a smooth compacted bed along the laying length of the pipe. Pipe cushion material shall be as follows:

    a. Open and Closed Loop Condenser Water and Hot Water Heating Piping: Material for pipe cushion shall comply with local codes and conform to the geo-technical report. In absence of local code requirements and/or geo-technical report, the cushion shall be bank sand or select backfill material approved by the General Contractor.

6. Anchors: Cast iron pipes shall have concrete anchors at each change in direction and/or as directed. Any change in direction exceeding 15 degrees shall be anchored. Concrete anchors shall rest against solid (virgin) ground with the required area of bearing on pipe and ground to provide suitable anchoring.

7. Backfill: Backfill trenches only after piping has been inspected, tested, and approved by the General Contractor. Backfill shall be provided as recommended in the geo-technical report included in these Contract Documents, or, in the absence of a geo-technical report, as required by site conditions. Refer to Division 2 or elsewhere in the Contract Documents for additional trenching and backfill requirements.

8. Existing Surfaces: Restore existing streets, driveways, and sidewalks damaged during the excavation work to acceptable condition, subject to approval by the Owner, Architect, and/or Engineer.

9. Safety: Provide street and sidewalk excavations with approved barricades, warning lights, and cover plates as required by the local authorities.

## 3.2 CHILLED WATER & HEATING WATER PIPING

A. General: On each floor, provide isolating valves on core water supply and return mains to permit half of the floor to be isolated while maintaining service to the other half of the floor.

B. Aboveground Pipe: 5” and larger: Black steel, ASTM A53, Schedule 40; 4” and smaller: Copper type “L”

C. Underground Hot Water Piping: see below grade piping specification.

D. Underground Chilled Water Piping: see below grade piping specification.

E. Fittings:

1. Service Pressure at or Less Than 150 psig:

a. Fittings, 2" in diameter and smaller, threaded, Class 150 rated, black, banded, malleable iron.

b. Fittings, 2-1/2" in diameter and larger, factory-fabricated, Class 150, weld-type.

c. Flanges, Class 150, forged steel weld neck.

2. Taps and Branches: "Weld-O-Lets", "Thread-O-Lets", or "Branch-Lets" may be employed at locations where taps or branches join line pipe, provided the tap or branch does not exceed 1/2 the size of the line pipe. Factory-fabricated wye and tee fittings may be welded into the main.

3. Service Pressure Greater Than 150 psig:

a. Fittings, 2" in diameter and smaller, threaded, 300 psig, black, banded, malleable iron.

b. Fittings, 2-1/2" in diameter and larger, factory-fabricated, weld-type, rated for greater than 300 psig.

c. Flanges, 300 psig, weld neck, welding flanges at valves and all flanged connections.

F. Cold-springing: Cold-springing of piping will not be permitted.

G. Automatic Air Vents:

1. An automatic air vent shall be installed at the air separator and piped to the floor drain, at a minimum. All other system high points at other locations as required, shall be manually vented. Vents shall be designed to eliminate air from the system automatically and/or manually without permitting the passage of any water and shall be similar and approved equal to the following:

a. 150 psig working pressure service - Sarco Type 13W or approved equal.

b. 300 and 400 psig working pressure service - Sarco Type 13WH or approved equal.

2. Automatic air vents shall have a ¾" ips inlet connection and 3/8" outlet. Provide 3/8" OD hard drawn, Type "L" copper tubing from vent outlet for overflow in case of defective action. Copper tubing shall run to a suitable drain. Provide ¾" stop valve in vent line for servicing of automatic air vent.

H. Provide pressure independent balancing valves at reheat coils.

I. Flow Meter Bypass:
   a. Full bore flow meters must have a lockable bypass around them. Manual bypass valve must be lockable. Locks will be issued by Auburn University Utilities & Energy Prior to water being turned on.

## 3.3 OPEN & CLOSED LOOP CONDENSER WATER PIPING

A. General: On each floor, provide isolating valves on core water supply and return mains to permit half of the floor to be isolated while maintaining service to the other half of the floor.

B. Above ground Pipe: Black steel, ASTM A53, Schedule 40, up to 12" and standard weight for 12" and above.

C. Underground Piping: Perma-Pipe CHIL-GARD Water Pipe: Class 200 bell and spigot PVC pipe inside a PVC outer jacket.

D. Fittings:

E. Service Pressure at or Less Than 150 psig:

F. Fittings, 2" in diameter and smaller, threaded, Class 150 rated, black, banded, malleable iron.

G. Fittings, 2-1/2" in diameter and larger, factory-fabricated, Class 150, weld-type.

H. Flanges, Class 150, forged steel weld neck.

I. Taps and Branches: "Weld-O-Lets", "Thread-O-Lets", or "Branch-Lets" may be employed at locations where taps or branches join line pipe, provided the tap or branch does not exceed 1/2 the size of the line pipe. Factory-fabricated wye and tee fittings may be welded into the main.

J. Service Pressure Greater Than 150 psig:

K. Fittings, 2" in diameter and smaller, threaded, 300 psig, black, banded, malleable iron.

L. Fittings, 2-1/2" in diameter and larger, factory-fabricated, weld-type, rated for greater than 300 psig.

M. Flanges, 300 psig, weld neck, welding flanges at valves and all flanged connections.

N. Contractor Options:
   1. Schedule 40 pipe with rolled grooves and victaulic fittings may be used for 2-1/2" and above.

2. Type “M" hard copper tubing with wrought copper solder fittings using bridget lead-free solder may be used for 2-1/2" and below at the Contractor's option for service pressure at or less than 150 psi.
3. Schedule 10 pipe with rolled grooves and victaulic fittings may be used for sizes 4" and above for closed loop systems only. Where Schedule 20 piping is used, the nominal pipe size shall chosen based on Schedule 40 pipe for the same design conditions.

O. Cold-springing: Cold-springing of piping will not be permitted.

P. Automatic Air Vents:
3. An automatic air vent shall be installed at the air separator and piped to the floor drain, at a minimum. All other system high points at other locations as required, shall be manually vented. Vents shall be designed to eliminate air from the system automatically and/or manually without permitting the passage of any water and shall be similar and approved equal to the following:
c. 150 psig working pressure service - Sarco Type 13W or approved equal.
d. 300 and 400 psig working pressure service - Sarco Type 13WH or approved equal.
4. Automatic air vents shall have a ¾” ips inlet connection and 3/8” outlet. Provide 3/8” OD hard drawn, Type “L” copper tubing from vent outlet for overflow in case of defective action. Copper tubing shall run to a suitable drain. Provide ¾” stop valve in vent line for servicing of automatic air vent.

## 3.4 CONDENSATE DRAINAGE

A. General: Provide a condensate drainpipe to connect each cooling unit drain pan or funnel and to extend to and discharge into an open type drain in the sanitary plumbing system. Funnel type floor drain requirements are to be coordinated with the Plumbing Contractor. Provide union or solder joint at connection to heat pumps.

B. Assembly: Use hard drawn Type “M” or DWV copper tubing with matching fittings, or Schedule 40, galvanized steel made up with Class 125, galvanized, threaded fittings. Assemble fittings to form a trap with depth equal to or greater than operating pressure of the unit served. Drains shall be of the size not less than the full size of the drain pan connection. Air handling unit drains shall have deep seal traps to permit unit pan drainage. The deep seal trap shall be installed for each blow-through or draw-through air handling unit to maintain the water seal.

## 3.5 CHEMICAL TREATMENT PIPING FOR OPEN & CLOSED LOOPS SYSTEMS

A. Chemical treatment piping systems shall be selected and installed based on the recommendations of the chemical treatment contractor. Refer to specification 23 25 00 for additional information.

B. Where a fluid cooler water treatment by-pass loop is installed, all valves utilized in increasing system pressure shall be marked to identify position.

C. Fluid cooler valves are not to be utilized to increase system pressure for the water treatment by-pass loop if the flow conditions to the fluid cooler cannot be maintained.

## 3.6 CLEANING, FLUSHING, TESTING, AND INSPECTING

A. Cleaning: Clean exterior surfaces of installed piping systems and prepare surface for application of any required coatings.

B. Flushing: Flush piping systems with clean water prior to performing any required tests. All piping system flushing is to be conducted in a manner not to adversely affect the performance of the equipment connected to the piping system.
   1. Flushing of Closed Loop Piping Systems:
      The supply and return run-outs must be disconnected from each heat pump and connected via a by-pass hose to allow circulation to the system, but not through the heat pump units. The system shall be chemically cleaned then flushed by opening the drain valve at the lowest point in the system. While the system is being drained, adequate make-up to the system will be provided to ensure the system remains full. With-in 24 hours after adequate and certification of system cleanliness by the chemical treatment contractor (refer to specification 15545 for additional requirements) the units shall be reconnected and an approved inhibitor shall be introduced to the loop.

C. Piping Tests:
   1. General: Blank off equipment during tests. Perform tests before piping is enclosed in walls, floors, partitions or in any other way concealed from view. Tests may be performed in sections. Tests shall be witnessed by the General Contractor and local inspectors and the test results presented to the Engineer for acceptance and approval prior to concealing piping from view. Provide all necessary equipment for testing, including pumps and gauges. Note: All test results are to be submitted to the Engineer as specified in Section 15995.
   2. Heating Open Loop Condenser, Closed Loop Condenser, and Cooling Water System: Test water systems hydrostatically to a pressure of 150 psig or 1-1/2 times working pressure, whichever is greater, for a period of 4 hours. Repair all leaks, replacing materials as necessary, and repeat tests until systems are proven tight.

D. Inspecting: Visually inspect each run of each system for completion of joints, adequate hangers, supports, and inclusion of accessories and appurtenances.

E. Chemical Treating: Refer to Section 23 25 00, "Water Treatment Systems", for additional requirements on flushing and cleaning of systems.

F. Identification: Refer to Section 23 05 53, “HVAC Equipment and Piping Identification” for nameplates and labeling requirements.

**END OF SECTION 232113**

# 232114
# VALVES

## PART 1 - GENERAL

### 1.1 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 23 01 00, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the valves associated with the piping systems. Comply with other Division 23 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the valves specified herein, as indicated on the drawings, and as required to provide complete and operating systems.

### 1.2 DESCRIPTION OF WORK

A. Work Included: Provide valves as specified and indicated.

### 1.3 QUALITY ASSURANCE

A. Acceptable Manufacturers: The model numbers listed in the Specifications establish a level of quality and material. The following manufacturers are acceptable, subject to compliance with the requirements of these Specifications.

1. General Valves: Jenkins Bros. Valves, Crane Company, Stockham Valves and Fittings, Walworth Company, Kennedy Valve, Kitz, Nibco, or approved equal
2. Ball Valves: Jenkins Bros. Valves, Jamesbury Corporation, Nibco, Stockham Valves and Fittings, Apollo, Kitz, approved equal.
3. Backflow Preventers: Watts Regulator Company, Febco, Hersey Products, Inc., Wilkins, or approved equal.
4. Refrigerant Valves: Mueller Brass Company, Henry Valve Company, Superior Valve Company, approved equal.
5. Check Valves: Jenkins Bros. Valves, Crane Company, Muesco, Inc., APCO/Valve & Primer Corporation, Williams-Hager, Clow Pipeline Products, Valve Division, Nibco, Crane, Stockham, Milwaukee, Kitz, or approved equal.
6. Butterfly Valves: Jenkins Bros. Valves, Jamesbury Corporation, Nibco, Stockham Valves and Fittings, Apollo, Keystone, Demco, Grinnell, Centerline, Kitz, or approved equal.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

A. General: All valves shall be similar to numbers listed. All similar type and size valves shall be products of one manufacturer.

B. Refrigerant Valves: Valves manufactured specifically for use in refrigerant systems shall be used in such systems.

C. Butterfly Valves: All butterfly valves shall be full tapped and threaded lug type, manufacturer certified for bubble-tight, dead end shut off from either direction at design working pressure and temperature. Valves 2 1/2 through 5" in size shall have lever type operators. Valves 6" and larger shall have enclosed, self-locking worm gear type operators, waterproof, and factory lubricated. Gear segment shall be manganese bronze or ductile iron with a steel or ductile iron worm and oil impregnated bronze bushings or worm shaft. Operator shall have built in adjustable mechanical stops and position indicators. Valves used for balancing shall be certified suitable for continuous throttling service.

D. Ball Valves: Valves shall be furnished with blowout-proof stems. Valves used for chilled water service shall be insulated as specified for the pipe in which the valve is installed. All ball valves shall be full-line size to prevent flow restriction through the ball.

E. Gate Valves: All bronze gate valves shall have packing boxes with adequate depth to allow space for sufficient amounts of stem packing. Malleable iron handwheels and gland followers shall be furnished on all bronze gate valves. All gate valves shall have non-asbestos stem packing suitable for pressure and service. OS&Y and IBBM gate valves shall be furnished with a stem lubrication fitting on all sizes. All gate valves shall be designed to permit repacking while the valve is in line.

## 2.2 VALVES

A. Valves located on primary water supply and return shall be offset butterfly type with metal seats.

B. Isolation Valves
   1. Provide shut-off valves for all services into laboratory spaces to allow for single lab to be isolated.
   2. Provide isolation of each independent item of equipment.
   3. Provide isolation at each branch takeoff.
   4. Provide isolation of each floor or section of a floor.
   5. Locate isolation valves outside the coil pull line to allow coil removal without disruption of hydronic service to other equipment and to keep piping disassembly to a minimum.

C. Valves for service at or less than 150 PSIG:

   1. Block (Stop) Valves: Ball valves 2" and smaller shall be red brass, cast bronze, or yellow forged bronze with brass, stainless steel, or bronze ball and stem, 150 psig non-shock WOG at 200°F, Jenkins Fig. No. 900T. Valves 2 1/2" and larger shall be butterfly type, 200 psig non-shock WOG at 200°F, ANSI Class 150 with ductile iron lug body. The replaceable resilient elastomer seat shall be Buna N or EPDM. The disc shall be silicon or aluminum bronze and shaft shall be No. 316 or No. 416 stainless steel. Secondary O ring seals shall be provided at the top and bottom of the upper and lower shafts to guarantee zero leakage to the shaft, Jenkins Fig. No. 232EL/EG or No. 632E.
   2. Balancing Valves: Valves shall comply with the general requirements specified for block valves. Valves used for balancing shall have adjustable memory stops or position indicators. Valves 2" and smaller shall be Jenkins Fig. No. 900TE. Valves 2 1/2" and larger shall be Jenkins Fig. No. 232EL.
   3. Gate Valves: As a general rule, gate valves shall not be used for sizes 2 1/2" and smaller. If necessary, with prior approval from the Construction Manager, valves 2-1/2” and smaller shall be Jenkins Fig. No. 47-U, 200 psig WOG bronze body with screwed bonnet and ends. Valves 3" and larger shall be Jenkins Fig. No. 651-A, 200 psig WOG.

4. Globe Valves: Valves 2" and smaller shall be Jenkins Fig. No. 546-P, bronze body, bronze rising stem, screw in bonnet, renewable seat, and screwed or solder ends. Valves 2 1/2" and larger shall be Jenkins Fig. No. 613, 200 psig WOG, outside screw and yoke (OS&Y), iron body, bronze-trimmed, renewable seat, Pressure Class 125, with ANSI B16.1 flanged ends.

D. Valves for Service Over 150 PSIG:

1. Block Stop Valves: Ball valves 2" and smaller shall be red brass cast bronze or yellow forged bronze with brass, stainless steel, or bronze ball and stem, 300 psig nonshock WOG at 200°F with Teflon packing and gaskets, Jenkins Fig. No. 900T. Valves 2 1/2" and larger shall be 300 psig nonshock WOG, with Class 300 ANSI B16.5 flanges, full tapped and threaded cast steel lug body. Valves shall have 300 pounds body drilling and shall be suitable for service indicated on the Plans. Disc shall be cast steel and the shaft shall be No. 416 stainless steel. Secondary O ring or gland seals at the top and bottom of the upper and lower shafts shall guarantee zero leakage to the shaft. Seals and backing rings shall be TFE or Viton. Seal retainer rings shall be No. 316 stainless steel, Dezurik No. 645.
2. Balancing Valves: Valves shall comply with the general requirements specified for block valves. Valves used for balancing shall have adjustable memory stops or position indicators.
3. Gate Valves: As a general rule, gate valves shall not be used for sizes 2 1/2" and smaller. If necessary, with prior approval from the Construction Manager, valves 2-1/2” and smaller shall be Jenkins Fig. No. 270-U, 300 pounds WOG, bronze body, rising stem, with screwed bonnet and screwed ends. Valves 3" through 12" shall be Jenkins Fig. No. 204, 500 pounds WOG, OS&Y valves with Class 250 ANSI B16.1 flanged ends, cast iron body and bronze trim.
4. Globe Valves: Valves 2" and smaller shall be Jenkins Fig. No. 556-P, 400 pounds WOG, bronze body and trim, rising stem, union bonnet, renewable seat, and screwed ends. Valves 2 1/2" through 8" shall be Jenkins Fig. No. 923, 500 pounds WOG, iron body, bronze trim rising stem, OS&Y Class 250 ANSI B16.1 flanged ends.

E. Check Valves: Chilled, hot, condenser, and domestic water pipes 2 1/2" and larger shall be Williams-Hager Fig. No. 375, spring-loaded, quiet type. Valve non-shock pressure temperature rating shall be as specified for piping in which it is installed. Valve shall be full-threaded, lug body, or flanged body. Valves 2" and smaller shall be Jenkins Fig. No. 92A. Threaded valves installed at pump discharge shall have its shaft perpendicular to the pump shaft. Valves located in pumped sewage pipes and in storm pipes shall be Crane No. 383 outside weight, 200 pounds WOG, iron body, bronze trimmed, with swing check design.

F. Valves for Water Make Up Connections: Valves 2" and smaller shall be Jenkins Fig. No. 900T. Valves 2 1/2" and larger shall be Jenkins Fig. No. 632B or No. 632E, butterfly valve operator furnished per Paragraph 2.01/C.

G. Relief Valve: Temperature and pressure, self-closing, lever operated with thermo-bulb extension, 3/4", ANSI B2.1 taper thread male inlet connection, 210°F (98.8°C) and 125 psig setting, ANSI Z1.22, Type No. 40XL Watts Regulator Company.

H. Combination Pressure Reducing and Relief Valve for Make up Water: Bell and Gossett Model Number 3, dual unit.

I. Reduced Pressure Backflow Preventer: Backflow preventer shall be Watts Regulator No. 909 Series, 2 1/2" and larger shall be provided with dual "Y" pattern spring-loaded check valves and independent relief valve located between checks. Backflow preventers shall

be rated for pressure up to 150 psig working pressure at 140°F (60°C) and sized according to the maximum design flow.

J. Domestic Water Pressure Reducing Valves: Watts 223S or Clayton 90G 01. Pressure and flow schedule as indicated on the Drawings.

K. Valves for Gas Connections: Valves 2" and smaller shall be Crane Fig. 254; valves 2 1/2 to 5" shall be Walworth Fig. 1797 F; and valves 6 to 12" shall be Walworth Fig. 1718 F.

## 2.3 FIRE PROTECTION VALVES

A. Check Valves: Valves 2" and smaller shall be threaded end Jenkins Fig. No. 92A. Valves 2 1/2" and larger shall be Jenkins Fig. No. 729 flanged, iron body, bronze mounted (IBBM) swing check, 175 psig WOG, with renewable composition disc and bronze seat ring, Underwriters' Laboratories, Inc. (UL) and/or Factory Mutual (FM) approved as required. Where ball drip is required, provide Jenkins Fig. No. 624 with Grinnell Fig. 1686 plain discharge.

B. OS&Y Valves: Valves 2" and smaller shall be Jenkins Fig. No. 275U, 175 psig WOG, threaded, all bronze, gate valve, UL approved. Valves 2 1/2" and larger shall be Jenkins Fig. No. 825A, 175 psig WOG, flanged, gate valve, IBBM, solid wedge, UL and FM approved. Provide OS&Y valves with tamper switches installed where indicated.

# PART 3 - EXECUTION

## 3.1 INSTALLATION

A. General: Except as otherwise indicated, comply with the following requirements.

B. Ball Valves: Provide ball valves on chilled water pipes at each runout to a piece of equipment, at each coil, and elsewhere as shown on the Drawings.

C. Valve Stems: Install valves with stems pointed up, in the vertical position where possible, but in no case with stems pointed downward from a horizontal plane.

D. Chain Operators: In central plant and in fan or mechanical rooms where chilled water and condenser water valves are installed over 8’ above floor, provide chain operators.

E. Swing Check Valves: Swing check valves shall be installed in horizontal piping only.

F. Unions and Companion Flanges: Provide unions or companion flanges where required to facilitate dismantling of valves and equipment.

G. Access Doors and Panels: Verify the location and quantity of access doors or panels required to provide full valve access.

**END OF SECTION 232114**

# 23 21 15
# HVAC BELOW GRADE SITE PIPING

## 1.0 GENERAL

### 1.1 SUMMARY

A. The General Provisions, Supplemental General Provisions and section 23 01 00 apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the HVAC exposed or below grade site piping systems. Comply with other Division 23 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the HVAC site piping systems specified herein, as indicated on the drawings, and as required to provide complete and operating systems.

### 1.2 DESCRIPTION OF WORK

A. Work Included: Provide complete operating mechanical piping systems including pipe, tube, fittings, and appurtenances as indicated and in compliance with these Specifications.

B. Applications: Applications of piping systems include, but are not limited to, the systems as listed below:

| System | Working Pressure | Operating Temperatures |
|---|---|---|
| Chilled Water | | |
| High | 350 psig | ***35*** to 100°F |
| Medium | 300 psig | ***35*** to 100°F |
| Low | 150 psig | ***35*** to 100°F |

### 1.3 QUALITY ASSURANCE

A. Welding: Qualify welding procedures, welders, and operators in accordance with ANSI B31.1, Paragraph 127.5, for shop and job site welding of piping work. Make welded joints on the piping system with continuous welds, without backing rings and with pipe ends beveled before welding. Gas cuts shall be true and free from burned metal. Before welding, surfaces shall be thoroughly cleaned. The piping shall be carefully aligned and no weld metal shall project inside the pipe.

## 2.0 PRODUCTS

### 2.1 PIPING / TUBING FITTINGS

A. General: Provide factory-fabricated fittings of type, materials, grade, class, and pressure rating indicated for each service and pipe size. Provide sizes and types matching pipe, tube, valve, and equipment connections. Where not otherwise indicated, comply with governing regulations, industry standards, and where applicable, with pipe manufacturer's instructions for selections.

1. Ductile Iron: AWWA C110, AWWA C153 or AWWA C111 *with restraint mechanical joints fittings* with gaskets. *No unrestrained joints shall be used.*

2. Wrought Steel Butt-welding Fittings: ANSI B16.9, *only long radius elbows shall be used.*

B. Miscellaneous Piping Materials/Products:

1. Welding Materials: Comply with ASME Boiler and Pressure Vessels Code, Section II, Part C, for welding materials.

2. Brazing Materials: American Welding Society, AWS A5.B, Classification BCup-5.

3. Gaskets for Flanged Joints: 1/8" thick gaskets. Ring-type shall be used between raised face flanges and full face-type between flat face flanges with punched bolt holes and pipe opening. Gaskets shall be Garlock Style 3400 compressed non-asbestos or equal.

## 2.3 BELOW GRADE AND EXPOSED PRE-INSULATED PIPE CONDUIT SYSTEM

A. General: Furnish a complete system of factory fabricated piping and fittings for the specified service.

B. Manufacturers: Basis of design is Thermocor. Other acceptable manufacturers include Energy Task Force, Perma-Pipe and Rovanco.

C. Service & Piping Materials:

1. Below Grade Chilled Water Piping – Class 350 cement lined Ductile Iron

2. Above Grade Exposed Chilled Water Piping 4” or under – Copper type “L”

D. Insulation: polyurethane foam or injected into the annular space between carrier pipe and jacket and bonded to both. Insulation shall be rigid, closed cell polyurethane with 2.0 to 3.0 pounds per cubic foot density and coefficient of thermal conductivity (K-Factor) not to exceed 0.16 and shall conform to ASTM C-591. Insulation thickness shall be determined by carrier pipe length and shall not be less than 1.5”.

E. Jacketing: High density polyethylene(HDPE) casing Type III, category 5, class C, conforming to ASTM D-1248 for all pipe sizes. Provide UV protection on jacket for any piping that is directly exposed to sunlight.

F. End Seals: Provide high temperature black mastic end seal on each end of each length of pre-insulated pipe. End seals shall be factory applied, sealed to jacket and pipe with pressure test certification. Provide extra mastic end seal material during installation for field cut pipe. At no time during installation should insulation be directly exposed Straight run joints shall be field insulated to match the system, covered with a HDPE sleeve and sealed with heat shrink tape per manufacturer’s recommendations. All material shall be furnished by the preinsulated pipe manufacturer.to elements.

G. Provide all necessary expansion loops, expansion elbows, anchors, wall sleeves and all necessary accessories for field assembly and insulation of fittings and straight joints.

H. Any piping that is exposed above grade provide integral electrically heated heat trace freeze protection. Heat trace system shall be by piping manufacturer with integral controllers. Coordinate electrical connection for heat trace with electrical contractor.

I. Any exposed piping exposed to sunlight shall have UV coating.

## 3.0 EXECUTION

### 3.1 CLEANING, FLUSHING, TESTING, AND INSPECTING

A. Cleaning: Clean exterior surfaces of installed piping systems and prepare surface for application of any required coatings.

B. Flushing: Flush piping systems with clean water prior to performing any required tests. All piping system flushing is to be conducted in a manner not to adversely affect the performance of the equipment connected to the piping system.

1. Flushing of Closed Loop Piping Systems:
   The supply and return run-outs must be disconnected from each heat pump and connected via a by-pass hose to allow circulation to the system, but not through the heat pump units. The system shall be chemically cleaned then flushed by opening the drain valve at the lowest point in the system. While the system is being drained, adequate make-up to the system will be provided to ensure the system remains full. With-in 24 hours after adequate and certification of system cleanliness by the chemical treatment contractor (refer to specification 15545 for additional requirements) the units shall be reconnected and an approved inhibitor shall be introduced to the loop.

C. Piping Tests:

1. General: Blank off equipment during tests. Perform tests before piping is enclosed in walls, floors, partitions or in any other way concealed from view. Tests may be performed in sections. Tests shall be witnessed by the General Contractor and local inspectors and the test results presented to the Engineer for acceptance and approval prior to concealing piping from view. Provide all necessary equipment for testing, including pumps and gauges. Note: All test results are to be submitted to the Engineer as specified in Section 15995.
2. Heating Open Loop Condenser, Closed Loop Condenser, and Cooling Water System: Test water systems hydrostatically to a pressure of 150 psig or 1-1/2 times working pressure, whichever is greater, for a period of 4 hours. Repair all leaks, replacing materials as necessary, and repeat tests until systems are proven tight.

D. Inspecting: Visually inspect each run of each system for completion of joints, adequate hangers, supports, and inclusion of accessories and appurtenances.

E. Chemical Treating: Refer to Section 23 25 00, "Water Treatment Systems", for additional requirements on flushing and cleaning of systems.

F. Identification: Refer to Section 23 05 53, “HVAC Equipment and Piping Identification” for nameplates and labeling requirements.

**END OF SECTION**

# SECTION 232116 - HYDRONIC PIPING SPECIALTIES

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

A. Section includes special-duty valves and specialties for the following:

1. Hot-water heating piping.
2. Chilled-water piping.
3. Dual-temperature heating and cooling water piping.
4. Condenser-water piping.
5. Glycol cooling-water piping.
6. Makeup-water piping.
7. Condensate-drain piping.
8. Blowdown-drain piping.
9. Air-vent piping.
10. Safety-valve-inlet and -outlet piping.

### 1.3 ACTION SUBMITTALS

A. Product Data: For each type of the following:

1. Valves: Include flow and pressure drop curves based on manufacturer's testing for calibrated-orifice balancing valves and automatic flow-control valves.
2. Air-control devices.
3. Hydronic specialties.

### 1.4 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For air-control devices, hydronic specialties, and special-duty valves to include in emergency, operation, and maintenance manuals.

### 1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Differential Pressure Meter: For each type of balancing valve and automatic flow control valve, include flowmeter, probes, hoses, flow charts, and carrying case.

### 1.6 QUALITY ASSURANCE

A. Pipe Welding: Qualify procedures and operators according to ASME Boiler and Pressure Vessel Code: Section IX.

1. Safety valves and pressure vessels shall bear the appropriate ASME label. Fabricate and stamp air separators and expansion tanks to comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.

B. Comply with FM Global requirements for pressure vessels and piping and for pressure relief devices.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

A. Hydronic piping components and installation shall be capable of withstanding the following minimum working pressure and temperature unless otherwise indicated:

1. Hot-Water Heating Piping: 150 psig at 200 deg F.
2. Chilled-Water Piping: 150 psig at 200 deg F.
3. Dual-Temperature Heating and Cooling Water Piping: 150 psig at 200 deg F.
4. Condenser-Water Piping: 150 psig at 150 deg F.
5. Glycol Cooling-Water Piping: 150 psig at 150 deg F.
6. Makeup-Water Piping: 150 psig at 150 deg F.
7. Condensate-Drain Piping: 180 deg F.
8. Blowdown-Drain Piping: 180 deg.
9. Air-Vent Piping: 180 deg F.
10. Safety-Valve-Inlet and -Outlet Piping: Equal to the pressure of the piping system to which it is attached.

### 2.2 VALVES

A. Bronze, Calibrated-Orifice, Balancing Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Armstrong Pumps, Inc.
    b. Bell & Gossett; a Xylem brand.
    c. Flow Design, Inc.
    d. Gerand Engineering Co.
    e. Griswold Controls.
    f. HCI; Hydronics Components Inc.
    g. Nexus Valve, Inc.
    h. Taco.
    i. Tour & Andersson; available through Victaulic Company.
    j. Victaulic Company.

2. Body: Bronze, ball or plug type with calibrated orifice or venturi.
3. Ball: Brass or stainless steel.
4. Plug: Resin.
5. Seat: PTFE.
6. End Connections: Threaded or socket.
7. Pressure Gage Connections: Integral seals for portable differential pressure meter.
8. Handle Style: Lever, with memory stop to retain set position.
9. CWP Rating: Minimum 125 psig.

10. Maximum Operating Temperature: 250 deg F.

B. Cast-Iron or Steel, Calibrated-Orifice, Balancing Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. Armstrong Pumps, Inc.
    b. Bell & Gossett; a Xylem brand.
    c. Flow Design, Inc.
    d. Gerand Engineering Co.
    e. Griswold Controls.
    f. HCI; Hydronics Components Inc.
    g. Nexus Valve, Inc.
    h. Taco.
    i. Tour & Andersson; available through Victaulic Company.
    j. Victaulic Company.

2. Body: Cast-iron or steel body, ball, plug, or globe pattern with calibrated orifice or venturi.
3. Ball: Brass or stainless steel.
4. Stem Seals: EPDM O-rings.
5. Disc: Glass and carbon-filled PTFE.
6. Seat: PTFE.
7. End Connections: Flanged or grooved.
8. Pressure Gage Connections: Integral seals for portable differential pressure meter.
9. Handle Style: Lever, with memory stop to retain set position.
10. CWP Rating: Minimum 125 psig.
11. Maximum Operating Temperature: 250 deg F.

C. Diaphragm-Operated, Pressure-Reducing Valves:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Apollo, Conbraco Industries, Inc.; 35 Series, or comparable product by one of the following:

    a. Watts; a Watts Water Technologies company.
    b. Zurn Industries, LLC.

2. Body: Bronze or brass.
3. Disc: Glass and carbon-filled PTFE or Silicone Elastomer.
4. Seat: Brass.
5. Stem Seals: EPDM O-rings.
6. Diaphragm: EPT or Nitrile.
7. Low inlet-pressure check valve.
8. Inlet Strainer: Installed directly upstream.
9. Valve Seat and Stem: Noncorrosive.
10. Valve Size, Capacity, and Operating Pressure: Selected to suit system in which installed, with operating pressure and capacity factory set and field adjustable.

D. Diaphragm-Operated Safety Valves: ASME labeled.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Apollo, Conbraco Industries, Inc.; 10-600 Series, or comparable product by one of the following:

    a. Bell & Gossett; a Xylem brand.
    b. Watts; a Watts Water Technologies company.

2. Body: Bronze or brass.
3. Disc: Glass and carbon-filled PTFE or Silicone Elastomer.
4. Seat: Brass.
5. Stem Seals: EPDM O-rings.
6. Diaphragm: EPT.
7. Wetted, Internal Work Parts: Brass and rubber.
8. Valve Seat and Stem: Noncorrosive.
9. Valve Size, Capacity, and Operating Pressure: Comply with ASME Boiler and Pressure Vessel Code: Section IV, and selected to suit system in which installed, with operating pressure and capacity factory set and sealed.

E. Safety Valves: ASME labeled.

1. Basis-of-Design Product: Subject to compliance with requirements, provide Apollo, Conbraco Industries, Inc.; 18C Series, or comparable product by one of the following:

   a. Bell & Gossett; a Xylem brand.
   b. Watts; a Watts Water Technologies company.

2. Body: Bronze or brass.
3. Disc: Glass and carbon-filled PTFE.
4. Seat: Brass.
5. Stem Seals: EPDM O-rings.
6. Wetted, Internal Work Parts: Brass and rubber.
7. Valve Seat and Stem: Noncorrosive.
8. Valve Size, Capacity, and Operating Pressure: Comply with ASME Boiler and Pressure Vessel Code: Section IV, and selected to suit system in which installed, with operating pressure and capacity factory set.

F. Automatic Flow-Control Valves:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Flow Design, Inc.
   b. Griswold Controls.
   c. HCI; Hydronics Components Inc.
   d. Nexus Valve, Inc.

2. Body: Brass or ferrous metal.
3. Piston and Spring Assembly: Stainless steel, tamper proof, self-cleaning, and removable.
4. Combination Assemblies: Include bronze or brass-alloy ball valve.
5. Identification Tag: Marked with zone identification, valve number, and flow rate.
6. Size: Same as pipe in which installed.
7. Performance: Maintain constant flow, plus or minus 5 percent over system pressure fluctuations.
8. Minimum CWP Rating: 300 psig.
9. Maximum Operating Temperature: 250 deg F.

## 2.3 AIR-CONTROL DEVICES

A. Manual Air Vents:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Apollo, Conbraco Industries, Inc.; 27-202 Series, or comparable product by one of the following:

    a. Taco, Inc.
    b. Watts; a Watts Water Technologies company.

2. Body: Bronze.
3. Internal Parts: Nonferrous.
4. Operator: Screwdriver or thumbscrew.
5. Inlet Connection: NPS 1/8.
6. Discharge Connection: NPS 1/8.
7. CWP Rating: 150 psig.
8. Maximum Operating Temperature: 225 deg F.

B. Automatic Air Vents:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. AMTROL, Inc.
    b. Armstrong Pumps, Inc.
    c. Bell & Gossett; a Xylem brand.
    d. Nexus Valve, Inc.
    e. Spirotherm, Inc.
    f. Taco, Inc.

2. Body: Bronze or cast iron.
3. Internal Parts: Nonferrous.
4. Operator: Noncorrosive metal float.
5. Inlet Connection: NPS 1/2.
6. Discharge Connection: NPS 1/4.
7. CWP Rating: 150 psig.
8. Maximum Operating Temperature: 240 deg F.

C. Full Bladder Expansion Tanks:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. AMTROL, Inc.
    b. Bell & Gossett; a Xylem brand.
    c. Taco, Inc.

2. Tank: Welded steel, rated for 150-psig working pressure and 375 deg F maximum operating temperature, with taps in bottom of tank for tank fitting and taps in end of tank for gage glass. Tanks shall be factory tested after taps are fabricated and shall be labeled according to ASME Boiler and Pressure Vessel Code: Section VIII, Division 1.
3. Air-Control Tank Fitting: Cast-iron body, copper-plated tube, brass vent tube plug, and stainless-steel ball check, 100-gal. unit only; sized for compression-tank diameter. Provide tank fittings for 150-psig working pressure and 250 deg F maximum operating temperature.
4. Bladder: Butyl rubber, shall accept the full volume of the expansion tank. Removable and replaceable.

5. Tank Drain Fitting: Brass body, nonferrous internal parts; 125-psig working pressure and 240 deg F maximum operating temperature; constructed to admit air to compression tank, drain water, and close off system.
6. Gage Glass: Full height with dual manual shutoff valves, 3/4-inch diameter gage glass, and slotted-metal glass guard.

D. Diaphragm Expansion Tanks:

1. Basis-of-Design Product: Subject to compliance with requirements, provide Apollo, Conbraco Industries, Inc.; 16-XT Series, or comparable products by one of the following:

    a. Taco, Inc.
    b. Watts Water; a Watts Water Technologies company.
    c. Amtrol

2. Tank: Welded steel, rated for 100-psig working pressure and 240 deg F maximum operating temperature. Factory test after taps are fabricated and supports installed.
3. Diaphragm: Securely sealed into tank to separate air charge from system water to maintain required expansion capacity.
4. Air-Charge Fittings: Schrader valve, stainless steel with EPDM seats.
5. Connection Material: Stainless Steel.
6. Connection Size: NPS 1/2.

E. Air and Dirt Separators:
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
    a. Taco, Inc 4900
    b. Spirotherm
    c. Flamco

2. Tank: Welded steel; ASME constructed and labeled for 125-psig minimum working pressure and 270 deg F maximum operating temperature.
3. Air Removal Device: Brass conical shaped air venting chamber. Air vent shall be able to be closed to allow for flushing.
4. Dirt Removal Device: Pall rings or similar, stainless steel.
5. Flushing Cock: Brass, located on side of each separator.
6. Inlet and Outlet Connections: Threaded for NPS 3 and smaller; flanged connections for NPS 2-1/2 and larger.
7. Blowdown Connection: Threaded.
8. Size: Match system flow capacity.
9. Removable Cover: Flanged bolted cover to allow for inspection and cleaning.
10. Performance: The air and dirt separator shall remove air down to 18 microns and shall remove dirt/debris down to 35 microns. The unit shall be 100% efficient at removing dirt down to 90 microns in 100 passes or less. Provide engineer with third party independent test data certifying performance.

F. Tangential-Type Air Separators:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

    a. AMTROL, Inc.
    b. Armstrong Pumps, Inc.
    c. Bell & Gossett; a Xylem brand.
    d. Taco, Inc.

2. Tank: Welded steel; ASME constructed and labeled for 125-psig minimum working pressure and 375 deg F maximum operating temperature.
3. Air Collector Tube: Perforated stainless steel, constructed to direct released air into expansion tank.
4. Tangential Inlet and Outlet Connections: Threaded for NPS 2 and smaller; flanged connections for NPS 2-1/2 and larger.
5. Blowdown Connection: Threaded.
6. Size: Match system flow capacity.

G. In-Line Air Separators:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. AMTROL, Inc.
   b. Armstrong Products, Inc.
   c. Bell & Gossett; a Xylem brand.
   d. Taco, Inc.

2. Tank: One-piece cast iron with an integral weir constructed to decelerate system flow to maximize air separation.
3. Maximum Working Pressure: Up to 175 psig.
4. Maximum Operating Temperature: Up to 300 deg F.

H. Air Purgers:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. AMTROL, Inc.
   b. Armstrong Pumps, Inc.
   c. Bell & Gossett; a Xylem brand.
   d. Taco, Inc.

2. Body: Cast iron with internal baffles that slow the water velocity to separate the air from solution and divert it to the vent for quick removal.
3. Maximum Working Pressure: 150 psig.
4. Maximum Operating Temperature: 250 deg F.

## 2.4 HYDRONIC PIPING SPECIALTIES

A. Strainers:

1. Bronze, Y-Pattern Strainers:

   a. Basis-of-Design Product: Subject to compliance with requirements, provide Apollo, Conbraco Industries, Inc.; 59 Series (threaded connections), or comparable product by one of the following:

      1) Mueller
      2) Nibco
      3) Keckley
      4) Watts.

b. Body: ASTM B 584, cast bronze with bottom drain connection.
c. End Connections: Threaded, solder, or press ends for strainers NPS 4 and smaller.
d. Strainer Screen: Stainless-steel, 50-mesh strainer, or perforated stainless-steel basket.
e. Tapped blowoff plug with optional blowout ball valve.
f. CWP Rating for Threaded and Solder Connections: 400 psig cold working pressure.
g. SWP Rating for Threaded Connections: 125 psig working steam pressure.
h. CWP Rating for Press Connections: 250 psig.
i. SWP Rating for Press Connections: 15 psig.

2. Cast-Iron, Y-Pattern Strainers:

a. Basis-of-Design Product: Subject to compliance with requirements, provide Apollo International, Conbraco Industries, Inc.; YCF Series, or comparable product by one of the following:

1) Mueller
2) Nibco
3) Keckley
4) Watts.

b. Body: ASTM A 126, Class B, cast iron with bolted cover and bottom drain connection.
c. End Connections: Threaded ends for NPS 2 and smaller; flanged ends for NPS 2-1/2 and larger.
d. Strainer Screen: Stainless-steel, 40-mesh strainer, or perforated stainless-steel basket.
e. CWP Rating: 125 psig.

3. Basket Strainers:

a. Body: ASTM A 126, Class B, high-tensile cast iron with bolted cover and bottom drain connection.
b. End Connections: Threaded ends for NPS 2 and smaller; flanged ends for NPS 2-1/2 and larger.
c. Strainer Screen: 60-mesh startup strainer and perforated stainless-steel basket with 50 percent free area.
d. CWP Rating: 125 psig.

B. Stainless-Steel Bellow, Flexible Connectors:

1. Body: Stainless-steel bellows with woven, flexible, bronze, wire-reinforcing protective jacket.
2. End Connections: Threaded or flanged to match equipment connected.
3. Performance: Capable of 3/4-inch misalignment.
4. CWP Rating: 150 psig.
5. Maximum Operating Temperature: 250 deg F.

C. Spherical, Rubber, Flexible Connectors:

1. Body: Fiber-reinforced rubber body.
2. End Connections: Steel flanges drilled to align with Classes 150 and 300 steel flanges.
3. Performance: Capable of misalignment.

4. CWP Rating: 150 psig.
5. Maximum Operating Temperature: 250 deg F.

D. Expansion Fittings: Comply with requirements in Section 230516 "Expansion Fittings and Loops for HVAC Piping."Section 15124 "Expansion Fittings and Loops for HVAC Piping."

## PART 3 - EXECUTION

### 3.1 VALVE APPLICATIONS

A. Install shutoff-duty valves at each branch connection to supply mains and at supply connection to each piece of equipment.

B. Install calibrated-orifice, balancing valves at each branch connection to return main.

C. Install calibrated-orifice, balancing valves in the return pipe of each heating or cooling terminal unless a pressure independent control valve is utilized.

D. Install check valves at each pump discharge and elsewhere as required to control flow direction.

E. Install safety valves at hot-water generators and elsewhere as required by ASME Boiler and Pressure Vessel Code. Install drip-pan elbow on safety-valve outlet and pipe without valves to the outdoors; pipe drain to nearest floor drain or as indicated on Drawings. Comply with ASME Boiler and Pressure Vessel Code: Section VIII, Division 1, for installation requirements.

F. Install drip-pan elbow for steam discharge on safety-valve outlet and pipe without valves to the outdoors; pipe drain to nearest floor drain or as indicated on Drawings. Comply with ASME Boiler and Pressure Vessel Code: Section IV or Section VIII – Div. I, as applicable. DPE is not intended for hot water-steam only.

G. Install pressure-reducing valves at makeup-water connection to regulate system fill pressure.

H. Install pressure-reducing valves with backflow preventer at makeup-water connection to regulate system fill pressure of make-up water, for hot water heating boilers and protect water supply lines from back siphonage or back pressure.

### 3.2 HYDRONIC SPECIALTIES INSTALLATION

A. Install manual air vents at high points in piping, at heat-transfer coils, and elsewhere as required for system air venting.

B. Install automatic air vents at high points of system piping in mechanical equipment rooms only. Install manual vents at heat-transfer coils and elsewhere as required for air venting.

C. Install piping from boiler air outlet, air separator, or air purger to expansion tank with a 2 percent upward slope toward tank.

D. Install tangential air separator in pump suction. Install blowdown piping with gate or full-port ball valve; extend full size to nearest floor drain.

E. Install expansion tanks above the air separator. Install tank fitting in tank bottom and charge tank. Use manual vent for initial fill to establish proper water level in tank.

1. Install tank fittings that are shipped loose.
2. Support tank from floor or structure above with sufficient strength to carry weight of tank, piping connections, fittings, plus tank full of water. Do not overload building components and structural members.

F. Install expansion tanks on the floor. Vent and purge air from hydronic system and ensure that tank is properly charged with air to suit system Project requirements.

**END OF SECTION 232116**

# 23 25 00

# WATER TREATMENT SYSTEMS

## PART 1 - GENERAL

### 1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 23 01 00, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the water treatment systems. Comply with other Division 23 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the water treatment system specified herein, as indicated on the drawings, and as required to provide complete and operating systems.

### 1.02 DESCRIPTION OF WORK

A. Work Included: Perform water analysis and provide water treatment products, holding reservoirs, equipment, and labor for testing, cleaning, flushing, and dispensing products to control water quality for each system.

B. Chemicals: Provide, at no change in Contract amount, chemicals required for operating and testing water treatment systems prior to acceptance by the Owner. In addition to the chemicals provided during construction, provide spare chemicals that the Owner can use that will last for a 90 day period. The 90 day period will begin after final acceptance of the system by the Engineer. Final acceptance will be established during the Commissioning walk through of the system conducted by the Engineer with the installing Contractor.

C. Instructions: Provide operation and maintenance instructions for each water treatment system; include one set in each Owner's Manual and deliver one set to Owner's operating personnel.

D. Testing Equipment and Reagents: Furnish suitable water treatment testing equipment for each system, complete with apparatus and reagents necessary for operation by the Owner.

E. Service Representative: Furnish the services of a qualified service representative to instruct Owner's operating personnel in proper operation and maintenance of water treatment equipment, systems, and tests required. Service representative shall return to the site biweekly during first month of operation. At such times, the service representative shall check and adjust water treatment system operation, check efficiency of chemicals and chemical applications, and instruct and advise operating personnel.

F. Replacement and Rework: Replace defective or nonconforming materials and equipment with new materials and equipment, at no change in Contract amount, for one year after successful start up of the system. All warranty work shall be FOB as installed at the project site.

### 1.03 QUALITY ASSURANCE

A. Qualifications: To perform work under this Section, the Contractor shall have regional laboratories capable of making water analysis and a service department with qualified service representatives.

B. Packaging and Labeling: Supply water treatment chemicals in metal drums, fiber drums with plastic liners, or plastic drums as best suited to the materials. Paper bags or unlined cardboard cartons will not be acceptable. All chemicals used in domestic water systems, and biocides, regardless of where used, shall be registered with the US Department of Agriculture (USDA) or the US Environmental Protection Agency (EPA) and labeled as required by law.

C. Electrical Standards: Provide electrical products which have been tested, listed, and labeled by Underwriters' Laboratories, Inc. (UL) and comply with National Electrical Manufacturers' Association (NEMA) standards.

D. Chemical Standards: Provide chemical products acceptable under state and local pollution control or other governing regulations.

**1.04 SUBMITTALS**

A. Test Reports: Submit test reports certified by an officer of the firm, on water treatment company letterheads, of samples of each treated water system specified. Comply with “Standard Methods” for reporting.

B. Shop Drawings: Submit Show Drawings for each water treatment system. Show wiring, piping and tubing sizes, fittings, accessories, valves, and connections.

C. Guarantee: Submit written guarantee, signed by the manufacturer or their representative and countersigned by the installer and Contractor, agreeing to adjust or replace the system or portions thereof, as required to achieve the required performance, during a one year period following the final start up for continued operation of the tower.

D. Provide a water treatment program outline specific for the water at the building showing operating limits. This should include the maximum cycles of concentration, conductivity ranges, total hardness, calcium hardness, and total alkalinity limits, and chemical level ranges.

**PART 2 - PRODUCTS**

**2.01 GENERAL**

A. Water Analysis: Determine which chemicals to use from the results of a water sample analysis taken from the building site by the system manufacturer. Provide ingredients necessary to achieve the desired water conditions. Outline the program on a submittal sheet.

B. Pre-treatment: Treat each closed loop with chemicals to remove and permit flushing of mill scale, oil, grease, and other foreign matter. Chemicals shall be non-corrosive, non-toxic, compatible with the final treatment chemicals, and compatible with all system components. Provide a letter to the Construction Manager indicating the pretreatment of the closed loop system has been completed and the water composition is acceptable. This letter is to be provided before the system is put into operation.

C. Cooling Tower Blow-down: Blow-down piping from the cooling tower shall be piped to the sanitary plumbing system.

D. Governing Laws: Verify that products, waste, blow-down, and other effluents do not violate local, state, EPA, or other agency regulations in effect in the project area.

## 2.02 CLOSED LOOP SYSTEMS

A. Chemicals: Provide water treatment products that contain inhibitors that perform the following:
1. Form a protective film to prevent corrosion and scale formation.
2. Remain stable throughout operating temperature range.
3. Are compatible with pump seals and other elements in the system.
4. The inhibitor shall be a boron nitrate corrosion inhibitor compound.

B. Equipment: For each system, provide a 5-gallon pot-type feeder constructed of materials that are impervious to the products dispensed. Feeder shall be designed for not less than 200 psig operating pressure.

C. Test Kit: Provide test kit, including a hand-held TDS meter (Myron L M-5 or approved equal), and reagents for determining proper water conditions.

## 2.03 OPEN LOOP SYSTEMS

A. General: Provide a microprocessor based controller system with three metering pumps for use in a cooling tower water treatment system and designed to monitor and/or control:
1. Total dissolved solids (TDS).
2. System blow-down, piped to sanitary plumbing system.
3. Scale and corrosion control chemicals
4. Deduct meter(s) for make-up water, Biological control chemicals

B. Program: Use a non-acid based approach including a scale and corrosion inhibitor, and two biocide products designed to prevent system immunities.

C. Equipment:
1. Chemical Solution Reservoirs: Shipping containers shall have protective linings impervious to the products held and dispensed.
2. Pump:
   a. Variable output diaphragm-type, with capacity to inject the quantity of solution required.
   b. Minimum discharge working pressure of 100 psig.
   c. Pump liquid end shall be compatible with the liquids to be pumped.
   d. Pump shall be suitable for 120 volt use.
3. Control Panel: Provide a Pulsatrol Model MCT 210-B-C-F-S2 control panel (or approved equal) consisting of the following:
   a. Nema 4 cabinet with a windowed, lockable viewing window.
   b. An external modular mounted flow switch assembly with integral sample port. The switch shall disable the control outputs if water flow is less than one gpm. The assembly shall contain the conductivity electrode.
   c. A front keyboard shall be fully programmable for all controller functions.

d. A real time clock.
e. Capability of operating over an average input voltage of 90-250 VAC at 50/60 Hz, ambient temperature rating of 0-115 F (-17.8 – 48.1 C) and at 100% humidity.
f. A permanent capacitor for power back-up to maintain clock and memory for up to 1000 hours during a power loss.
g. Front panel access to HOA switches for each pump and the blow-down valve.
h. A Programmable Hi/Lo alarm indicator with programmable set points.
i. Programmable scales of 0-500, 0-2000, 0-5000, and 0-10,000 micro ohms/cm.
j. Programmable inhibitor feed mode selector including a percentage timer, limit timer, water meter activated pulse timer, and a post-bleed percent timer.
k. A 28 day dual biocide timer with programmable bleed lock-out and pre-bleed capabilities.

4. Bleed Valve or Bleed-off Assembly: Provide bleed valve as follows:
   a. Normally closed, brass solenoid valve, or motorized butterfly valve rated to operate at system pressure and impervious to system products.
   b. Strainer: Provide a cast iron bodied strainer, with stainless steel strainer element immediately upstream of the bleed valve, rated to operate at system pressure.
   c. Where the fluid cooler water treatment by-pass is applied, a minimum of three gallons per minute is to be achieved at the cooling tower return of the by-pass loop when the full bleed is activated.
5. Water Meter: Provide a water meter with contacting head for use as a deduct meter as well as for water meter activated chemical feed.

## PART 3 - EXECUTION

### 3.01 PIPING SYSTEM PREPARATION

A. General: After piping systems are erected and proven free of leaks, and prior to equipment operation, administer chemicals required for preparation treatment and flushing. Apply chemicals for the time period and in the concentration recommended by the water treatment manufacturer for this portion of the Work.

B. Underground bypass piping shall not be less than 1-1/2” in diameter. The direct burial of steel pipe or type M or L Copper is not permitted.

C. Testing: Perform test procedures and submit a written report of test conditions and results to the Engineer. If test results are unsatisfactory, repeat preparation treatment as necessary to achieve test results approved by the Owner's insurance carrier and the Engineer.

### 3.02 FLUSHING

A. General: Drain preparation products from systems. Flush with clean water until system tests prove systems are free of preparation products and other contaminants prior to administering system water treatment as specified.

B. Refer to specification section 15100 HVAC Piping for additional flushing requirements.

**3.03 OPEN LOOP SYSTEM**

A. Treatment: Treat initial water charge to condenser cooling water system, after system has been flushed and prepped, to achieve water quality as specified.

B. Start-up Procedures: During cooling tower water system start-up, operate water treating system (after charging with specified chemicals) to maintain the required steady-state characteristics of cooling water. Demonstrate system operation to Owner's operating personnel.

C. Reports: Prepare certified test report for each required water performance characteristic. Comply with “Standard Methods” Testing.

**3.04 PERSONNEL TRAINING**

A. Operator Training: Train Owner's personnel in use and operation of heating water, chilled water and condenser water treating systems, including preparation of chemical solution, if applicable, and charging of the chemical solution reservoir. A Program Administration Manual shall be furnished encompassing all systems covered in this Section of the Specifications.

**END OF SECTION 23 25 00**

23 30 00

# DUCTWORK

## PART 1 - GENERAL

### 1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 23 01 00, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the duct systems. Comply with other Division 23 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the duct systems specified herein, as indicated on the drawings, and as required to provide complete and operating systems.

### 1.02 DESCRIPTION OF WORK

A. Work Included:
1. Provide sheet metal ductwork as specified herein.

B. Types: The types of ductwork specified in this Section include, but are not necessarily limited to the following:
1. Air conditioning cooling and/or heating supply and return air systems
2. Outdoor air supply systems
3. Mechanical exhaust systems
4. Air relief systems

C. VAV Supply Air Ductwork Upstream of Terminal Units (round or flat oval): Ductwork shall be sheet metal designed for velocities up to 2,800 fpm. The ductwork shall meet the latest SMACNA Standards for construction and stiffening based on the maximum pressure in the ductwork. Ductwork shall be 3” W.C. pressure class.

D. VAV Supply Air Ductwork Upstream of Terminal Units (rectangular): Ductwork shall be sheet metal designed for velocities up to 2,300 fpm. The ductwork shall meet the latest SMACNA Standards for construction and stiffening based on the maximum pressure in the ductwork. Ductwork shall be 3” W.C. pressure class.

E. Supply Air Ductwork Downstream of Terminal Units: Ductwork shall be sheet metal ductwork designed for velocities up to 1,500 fpm or a friction rate of 0.10 inches water column per 100 feet of duct, whichever is most stringent. The ductwork shall meet the latest SMACNA Standards for construction and stiffening based on the maximum pressure in the ductwork. Ductwork shall be 1” W.C. pressure class.

F. Outside Air Ductwork (fan forced): Ductwork shall be sheet metal ductwork designed for velocities up to 2,500 fpm. The ductwork shall meet the latest SMACNA Standards for

construction and stiffening based on the maximum pressure in the ductwork. Ductwork shall be 1" W.C. pressure class.

G. Outside Air Ductwork (passive): Ductwork shall be sheet metal ductwork designed for velocities up to 1,000 fpm. The ductwork shall meet the latest SMACNA Standards for construction and stiffening based on the maximum pressure in the ductwork.

I. Restroom and General Exhaust Ductwork: Ductwork shall be sheet metal ductwork designed for velocities up to 1,500 fpm. The ductwork shall meet the latest SMACNA Standards for construction and stiffening based on the maximum pressure in the ductwork. Ductwork shall be 1" W.C. pressure class.

J. Relief Air Ductwork: Ductwork shall be sheet metal ductwork designed for velocities up to 3,000 fpm. The ductwork shall meet the latest SMACNA Standards for construction and stiffening based on the maximum pressure in the ductwork. Ductwork shall be rated for the temperature ranges of the fire as required by the local authority having jurisdiction.

K. Flexible Ductwork: Ductwork connections to HVAC terminal units and air devices shall be made with flexible ductwork connection where shown on the Drawings. Additional connections may be made using flexible ductwork at the Contractors opinion, where approved in writing, in advance, by the Engineer. Insulated value of Flexible duct shall be R-6 or greater.

L. Ductwork Insulation: Refer to section 23 07 00, "HVAC Insulation", for duct insulation.

M. Ductwork Accessories: Refer to Section 23 33 00, "Ductwork Accessories", for accessories and specialties related to ductwork systems and installation.

1.03 QUALITY ASSURANCE

A. Design and Installation Standards:
1. SMACNA HVAC Duct Construction Standards, latest edition.
2. ASHRAE Standards: Comply with American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE 70-72) , Method of Testing for Rating the air flow performance of outlets and inlets.
3. ADC Standard 1062R2, Air Diffusing Equipment Test Code.
4. AMCA Standard 210, Test Code for Air Moving Devices.
5. NFPA 90-A, Standard for the Installation of Air Conditioning and Ventilating Systems, 2002 edition.

B. Fire and Smoke Rating Test Standards: ASTM E84, NFPA 255 and UL 723.

1.04 SUBMITTALS

A. Shop Drawings: Submit dimensioned layouts of ductwork showing both the accurately scaled ductwork and its relation to space enclosure. Show modifications of indicated requirements, made to conform to local shop practice and how those modifications ensure that the free area, materials, and weights are not reduced. The shop drawings must be submitted at ¼" = 1'-0" or larger scale and shall include all equipment connected to the duct systems, drawn to scale, based on the equipment submittals. All ductwork and

equipment must indicate bottom elevations, referenced to finished floor below (bottom of duct = X'-Y" AFF, e.g.)

PART 2 - PRODUCTS

2.01 DUCTWORK MATERIALS

A. Exposed Ductwork Materials: Where ductwork is indicated to be exposed to view in occupied spaces, provide materials which are free from visual imperfections including pitting, seam marks, roller marks, oil canning, stains, discolorations, and other imperfections, including those which would impair painting.

B. Gauges, Rectangular Ductwork: Fabricate galvanized steel ductwork from the minimum gauges for sizes up to the corresponding maximum long-side dimensions as indicated in SMACNA Duct Construction Standards.

C. Gauges, Round Ductwork: Fabricate lock-form quality galvanized steel ductwork from the minimum gauges for diameters up to the corresponding maximum dimensions as indicated in SMACNA Duct Construction Standards.

D. Fiberglass Duct board: Fiberglass duct board is NOT an acceptable means of air transport.

2.02 MISCELLANEOUS DUCT MATERIALS

A. General: Provide miscellaneous materials and products of the types and sizes indicated and where not otherwise indicated, provide type and size required to comply with ductwork system requirements including proper connection of ductwork and equipment.

B. Duct Sealant: Provide non-hardening, non-migrating mastic or liquid elastic sealant (type applicable for the fabrication/installation detail) as compounded and recommended by the manufacturer specifically for sealing joints and seams in ductwork.

C. Ductwork Support Materials: Except as otherwise indicated, provide hot-dipped galvanized steel fasteners, anchors, rods, straps, trim, and angles for support of ductwork.

D. Duct Liner Adhesive: Comply with ASC-A-7001 by The Adhesive and Sealant Council, Inc. (per SMACNA standards).

E. Duct Liner Fasteners: Comply with SMACNA.

F. Flexible Ductwork: Insulated flexible ductwork shall be Atco Type UPC #036 or UPC #031. Approved equal flexible ductwork by Certainteed Corporation, Flexaust Company, Genflex or Owens-Corning Fiberglass will be acceptable. Provide either 45 degree angle taps with manual volume dampers or "spin-in" taps with manual volume dampers at main duct tap as shown on Drawings. Provide with a minimum R-Value of 6.0 or R-Value of 8.0 when installed in unconditioned spaces.

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

A. Standards: Round and rectangular sheet metal ductwork shall be constructed in accordance with SMACNA "HVAC Duct Constructions Standards", latest Edition, ASHRAE Guide and Data Book, "Handbook of Fundamentals", latest edition, specifically Chapter 25 and NFPA Standard 90-A, "Standard for the Installation of Air Conditioning and Ventilating Systems".

B. All ductwork required for the heating, ventilating and air conditioning systems shall be constructed and erected in a first class workmanlike manner. This work shall be guaranteed for a period of one year from and after the date of acceptance of the job against noise, chatter, whistling, vibration, and free from pulsation under all conditions of operation.

C. The interior surface of all ductwork shall be smooth with no parts projecting into the air stream unless specified to do so. All seams and joints shall be external. The inside of all ductwork shall be thoroughly cleaned and all fans operated to remove any debris prior to connection of air devices.

D. All holes in ducts for damper rods and other necessary devices shall be either drilled or machine punched (not pin punched), and shall not be any larger than necessary. All duct openings shall be provided with sheet metal caps if the openings are to be left unconnected for any length of time.

E. Where ducts, exposed to view (including equipment rooms), pass through walls, floors or ceilings, furnish and install sheet metal collars around the duct.

F. Sheet metal plenums shall be constructed and reinforced in accordance with SMACNA standards. Where plenums are connected to louvers, the plenum bottom shall be sloped to drain to the louver.

G. Ductwork which is exposed to weather shall have soldered joints and seams and shall be painted with a suitable epoxy coating. In lieu of solder joints, the use of duct-mate or TDC manufactured flanges are acceptable.

3.02 COORDINATION

A. Prior to submitting ductwork shop drawings, the Division 23 Contractor shall fully coordinate the routing and height of all ductwork with all other trades and with ceiling heights, lighting fixtures and building construction.

3.03 GENERAL DUCTWORK FABRICATION

A. Duct Gauge and Reinforcing:
   1. Rectangular Ductwork: Minimum metal gauges and reinforcement shall be in accordance with SMACNA HVAC Duct Construction Standards (SDCS) Tables 1-3 through 1-13. Minimum aluminum gauges and reinforcement shall be in accordance with SDCS Tables 1-14 through 1-16. Reinforcing shall be installed per SDCS Fig. 1-9 through 1-12.

2. Round Ductwork: Minimum metal gauges for longitudinal and spiral seam round ductwork shall be in accordance with SDCS Table 3-2. Minimum aluminum gauges for longitudinal and spiral seam round ductwork shall be in accordance with SDCS Table 3-3. Longitudinal seam ductwork larger than 12" diameter shall not be permitted unless welded seams are used.
3. Cross-breaking: Cross-break or transverse bead all flat surfaces which are more than 12" wide. Transverse beading shall be on 12" centers and shall be a minimum of 1/8" deep at the center of the bead and 3/8" wide at the base of the bead.
4. Minimum Gauges: The metal gauges listed in the SDCS for round and rectangular ductwork are the minimum recommended. It shall be the Contractor's responsibility to select a metal gauge heavy enough to withstand the physical abuse of installation.

B. Duct Joints And Seams:
1. General: Make all joints airtight. The distance between transverse joints on any size duct shall not exceed 5'.
2. Rectangular Ductwork: Transverse joints and longitudinal seams in ductwork shall be constructed in accordance with SDCS Fig. 1-4 and 1-5. Drive slips may be used on rectangular ductwork on short sides only, up to 18" maximum. Gauge of drive slips shall be at least as heavy as ductwork on which they are installed. Bend drive slips over at least 3/4" at corners. Corner closures shall be in accordance with SDCS Fig. 1-13 through 1-18. All longitudinal seams shall be "Pittsburgh Lock" or button punch snap lock at corner seams and grooved seam or seam welded in sides between corners, in accordance with SDCS Fig. 1-5. At the Contractor's option, transverse joints may be transverse duct flange joints or Ductmate EP12/11 prefabricated galvanized "Ductmate" sections. The proposed gasket material, flange, corner piece and Ductmate details shall be submitted for approval.
3. Round Ductwork: Transverse joints for round ductwork shall be beaded sleeve type constructed in accordance with SDCS Fig. 3-2, properly secured and sealed. Draw bands shall not be used on round ductwork. Longitudinal and spiral seams shall be constructed in accordance with SDCS Fig. 3-1.
4. Ductwork Sealing: Seal all longitudinal and transverse ductwork joints and seams using SMACNA ductwork sealant to provide positive seal.

C. Connections and Take-offs:
1. Rectangular Ductwork: Parallel flow branches shall be constructed using radius elbow take-offs in accordance with SDCS Fig. 2-7. Branch duct connections shall be 45 degree entry expanded taps constructed in accordance with SDCS Fig. 2-8. Duct-mounted coil connections shall be constructed in accordance with SDCS Fig. 2-11.
2. Round Ductwork: Connections and takeoffs shall be made using 90 degree conical taps, 45 degree lateral taps or wye fittings constructed in accordance with SDCS Fig. 3-4 and 3-5. Use of 90 degree tees shall not be allowed.
3. Spin-in Fittings: Spin-in fittings may be used for duct taps to air supply and exhaust devices and shall include quadrant dampers even though a volume damper may be specified for the air device. Spin-in fittings shall be sealed at the duct tap with a gasket and compression fit or sealed with duct sealant. The location of spin-in fittings in the ducts shall be determined after terminal units are

hung and the location of the light fixtures is known so as to minimize flexible duct lengths and sharp bends. Spin-ins shall be installed with their damper axis parallel to airflow. A minimum of 18" must be provided between fittings.

4. Flexible Joints In Ductwork: Provide flexible connections where ductwork connects to air-handling units, fans, and similar powered equipment items and where required for expansion and contraction of the ductwork or the building structure. A minimum of one inch (1") slack shall be provided in all flexible connection to insure vibration isolation. Flexible joints are not required where equipment is connected with flexible duct. Flexible connections shall be rigidly connected to metal work on each side and shall be airtight. Bond flanges of flexible duct connectors to ducts and housings to provide airtight connections. Seal seams and penetrations to prevent air leakage.

D. Elbows and Tees:

1. Rectangular Ductwork: Provide radius or square elbows in ductwork, where shown on the Drawings. Where radius elbows are shown, radius elbows must be provided. Where square elbows are shown, square or radius elbows may be provided, at the Contractor's option. Elbows shall be constructed in accordance with SDCS Fig. 2-2. Turning vanes are required in all square elbows of 46 degrees or greater angle. Turning vanes are not required in radius elbows. Turning vanes shall be single vane type without a trailing edge and shall be constructed and installed in accordance with SDCS Fig. 2-3 and 2-4.
2. Round Ductwork: Provide radius elbows of the stamped or segmented type constructed in accordance with SDCS Fig. 3-3. Segmented elbows shall have a minimum of three segments for 45 degree elbows and five segments for 90 degree elbows.

E. Offsets and Transitions: Where duct width increases, maximum angle of slope shall be 20 degrees (one inch (1") in 2.7"). Where duct width decreases, maximum angle of slope shall be 30 degrees (one inch (1") in 1.7"). Offsets and transitions shall be constructed in accordance with SDCS Fig. 2-9 and 2-10.

F. Air Device Connections: Make connections to air devices and fabricate air device plenums as detailed on the Drawings and in accordance with SDCS Fig. 2-16 through 2-18.

3.04. DUCTLINER

A. General: The liner shall be applied to the inside of the duct with heavy density side to the air stream and shall be secured in the duct with adhesive, completely coating the clean sheet metal. All joints in the insulation shall be "buttered" and firmly butted tightly to the adjoining liner using fireproof adhesive. Where a cut is made for duct taps, etc., the raw edge shall be accurately and evenly cut and shall be thoroughly coated with fireproof adhesive. On ducts over 24" in width or depth, the liner shall be further secured with mechanical fasteners. The fasteners shall be A.J. Gerrard Company pronged straps, or approved equal, secured to the ducts by fireproof adhesive. The clips shall be 18" maximum spacing and shall be pointed up with fireproof adhesive. Liner shall be accurately cut and ends thoroughly coated with fireproof adhesive so that when the duct section is installed, the liner shall make a firmly butted and tightly sealed joint. Where ducts are lined exterior insulation will not be needed unless otherwise noted, except that the two insulations shall lap not less than 24". Ductliner for velocities over 2,000 fpm

shall be as specified except a perforated metal liner shall be used over ductliner for securement, in lieu of fasteners. Ductliner installation and fasteners shall comply with SDCS Fig. 2-22 through 2-25.

3.05 DUCTWORK INSTALLATION

A. General: Assemble and install ductwork in accordance with recognized industry practices which will achieve airtight and noiseless systems, capable of performing each indicated service. Install each run with a minimum of joints. Align ductwork accurately at connections, within 1/8" misalignment tolerance and with internal surfaces smooth. Support ducts rigidly with suitable ties, braces, hangers, and anchors of the type which will hold ducts true-to-shape and prevent buckling. System leakage shall be the lesser of SMACNA Class B leakage calculation or 5% of total system CFM.

B. Inserts: Install concrete inserts for support of ductwork in coordination with formwork, as required to avoid delays in the work.

C. Completion: Complete fabrication of work at the project as necessary to match shop-fabricated work and accommodate installation requirements.

D. Run Location: Locate ductwork runs, except as otherwise indicated, vertically and horizontally and avoid diagonal runs wherever possible. Locate runs as indicated by diagrams, grams, details, and notations or, if not otherwise indicated, run ductwork in the shortest route which does not obstruct usable space or block access for servicing the building and its equipment.

Hold ducts close to walls, overhead construction, columns, and other structural and permanent-enclosure elements of the building. Limit clearance to 0.5" where furring is shown for enclosure or concealment of ducts, but allow for insulation thickness, if any. Where possible, locate insulated ductwork to assure 1.0" clearance of insulation. Wherever possible in finished and occupied spaces, conceal ductwork from view, by locating in mechanical shafts, hollow wall construction or above suspended ceilings. Do not encase horizontal runs in solid partitions, except as specifically shown. Coordinate the layout with suspended ceiling and lighting layouts and similar finished work.

E. Coordination: Coordinate duct installation with installation of accessories, dampers, coil frames, equipment, controls, and other associated work of the ductwork system.

F. Hangers and Supports:

1. General: All ductwork supports shall be per Section IV of the SMACNA "HVAC Duct Construction Standards - First Edition" with all supports directly anchored to the building structure. Supports shall be on maximum 8'-0" centers with additional supports as required to prevent sagging.
2. Attachment to Structure: Provide hanger attachment to the building structure as specified in Section 15100, "Basic Materials and Methods", and in accordance with SDCS Fig. 4-1 through 4-3.
3. Hangers: Hangers shall be strap or rod sized in accordance with SDCS Table 4-1 and 4-2. Strap hanger attachment to rectangular duct shall consist of a turning strap under the duct a minimum of one inch (1") and securing the strap with one screw into the bottom of the duct and one screw to the side of the duct.

Rectangular duct supported on trapeze hangers shall be attached to the trapeze. Round duct attachments shall be constructed in accordance with SDCS Fig. 4-4.

4. Horizontal Ducts: Ducts larger than 50" in their greatest dimension shall be supported by means of hanger rods bolted to angle iron or half round trapeze hangers. Duct shall have at least one pair of supports 8'-0" on centers according to the following:

| Angle Length | Angle | Rod Diameter |
|---|---|---|
| 4'-0" | 1-1/2" x 1-1/2" x 1/8" | 1/4" |
| 6'-0" | 1-1/2" x 1-1/2" x 1/8" | 1/4" |
| 8'-0" | 2" x 2" x 1/8" | 5/16" |
| 10'-0" | 3" x 3" x 1/8" | 3/8" |

5. Vertical Ducts: Ducts shall be supported where they pass through the floor lines with 1-1/2" x 1-1/2" x 1/4" angles for ducts up to 60". Above 60", the angles must be increased in strength and sized on an individual basis considering space requirements.

G. Flexible Ductwork:

1. General: Flexible ductwork shall be provided as shown on Drawings. Flexible ducts shall be installed in a fully extended condition free of sags and kinks, using only the minimum length required to make the connection, subject to the maximum lengths herein and below. Bends in any length of flexible duct shall not exceed 45 degrees for HVAC terminal unit connections or 135 degrees for air device connections and shall not exceed that recommended by the flexible ductwork manufacturer. Unless otherwise shown on the Drawings, the length of any one run of flexible ductwork shall not exceed 2 feet to terminal units or 6 feet to air devices.
2. Supports: Where flexible duct extension exceeds 48", horizontally, a support shall be provided. Duct shall be suspended on 48" centers with a minimum two inch (2") wide flat banding material. Refer to SDCS Fig. 3-9 and 3-10 and Page 3-17 for additional requirements.
3. Terminal Unit Flexible Duct Connections: The terminal ends of the duct core shall be secured by stainless steel worm gear type clamps. The fittings on terminal units and on sheet metal duct shall be coated with sealant, then the flexible duct core slipped over duct and the clamp tightened, and the connections shall be sealed with duct sealant. Insulation of flexible duct shall be slipped over connection to point where insulation abuts terminal unit or insulation on duct and attached with self-locking nylon straps. The insulation connections shall then be sealed using foil duct tape to provide vapor barrier. Refer to SDCS Page 3-13 and 3-15 for additional requirements.
4. Air Device Flexible Duct Connections: All joints and connections shall be made by turning back the insulation and securing the inner liner with self-locking nylon straps and sealing with two wraps of duct tape. The insulation shall then be placed over the joint, attached with a self-locking nylon strap and sealed on the exterior with an approved foil duct tape. Refer to SDCS Page 3-13 and 3-15 for additional requirements.

H. Duct Mounted Devices:

1. Install duct mounted sensors and control devices furnished under Section 23 09 00, "Building Controls". Provide access doors at each duct mounted control

device. Coordinate location of devices and installation requirements with the Section 23 09 00Contractor.

2. Install duct type smoke detectors furnished under Division 26. Provide access doors at each sampling tube assembly. Coordinate location of detectors and installation requirements with Division 26.
3. Provide duct test ports in ductwork as required to properly balance all air systems. Test ports shall be located per ANSI/ASHRAE Standard III to allow accurate pitot-tube traverse measurements in ductwork.

3.06 CLEANING AND PROTECTION

A. General: Clean ductwork internally, section-by-section of dust and debris as it is installed. Clean external surfaces of foreign substances which might cause corrosive deterioration of the metal or, where ductwork is to be painted, might interfere with painting or cause paint damage.

B. Repairs: Strip protective paper from stainless ductwork surfaces and repair finish or replace ductwork portion wherever it has been damaged.

C. Temporary Closure: At ends of ducts which are not connected to equipment or air distribution devices at the time of ductwork installation, provide temporary closure of polyethylene film or other covering which will prevent the entrance of dust and debris until such time that connections are to be completed.

END OF SECTION

23 33 00

# DUCTWORK ACCESSORIES

## PART 1 - GENERAL

### 1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 23 01 00, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the ductwork accessories. Comply with other Division 23 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the duct systems specified herein, as indicated on the drawings, and as required to provide complete and operating systems.

### 1.02 DESCRIPTION OF WORK

A. Work Included: Provide ductwork accessories as required for the project including the following:
1. Extractors,
2. Turning vanes,
3. Monitors,
4. Splitter dampers,
5. Access doors,
6. Straightening grids
7. Fire dampers.

### 1.03 QUALITY ASSURANCE

A. SMACNA Compliance: Comply with applicable portions of Sheet Metal and Air Conditioning Contractors' National Association (SMACNA) Duct Construction Standards (latest edition).

B. ASHRAE Standards: Comply with American Society of Heating, Refrigerating, and Air Conditioning Engineers, Inc. (ASHRAE) recommendations pertaining to construction of ductwork accessories.

### 1.04 SUBMITTALS

A. Shop Drawings: Show modifications of indicated requirements, if applicable, made to conform to local shop practice and show how these modifications ensure that the materials and weights are not reduced and that the fabricated units are equivalent to the specified requirements in every significant way.

## PART 2 - PRODUCTS

2.01 DUCTWORK ACCESSORIES, FABRICATION AND MATERIALS

A. General: Provide ductwork accessories that comply with the Section 23 30 00, "Ductwork", and other applicable product requirements of ductwork materials noted in this Section.

2.02 FLEXIBLE CONNECTIONS

A. General: Flexible connections shall be UL-labeled, 30 ounces glass fabric-lined with insulation and coated on both sides with neoprene, complete with attachment accessories, "Vent-Glass" by Vent-Fabrics, Inc. or approved equal.

2.03 DUCTWORK HARDWARE

A. General: Damper operators for concealed inaccessible ductwork shall be Young Regulator Company, Catalog No. 700 or No. 315, as shown. Non-insulated accessible ductwork shall be Young Regulator Company, Catalog No. 433. Accessible insulated ductwork shall be Young Regulator Company, Catalog No. 443. Approved equal units by Duo-Dyne or Vent Fabrics, Inc. will be acceptable.

2.04 DIRECTIONAL, VOLUME CONTROL, AND FIRE DAMPERS

A. General: Provide all direction and volume control and fire dampers shown or noted on Drawings. All damper control devices shall be installed so as to be fully concealed in finished rooms and spaces.

B. Dampers:

1. Splitter Dampers: Splitter dampers shall be not less than 16 gauge. Splitter dampers shall be 1-1/2 times the width of narrowest duct leaving split, except not less than 12" long and shall have not more than 1/4" less height than duct in which it is installed. Splitter dampers having area less than 2.25 square feet shall be adjusted by means of a locking quadrant mounted on end of shaft. Splitter dampers having larger area shall be adjusted by means of one or more push rods in accordance with Figure 2-5, SMACNA "Low Velocity Duct Construction Standards".
2. Extractors: Provide extractors of the size and type required, with hex-key operated adjustable blades, and with gang operated galvanized steel blades on one-inch centers.
3. Taps: Where rectangular take-offs of branches from main ducts are used with 45 degree entry, provide manual volume regulators with lockable operators and nylon bushings on both sides of damper blade rod. Manual volume damper shall have standoff when duct system type is insulated.
4. Round Taps: Where taps to main ducts or their branches are made, provide 45 degree angle taps or 90 degree spin-in taps with manual volume dampers with nylon bushings on both sides of damper blade rod. Manual volume damper shall have standoff when duct system type is insulated.
5. Multi-leaf Dampers: Where multi-leaf dampers are required, provide opposed blade-type in accordance with Figure 2-12, SMACNA "Low Velocity Duct Construction Standards".

C. Fire Dampers: Provide fire dampers at duct penetrations of floors, smoke partitions, fire walls, and where required by the applicable building codes or authority having jurisdiction. Fire dampers shall comply with state and local codes, be inspected and approved by an approved inspection agency and be labeled at the factory in accordance with Uniform Building Code Standard 43, Section 43.714.
   1. Provide one-hour rated dampers where penetrations are in required one-hour fire rated assemblies.
   2. Provide 1-1/2 hour rated dampers where penetrations are in required 2-hour fire rated assemblies.
   3. Provide 3 hour rated dampers where penetrations are in required 4-hour fire rated assemblies; 4-hour occupancy separating walls are accepted.
   4. Fire Dampers shall be type 'B' with shutter located outside of the airstream unless otherwise noted or detailed.

2.05 FLASHING AND COUNTER-FLASHING

A. General: Flashing and counter-flashing shall be as specified in other Divisions of these Specifications.

2.06 DUCT ACCESS DOORS

A. General: Provide hinged duct access doors, gasketed and with insulation where ductwork is indicated to be insulated. Provide construction per SMACNA Standards. Access doors shall be at least 15" x 15".

B. Inspection Plates: Provide inspection plates as required. Provide a minimum opening of 4" x 4" with a 6" x 6" cover plate. The cover plate shall be one gauge heavier than the ductwork, gasketed and secured with a minimum of eight sheet metal screws.

2.07 MISCELLANEOUS DUCTWORK MATERIALS

A. General: Provide miscellaneous materials for ductwork accessories, including hinges, refrigerator latches, sash locks, bolts and wing nuts, gaskets and pitot tubes as recommended by the ductwork accessories manufacturer for the application indicated.

2.08 TURNING VANES

A. Construct turning vanes in accordance with SMACNA Standards (current edition).

PART 3 - EXECUTION

3.01 INSTALLATION

A. Access Doors: Install access doors so that the doors open against the system air pressure wherever feasible and that their latches are operable from either side, except where the duct is too small to be entered. Provide access to each fire damper link to permit resetting. Comply with the applicable building codes or authority having jurisdiction and NFPA 96.

B. Inspection Plates: Install plates at each primary zone damper and where otherwise required for inspection of operable mechanisms within the duct systems.

C. Multileaf Dampers: Install multileaf volume dampers in each zone duct of multizone units and as otherwise required for balancing.

D. Splitter Dampers: Install splitter dampers at all divisions of ductwork for proper air pattern control.

E. Turning Vanes:
1. Install turning vanes for all rectangular mitered elbows. Install turning vanes in accordance with SMACNA Standards.
2. Turning vanes for Ducts with air velocity less than 2500 FPM: Use single wall type vanes for ducts having width equal to or less than 12 inches.
3. Use double wall type vanes for (2” radius, 2–1/8” spacing) for ducts having widths greater than 12 inches.
4. If duct sizes change in a mitered elbow, use single wall type vanes with a trailing edge extension.
5. Turing vanes for Ducts with air velocity greater than 2500 FPM: Use double wall type vanes (4-1/2” radius, 3-1/4” spacing).

3.02 TESTING

A. General: Check installed ductwork accessories for required operation and leak-proof performance during the system's operational test. Repair or replace faulty accessories, as required to obtain proper operation and leak-proof performance.

END OF SECTION

23 34 00

# FANS AND HOODS

## PART 1 - GENERAL

### 1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 23 01 00, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the fan and hood systems. Comply with other Division 23 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the fan and hood systems specified herein, as indicated on the drawings, and as required to provide complete and operating systems.

### 1.02 DESCRIPTION OF WORK

A. Work Included: Provide U.L. listed fans and ventilators as required by code and as specified.

### 1.03 QUALITY ASSURANCE

A. Basis of design is Greenheck. Other acceptable manufacturers are ACME, Broan, Buffalo, Carnes, Cook, Penn, and Woods.

## PART 2 - PRODUCTS

### 2.01 PRODUCT REQUIREMENTS

A. Ratings: Fans shall be licensed to bear the AMCA certified ratings seal. Ratings of fans shall be based on 70°F and 29.92" of Hg atmospheric pressure. Air handling equipment shall be sized in conformance with applicable codes and good engineering practice. Roof-mounted units shall be located in coordination with the Architect to ensure proper sight lines.

B. Construction: Fan construction shall be in accordance with AMCA classes of construction for the intended duty. Fan wheels, shafts, and drives shall be statically and dynamically balanced at the factory as a unit. Balance reports shall be factory-certified to the Construction Manger.

C. Drives: Provide drives with a minimum belt horsepower capacity of 120% of the motor nameplate horsepower.

D. Motor Sheaves: Motor sheaves shall be Browning Type, MVP, or approved equal, adjustable type with double-locking feature. Motor sheaves shall be selected for the rated fan rpm and shall be adjustable to as close as 10% above and below the rated fan speed.

E. Fan Sheaves: Provide adjustable or nonadjustable sheaves with removable machined bushings. Sheaves shall be machined on surfaces. Sheaves with over three grooves shall be dynamically balanced and the manufacturer shall so designate on each sheave. Fan sheaves with three grooves or less shall be statically balanced and weights required for balancing shall be welded to the sheaves. Manufacturers shall be Browning, Eaton, Yale, Towne, Dodge Manufacturing Company, or Fort Worth Steel and Machinery Company.

F. Belts: Provide standard "V-groove" belts suitable for the service intended with the required capacities. The belts shall be closely matched and tagged prior to delivery to the job site. If the belts do not appear to be properly matched during operation, they shall be rechecked and, if necessary, replaced. Belts shall be as manufactured by Gates, Durkee-Atwood, Goodyear, Browning, or Uniroyal.

G. Bearings: Provide SKF, Sealmaster, Timken, or Fafnir externally or internally-mounted, grease-lubricated, self-aligning ball bearings. Bearings shall have grease type zerk fittings.

H. Motor Mount: Motors shall be mounted on an adjustable base rigidly supported on the fan and shall have extended shaft to accommodate the adjustable pitch sheave.

## 2.02 CEILING EXHAUST FANS

A. General: Provide direct driven ceiling exhaust fans as required. Fan shall be acoustically insulated and have a maximum sound level rating as scheduled.

B. Motor: Motor shall be suitably grounded and mounted on rubber-in-shear vibration isolators and speeds shall not exceed that scheduled.

C. Accessories:
1. Provide totally noise-free, integral back draft damper, with no metal to metal contact.
2. Inlet grille shall be white molded plastic with egg-crate or perforated shape and provide 85% free open area.
3. Provide terminal box on the housing with cord, plug, and receptacle inside the housing.

# PART 3 - EXECUTION

## 3.01 VENTILATION AND EXHAUST FANS

A. General: Ventilating and exhaust fans not having integral vibration isolation shall be mounted on or suspended by vibration isolators as specified under Section 23 05 48. Where ductwork is connected to fans, Contractor shall provide UL labeled flexible duct connections.

B. Curbs: Factory-fabricated roof curbs, caps, and similar items, shall be supplied and installed by Mechanical Contractor. Coordinate installation with Roofing Contractor.

3.02 SYSTEMS

A. Refer to Section 23 05 53, “Mechanical Identification” for applicable painting, nameplate, and labeling requirements.

B. Placement of fans and noise levels generated by the fans shall be taken into consideration. Refer to specification 23 34 00 for additional information.

END OF SECTION

**23 36 00**

# VARIABLE VOLUME TERMINAL UNITS

## PART 1 - GENERAL

### 1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 23 01 00, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the variable volume and fan powered terminal units. Comply with other Division 23 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the variable volume and fan powered terminal units specified herein, as indicated on the drawings, and as required to provide complete and operating systems.

### 1.02 DESCRIPTION OF WORK

A. Work Included: Provide variable air volume (VAV) and fan powered system terminal units with DDC controller supplied by BAS contractor for factory mounting.

### 1.03 QUALITY ASSURANCE

A. Provide VAV and Fan powered system terminal units complying with ARI 880, Air Volume Terminals.

### 1.04 SHOP DRAWING AND SUBMITTALS

A. Shop drawings submittals shall include, but are not limited to, the following:
   1. Unit cut-sheets clearly showing all features, accessories, dimensions, weights, and capacities.
   2. Written instructions for equipment to installation.
   3. Wiring and piping diagrams and connection locations.
   4. Performance certifications and test results.
   5. Warranty information.
   6. Additional information as required in Section 23 01 00.

## PART 2 - PRODUCTS

### 2.01 MATERIALS

A. General: Provide HVAC terminal units of standard materials and components designed and constructed as recommended by the manufacturer and as required for a complete installation in compliance with these Specifications. Units with electrical equipment shall be constructed in accordance with NEMA and NEC and shall include disconnects or fused disconnects where specified required by the NEC.

### 2.03 VARIABLE VOLUME AIR TERMINAL UNITS

A. General: Provide pressure independent single duct VAV air valve terminal units consisting of a sheet metal housing with a control damper, damper operator, heating coil and flow controls. Single duct VAV air valve/terminal units shall be compatible with the

temperature controls as specified in Section 23 09 00, "Direct Digital Control System". Terminal unit capacities and sizes shall be as scheduled and shown on the Drawings.

B. Housing: Shall be constructed of 22 gauge minimum galvanized sheet metal with mechanical seals and gaskets to minimize housing leakage. Housing shall be insulated with one inch (1"), dual density coated fiberglass insulation meeting the requirements of NFPA 90A and UL 181. Housing shall be provided with a round or oval inlet for use with flexible duct (1800 fpm maximum velocity) and a rectangular outlet for slip and drive connection to sheet metal ductwork (1600 fpm maximum velocity).

C. Control Dampers: Shall be of a low leakage, opposed blade or single blade design with galvanized steel blades and self-lubricating bearings. Dampers shall be selected to limit pressure drop to 0.010" wc pressure loss when operating at a velocity of 2000 fpm.

D. Damper Operator: Shall be a electric type normally closed damper operator rigidly mounted to the terminal unit and connected to the damper with an adjustable linkage. Operators shall be sized to properly operate the unit dampers. Damper shall be factory-mounted and wired including all controls required for operation, except control wiring connections. Operator shall be selected to coordinate with the control sequence shown on the Drawings and specified. All exposed operational/linkage components shall be protected with removable metal covers.

E. Heating Coils: Electric heating coils shall be provided on single duct VAV terminal units where scheduled or shown on the Drawings. 480 volt heaters shall be delta wired. Units with heaters shall be UL-listed for zero clearance, shall bear the UL-listing mark and label and shall meet all National Electrical Code (NEC) requirements. Heater frames, enclosures, and terminal boxes shall be constructed of galvanized steel. Heating elements shall be Type A 80-20 nickel/ chromium wire and shall not glow when operating per design. Heaters shall be provided with factory-installed and wired branch circuit fusing as required by the NEC and UL. Each heater shall be complete with silent magnetic contactors for each stage, a primary thermal cutoff to de-energize the heater in case of overheating, a differential air pressure switch and electronic controls for each heater contactor.

F. Leakage: Overall leakage for the control damper and pressurized portions of the housing shall be less than 3% of nominal cfm at 3" SP, as rated by ADC Test Code 1062 R4.

G. Controls: Pressure independent volume controls shall be factory-installed, including a multipoint air flow sensor for inlet volume measurement, and related accessories and components. Controls shall provide adjustable minimum and maximum cfm limits, adjustable throttling range and a constant throttling range option. Adjustments for control settings and gauge tees for flow measurement and balancing shall be easily accessible. DDC controllers and damper operators shall be furnished by the Temperature Control Contractor for factory-installation, wiring and testing by the terminal unit manufacturer. Controllers shall be located for easy access from the ceiling below the unit. Temperature control functions and sequences shall be as specified in Section 23 09 00, "Direct Digital Control System", and as shown on the Drawings. The terminal unit manufacturer shall provide an appropriately sized volt control power transformer to serve the terminal unit controller. An air flow sensor calibration curve label shall be attached to each terminal unit in a location visible from the unit controller. Air flow shall be proven prior to the energization of any electric heating coil.

**PART 3 - EXECUTION**

## 3.01 INSTALLATION

A. Install items in accordance with manufacturer's recommendations and instructions.

B. Firmly attach each item to supporting members.

C. Items which vibrate, whistle or rattle when system is in operation are considered defective. Replace any defective unit which cannot be tightened or adjusted to eliminate objectionable noises with new unit.

D. Comply with all applicable code restrictions for installation of units, controls, and interconnecting tubing in ceiling.

**END OF SECTION 23 36 00**

23 37 00

# REGISTERS, GRILLES, AND DIFFUSERS

## PART 1 - GENERAL

### 1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 23 01 00, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the registers, grilles, and diffusers. Comply with other Division 23 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the registers, grilles, and diffusers specified herein, as indicated on the drawings, and as required to provide complete and operating systems.

### 1.02 DESCRIPTION OF WORK

A. Work Included: Provide air outlets and inlets as required for the finished or non-tenant areas of the project including the following:
   1. Ceiling air registers, grilles, diffusers
   2. Wall mounted registers and grilles
   3. Linear lay-in slot diffusers
   4. Architectural linear diffusers

### 1.03 QUALITY ASSURANCE

A. Basis of design is Titus. Other acceptable manufacturers are Krueger, Anemostat, Carnes, Metal Aire, Price, Nailor or Tuttle & Bailey.

B. NFPA Compliance: Comply with NFPA 90, as applicable to air diffuser construction and installation.

C. Air Distribution Equipment: Maximum space temperature variation shall not exceed 2°F through the conditioned area from 2’ above the floor to 7’ above the floor. The air outlets shall be selected by the manufacturer to suit the volume, throw, and noise level criteria described in these Specifications, and maintain maximum terminal velocities of 50 fpm, unless otherwise indicated.

## PART 2 - PRODUCTS

### 2.01 AIR OUTLETS AND INLETS

A. General: Provide air outlets and inlets of the size, shape, and type, constructed of materials and components, and with finishes as required. Apply corrosion resistant treatment to surfaces prior to applying prime coat.

B. Ceiling Diffusers: Provide diffusers with corrosion resistant treated surfaces and finished in baked enamel unless otherwise required. Where applicable, provide adapters with diffusers to permit connection to round supply duct.

C. Registers and Grilles:
1. General: Provide registers that contain a key-operated multi-louvered opposed blade damper operable from the face side.
2. Supply Air Register: Provide supply air registers of the double deflection type.
3. Return Air Grilles and Return Air Registers: Provide grilles and registers as required.

D. Supply Linear Diffuser:
1. Provide supply linear diffuser with length and width as required. The supply diffuser shall be installed above the ceiling and located as indicated on the Architectural and Mechanical Drawings.
2. The diffuser shall be designed, tested, and constructed in a manner so as to comply with the performance criteria and sound level requirements specified elsewhere in these Specifications. Plenum shall be constructed of at least 24 gauge galvanized steel and shall be reinforced as required. The air volume, length and duct connection size shall be as required. Coordinate the attachment, support, and similar features of the supply plenum with the ceiling Subcontractor.
3. The plenum shall be painted flat black on interior surfaces and the exposed surfaces as viewed from below the ceiling system shall be painted flat black.

## PART 3 - EXECUTION

### 3.01 INSTALLATION

A. General: Install air outlets and inlets in accordance with manufacturer's written instructions and recognized industry practices to ensure that products serve intended functions.

B. Duct Connection to Diffuser:
1. Where flexible duct is connected to ceiling diffusers, the contractor shall use one of these three methods:
   a. Insulated flexible duct with Titus FlexRight flexible duct support, UL listed, to form duct elbow.
   b. A sheet metal elbow, externally insulated.
   c. Insulated flexible metal duct consisting of flexible metal core of corrugated aluminum with external insulation.
2. In all cases duct connection/elbow shall be made with a bend that has not less than one duct diameter centerline radial.

C. Coordination: Coordinate with other trades, including ductwork, and ductwork accessories, as necessary to interface air outlets and inlets properly with other work.

### 3.02 FIELD CONTROL QUALITY CONTROL

A. Test installed devices to demonstrate satisfactory compliance with specified and indicated requirements.

END OF SECTION

**237300**

**CHILLED WATER AIR HANDLING UNITS**

## 1.0 GENERAL

### 1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 23 01 00, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the air handling unit. Comply with other Division 23 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the air handling unit system specified herein, as indicated on the drawings, and as required to provide complete and operating systems.

D. Refer to Section 23 25 00, “HVAC Water Treatment”, for information regarding required chemicals, etc.

### 1.02 DESCRIPTION OF WORK

A. Provide variable air volume chilled water air handling unit and all associated components and specialties as specified herein, on the drawings, or as otherwise required to maintain the design chilled water supply conditions.

### 1.03 QUALITY ASSURANCE

A. Manufacturer: Basis of design is Trane. Approved alternate manufacturers are Carrier, Daikin, or Johnson Controls, Inc.

B. Submittals must be provided including equipment dimensions, installation, clearance, performance at specified conditions, etc.

## 2.0 PRODUCTS

### 2.01 AIR HANDLING UNITS

A. Units shall consist of the components listed below and shall perform in accord with capacities as scheduled on the drawings.

B. Casing: Includes all sections of air handling unit: coil section, fan sections, access sections, sections of blow through units downstream of cooling coils, etc. Refer to SECTION 23 30 00 for discharge plenums which attach to air handling unit vertical discharge opening.

1. Wall and roof panels shall be minimum 2" thick acoustical type of minimum solid galvanized exterior panel (min. 16 ga.) and a solid interior panel (min. 20 ga). Acoustical fill shall be glass fiber insulation, 1.5 pounds per cubic foot minimum density. Fill shall comply with the following U.L. Fire Resistance Ratings:
   Flame Spread 10 - 20

Fuel Contributed 10 - 15
Smoke Developed 0 – 20

2. Floor construction shall be structural longitudinal and perimeter base rail with 20 gage solid galvanized inner and 16 gage galvanized outer panels.
3. Access door panels shall be constructed identically to the wall panels. Doors shall be thermally broken. The latches shall be wedge lever type, minimum 2 per door. The door hinges shall be lift off type.
4. Provide factory installed test ports in each section to allow for test and balance pressure measurements.
5. Access panels shall be provided at the coils and shall allow for man entry access to the coils.

C. Fans:
   1. Fans shall deliver the scheduled capacities. Fans shall be airfoil type. Fans shall be furnished complete including: motor, motor mount, inlet bells (if applicable), 2" deflection spring type vibration isolation, discharge section (if applicable), drive mechanisms and all other accessories required and/or specified to produce the intended result.
   2. Fans shall be forward curved type with variable speed drive.
   3. Air handling units over 5,000 CFM shall have a minimum of (2) fans

D. Water coil(s) shall be constructed in accordance with ARI Standard 410. Coils shall have aluminum fins mechanically bonded to seamless copper tubes with copper headers and return bends. Coils shall be leak tested under water at 350 PSI of dry air. Where stack coils are utilized coil tracks shall be provided to allow for coil removal.

E. Dampers:
   a. Outside air dampers shall be constructed of stainless steel or aluminum.

F. UV Lights shall be provided and located upstream of cooling coil.

G. Drain pan(s) shall be #304 stainless steel. Drain pans shall form positive built-in slope of the trough to the drain connection. Drain pan shall drain dry to preclude the buildup of microbial slime or fungus. Each cooling coil shall have a drain pan under the entire coil extended at least 6" past the leaving air side of the coil and minimum of 2 1/2" deep. When air handling units are furnished with stacked coils, upper drain pans shall have a minimum of two 1" drain connections piped to the lower pan and secured to prevent vibration. All condensate piping shall be of hard drawn copper tubing.

H. Filter sections shall be “A” frame and shall accommodate high efficiency filters. Filter section shall have full height hinged access doors and holding frames shall be welded in place. Frames shall include spring clips for filter retention. Provide MERV 12 or better filters for Air Handling Unit.

I. Each air handling unit shall be constructed and shall operate for all conditions of air flow to provide acceptable an NC levels (max NC 35) in the occupied tenant space immediately adjacent to the fan room.

J. Controls – Where possible sensors and devices shall be factory mounted.

K. The unit manufacturer shall submit sound power levels of each air handling unit. Acoustic performance shall be based on data obtained in accordance with ANSI Standard SI-32, for discharge sound power levels and radiated sound power levels. Aerodynamic performance data shall be in accordance with ARI Standard 430. Maximum sound power levels shall not exceed:

| | 63 | 125 | 250 | 500 | 1k | 2k | 4k |
|---|---|---|---|---|---|---|---|
| Discharge PWL's (re.$10^{-12}$W) | 88 | 88 | 87 | 86 | 85 | 85 | 85 |
| Inlet/cabinet PWL's | 88 | 85 | 85 | 84 | 83 | 81 | 81 |

## 3.0 INSTALLATION

### 3.01 AIR HANDLING UNITS

A. Install the air handling unit(s) where indicated on the drawings, observing required clearances. See related specification sections concerning ductwork, piping and electrical work to assure proper connection of services to the unit. Follow the manufacturer's written instructions concerning start-up and installation. The unit shall not be started or run without filters in place.

B. Where air handing unit is installed above grade level or in a room without a floor drain install auxiliary drain pan below unit.

C. Contractor shall arrange piping to units so as to provide required access to equipment.

D. Install clean filters in unit at time of air balance. Provide temporary filters during construction.

**END OF SECTION 237300**

23 82 00

# ELECTRIC HEATERS

## PART 1 – GENERAL

### 1.01 SUMMARY

A. The General Provisions, Supplemental General Provisions, section 23 01 00, Division 1 Specifications and Special Provisions apply to all Work specified in this Section.

B. This section describes the basic materials and installation methods for the electric heaters. Comply with other Division 23 sections and drawings as applicable. Refer to other divisions for coordination of work.

C. Furnish and install all components of the electric heaters specified herein, as indicated on the drawings, and as required to provide complete and operating systems.

### 1.02 DESCRIPTION OF WORK:

A. Work Included: Provide electric heating and cooling units, as specified, which may include:

1. Electric baseboard radiation
2. Electric ceiling heaters
3. Electric unit heaters
4. Electric reheat coils
5. Electric wall heaters
6. Additional information as required in Section 23 01 00.

### 1.03 QUALITY ASSURANCE:

A. The complete assembly, not just components, shall be approved as a unit by Underwriters' Laboratories, Inc. (UL) and shall bear the UL label, where required by code. Equipment shall be installed and wired in accordance with applicable local and national codes.

### 1.04 SUBMITTALS:

A. Shop drawings submittals shall include, but are not limited to, the following:

1. Unit cutsheets clearly showing all features, accessories, dimensions, weights and capacities.
2. Complete color samples for selection.
3. Written instructions for equipment to installation.
4. Wiring and piping diagrams and connection locations.
5. Performance certifications and test results.
6. Warranty Information.
7. Additional information as required in Section 23 01 00.

PART 2 – PRODUCTS

2.01 MANUFACTURERS:

A. Chromalox

B. Indeeco

C. QMark

D. Berko

E. Brasch

F. Markel

G. Electric Heaters, Inc.

H. Nailor

I. Tutco

J. Warren

2.02 EQUIPMENT:

A. [Electric Ceiling Heaters (ECH):]

1. As manufactured by QMark.
2. Other acceptable manufacturers: Chromalox, Brasch, Markel
3. Units shall include galvanized steel chassis, electric heating coil, fan board, fan wheels, housings, motor and faced heavy density fiberglass insulation.
4. Units shall be factory wired with unit mounted heat switch, magnetic contactors, high temperature cutout control, dead-front switch and fan override switches.
5. Units shall be single heat type with mounted switch having off-heat-vent selectors.
6. Filters shall be throw-away type.
7. Cabinet parts shall be cleaned, bonderized, phosphatized and flow-coated with baked-on primer.
8. Baked enamel finish shall be as selected by A/E.
9. Capacities and electrical characteristics: scheduled on drawings.

B. [Electric Unit Heaters (EUH):]

1. As manufactured by QMark.
2. Other acceptable manufacturers: Brasch, Chromalox, Markel
3. Cabinet shall be 18 gauge dip formed steel.
4. Paint of phosphate undercoat or corrosion resistance and finished in neutral gray, baked enamel.

5. Heating element shall be corrosion-resistant fin tube with reset thermal overload protection, magnetic contactor for remote control.
6. Remote thermostat shall be line voltage SPST with temperature range of
7. 40°F to 70°F, wall mounted.
8. Fan shall be dynamically balanced with totally enclosed continuous duty sleeve bearings, with built-in thermal overload protection.
9. Capacities and electrical characteristics: Scheduled on drawings.

C. [Electric Duct Heater (EDH):]

1. As manufactured by Tutco.
2. Other acceptable manufacturers: Indeeco, Brasch, Warren, Electric Heaters, Inc.
3. Heaters shall be Tutco type DC3, slip-in duct mounted heaters.
4. Construction: Heater shall have 80% nickel, 20% chromium resistance coils, insulated by floating ceramic bushings and supported in aluminized steel frames.
5. Bushings shall be recessed into embossed openings and staked into supporting brackets spaced 3-1/2" maximum center-to-center.
6. Coils shall be machine crimped in stainless steel terminals which are insulated with high temperature phenolic bushings.
7. Coils to be provided with following:
   a. Magnetic contactors, one for each step of heating
   b. Automatic thermal cutouts for primary protection and manual reset cutouts for secondary protection.
   c. Control transformer with fused protection.
   d. Fused disconnect switch.
   e. Air flow switch.
   f. Factory mounting and wiring of P-E switches furnished under Controls and Instrumentation Section.
8. Capacities and electrical characteristics: Scheduled on drawings.

D. Electric Wall Heaters:

1. As manufactured by QMark.

2. Other acceptable manufacturers: Brasch, Chromalox, Markel
3. Units shall be UL listed and wired in accordance with NEC.
4. The heater assembly which fits into the back box shall consist of a fan panel upon which is mounted all of the operational parts of the heater.
5. The heating element shall be of the non-glowing design consisting of an 80/20 nickel-chromium resistance wire enclosed in a steel sheath to which plate fins are copper brazed. It shall be warranted for 5 years.
6. Capacities and electrical characteristics: As scheduled on drawings.

PART 3 – EXECUTION

3.01 INSTALLATION:

A. Install units in accordance with manufacturer's instructions.

B. Install units where indicated on drawings.

C. Provide supports, for pedestal type wall fin per manufacturer's recommendations.

END OF SECTION

# SECTION 26 00 00

# ELECTRICAL

The following seal, signed and dated, acknowledge that Cyle Conoly of Mills-Conoly Engineering, P.C. prepared these specifications:




## 1 GENERAL PROVISIONS

1.1 General Requirements: Division One is applicable in full hereto.

1.1.1 Qualification of Bidders: Subcontractor for this section must have installed at least 3 similar type and size jobs, and electrical contracting shall be his primary business.

1.2 Work Under Other Sections: Painting of conduits, equipment, etc. (except wood backboards). Refer to Par. "Equipment Connections" regarding controls, control circuits, starters, etc.

1.3 Codes, Permits and Inspections: Comply with applicable laws of the community, with latest edition of NEC where not in conflict with those laws, and with the service rules of the local utility company. Obtain and pay for all permits and fees as required. After completion of the work, submit certificates of final inspection and approval from the local electrical inspector, certifying that the installation complies with all regulations governing same.

1.4 Materials and Workmanship: All materials shall be new, UL listed where a standard has been established. Execute all work so as to present a neat and professional appearance when completed.

1.5 Drawings and Specifications: Consider as complementary each to the other. What is called for by one shall be as binding as if called for by both. Where conflicts occur, secure clarification from Architect in advance of bidding; otherwise provide the more expensive quality or quantity. Follow figures in preference to scale dimensions, verify all dimensions and existing conditions.

1.6 Conflicts, Coordination and Changes: In the event that interferences or conflicts develop, contact the Architect at once. Whether conflicts develop due to field conditions or between different contractors, the Architect shall decide what action to take or equipment to be relocated regardless of which was installed. In the interest of avoiding such conflicts, the electrical sub-contractor who is using common space such as mechanical rooms, chases, ceiling space, etc., shall coordinate his work with other trades and other parts of his own work. If, during this construction, it is discovered that necessary or desirable changes should be made, advise the Architect and secure his decision in writing.

1.7 Definitions: The definitions in the National Electrical Code (NEC) shall apply where referenced in the NEC. When the word “concealed” is referenced in these specifications and on the drawings, it shall mean to be out of sight. A conduit referenced to be concealed overhead would allow it to run above an accessible ceiling. The word “exposed” when referenced in these specifications and on the drawings, means to be within sight. Items “To Be Removed” shall be removed by the contractor unless followed with “by others”. Removed items shall be disposed of as directed in other sections of these specifications and to comply with all codes and ordinances.

1.8 Cutting, Chasing and Patching: Where possible all work shall be built in as the job progresses. Where this is not possible, secure approval and do necessary cutting, chasing, etc. required. Patching shall restore disturbed surfaces to original condition.

1.9 Visit to Site: Before submitting a bid, visit the site and ascertain all existing conditions. Make sure adjustments in work as are required by actual conditions encountered.

1.10 Manufacturer's Drawings and Data: Follow procedure outlined in Section 1. Submit for approval within 20 days of award all items as indicated below. Because items must be coordinated one with another, partial submittals will not be considered. Where one manufacturer is named, a pre-bid submittal is recommended (and an addendum will be issued if enough time was provided) or equal products will be considered for approval unless stated otherwise. Similar products shall be produced by the same manufacturer. Only manufacturers with local, active, ethical and reliable representation in specifier's area will be considered.

1.10.1 Submit a complete list of materials proposed; include all items, even if exactly as specified. Submit manufacturer's data (and samples upon request) for all items where substitutions are desired. All substituted items shall indicate the differences in that specified from that submitted.

1.10.2 Submit shop drawings for the lighting fixtures, lighting controls, wiring devices, floor outlets, surface raceway, area of rescue assistance intercom system, fire alarm system and power distribution equipment (including those exactly as specified). Before the submittals are reviewed by the engineer, there shall be a stamp or letter attached indicating the submittals were reviewed and in compliance with plans and specifications, signed by the electrical contractor. Faxed copies of submittal data will not be accepted. All data shall be readable and complete with catalog numbers, highlighted accessories and options, and detailed information to describe portions of catalog numbers.

1.11 C.A.D. Drawings Requests: Electrical drawings produced by Computer Aided Design are available on disk or e-mail at a minimal fee to compensate for time, materials, shipping, etc. incurred to provide the amount of detail requested. The electronic files are available in AutoCAD Release 2014 format. The accuracy of the electronic files shall be the responsibility of the person placing the request due to addenda items, change orders, etc. that may not be incorporated in the files. The files are only available for shop drawing and as-built document preparation. Written permission by the Engineer is required for uses other than that stated.

1.12 Testing: Upon completion of the work, conduct a thorough test in the Architect's presence, and demonstrate that all systems are in perfect working condition.

1.13 Demonstration: By on-off, start-stop operation, demonstrate to the owner or his representative, the use, working, resetting and adjusting of each and every system. Include hands-on instructions to the Owner for the testing of exit lights, emergency battery lighting systems, smoke detectors, etc. that must be performed periodically per codes. Submit statement initialed by the owner that such demonstration has been made.

1.14 Warranty: Warrant the electrical work performed in this project in proper working order. Replace, without additional charge, all work or material which may develop defects from ordinary wear and tear (damage resulting from improper handling excepted) within a period of one year from date of final acceptance.

1.15 Trenching and Backfilling: Provide all excavating necessary for installation of work; backfill trenches and excavations after work has been installed and inspected; dispose of surplus earth as instructed in other sections of specifications. Backfill within the building and under paved areas shall be compacted and fill material shall be pit run gravel or similar granular material. All compaction requirements shall meet requirements specified in other sections. Route underground conduits as directed by Architect. Ascertain in advance the location of all existing underground utilities. Any existing underground utilities damaged by trenching shall be repaired to original condition.

1.15.1 Before proceeding with excavation or trenching, arrange with various utility companies and Owners Building and Grounds Department to visit site, describe and mark any and all of their systems which might be damaged by construction operations.

1.16 Conduit Routing: Exact routing of all conduits shall be as indicated and shall be approved by Architect. No penetrations of four hour rated partitions will be allowed unless a written letter from local authority having jurisdiction is provided.

1.17 Roof Penetrations: Roof penetrations are to be flashed by the roofing contractor using materials as recommended by the roofing manufacturer and approved by the Architect.

1.18 Fire Stops: Where conduits and electrical equipment raceways pass through partitions (walls, floors, ceilings, etc.) rated less than four hours, install a fire stop that provides an effective barrier against the spread of fire, smoke and gases. NFPA 221 prohibits conduits, pipes and wiring from passing through four hour rated partitions. Fire stop material shall be packed tight and completely fill clearance between raceways and openings fire stop material shall be 3M, Crouse-Hinds, Dow Corning, Hilti or approved equal installed in accordance with ASTM E-814. Where conduit nipples pass thru walls, provide removable pillow type firestop.

1.19 Record Drawings: Provide in detail, as set forth under General and Supplemental Conditions a complete set of drawings with actual electrical work installed on project. Keep an accurate record of changes made during construction. Transfer these changes to a set of reproducible copies of original contract drawings which the Architect will sell to Contractor at printing cost. Electronic files (AutoCAD format) of drawings may be issued at the cost to reimburse for time and shipping of producing the files. When work is completed, submit corrected reproducible drawings on film media or in AutoCAD format as directed by and to Architect for record.

1.20 Operating Manuals: Provide a type written operating manual and maintenance manual to the building owner. These manuals shall include:

1.20.1 Data stating equipment rating, selected options, manufacturer and catalog numbers for each piece of equipment requiring maintenance.

1.20.2 Operation manuals and maintenance manuals for each piece of equipment requiring maintenance. The required routine maintenance actions shall be clearly identified.

1.20.3 Names and addresses of at least one qualified service agency.

1.20.4 Submittal data indicating all selected options for each piece of lighting equipment and lighting controls. Include a schedule for inspecting and recalibrating all lighting controls.

1.20.5 A complete narrative of how each system is intended to operate, including recommended set points and the programmed entry data for systems on this project.

## 2 SERVICES

2.1 General: Coordinate with Utility Company. Provide all material and labor not supplied by Utility Company so as to produce a complete installation meeting the Utility regulations.

2.2 Characteristics of Services: 120/208 volt, 60 cycle, 3 phase, 4 wire, wye connected with a grounded solid neutral.

2.3 Main Service Equipment: Provide UL approved service entrance components as shown or specified hereinafter. The service equipment shall be labeled and dated to indicate the available fault current from the utility per NEC 110.24. The fault current shall be the same as that available at the load side of the utility transformer (assume infinite buss from transformer to the service equipment). The contractor shall contact the utility (if utility served) or the owner (if non-utility served) for the fault current available.

2.4 Metering: Obtain metering equipment from Utility Company and install in compliance with Utility Company requirements.

2.5 Service Feeder: Of type and size shown on Riser Diagram. Extend from service equipment to transformer location (verify exact location with Utility Company). Terminate conduit at transformer as directed by the Utility Company and leave sufficient slack for connection to transformer lugs.

2.6 Transformer: Will be furnished and installed by Utility Company. Provide anchor bolts, ground rods, concrete base, primary ducts, and all other accessories which are not furnished by Power Company. Installation shall be in accordance with Utility Company standard drawings. Provide connectors as directed by Utility Company for terminating feeder at transformer lugs.

2.7 Utility Coordination: Contractor shall notify Local Utility Company prior to starting work. All work including pad, trenching, conduit, backfilling, etc. shall be inspected by The Utility Company Engineering Department at times required by their regulations.

## 3 GROUNDING

3.1 General: Ground the neutral conductor and various conductive materials in the building per NEC Article 250.

3.2 Grounding Electrode Conductor: Refer to NEC 250.52 for electrodes permitted for grounding. Connect to all electrodes present as required by code. The grounding electrode conductor shall serve as ground for system neutral and for building equipment bonding. The grounding electrode conductor shall be bare copper and shall be attached to each electrode with approved type ground clamp or device. The conductor shall be run in conduit and shall be bonded at both ends. Connect conductor to neutral connection in service equipment. The ground rod shall be 3/4" diameter by 10 foot long copper-clad steel ground rod as described in National Electrical Code. Where concrete foundations and footings are present, provide rebar or bare copper conductor as required by local authority having jurisdiction (AHJ). Some AHJ personnel may require additional rebar stubbed up for termination of ground. Coordinate with AHJ prior to pouring concrete.

3.3 Electric System (Neutral) Ground: The current carrying neutral leg of the wiring system shall be of insulated conductor and shall be connected to the grounding electrode conductor only via the neutral connection at the service equipment.

3.4 Gas Piping: Bond gas piping to main service panel ground. Provide #4 conductor connected to gas pipe at entrance to building with ground clamp.

3.5 Building Equipment Ground: All non-current-carrying metal parts of the wiring system (including conduit, outlet boxes, cabinets, motor frames, etc.) shall be connected to ground via equipment grounding system. A grounding conductor (copper with green insulation except where bare copper is used) shall be installed. Conduit ground is not acceptable. Provide bonding jumpers at flexible conduit connections, expansion joints, service equipment enclosure, and all other places where required for electrical continuity.

## 4 POWER DISTRIBUTION SYSTEM

4.1 Type of Wiring: Install wiring in approved raceways with conductors of the types and sizes as shown and specified herein; where no types or sizes are shown, meet NEC requirements.

4.2 Feeder Circuits: Provide a complete system of wiring from main service equipment to the various load centers, panels and other locations, as indicated.

4.3 Branch Circuits: From panels and load centers extend a complete system of wiring to all fixtures, motors, devices and other equipment. Lighting circuits shall supply lighting outlets only, except as shown otherwise. Secure approval of any departure from the circuit arrangement as shown.

4.4 Indication on Drawings: Numerals shown on "home runs" and by the outlet indicate the circuit arrangement in the panelboard. Crossmarks on branch circuit runs indicate the number of conductors required. No runs shall contain more than three circuits unless shown. Connect circuits to panelboards to give an evenly balanced load to the supplying feeder, based on normal usage of the connected equipment.

4.4.1 Lower case letter shown by an outlet indicates that the switch shown with the corresponding letter controls the outlet. An upper case letter by a special purpose outlet corresponds with symbols in the legend.

## 5 RACEWAYS

5.1 Applications: Raceways shall be as follows:

5.1.1 Where subject to moisture or mechanical injury - rigid conduit.

5.1.2 In concrete or solid masonry - rigid conduit.

5.1.3 Above furred space or in cells of hollow masonry - EMT.

5.1.4 Buried in earth or porous fill - rigid conduit painted with two coats of asphaltum paint (1" and larger may be plastic with ground wire except elbows and vertical runs).

5.1.5 Exposed in unfinished areas (Boiler, Electrical, Mechanical Rooms) - rigid conduit or EMT.

5.1.6 Motor and vibrating equipment connections - flexible conduit.

NOTE: The use of MC cable is not allowed on this project unless stated otherwise.

5.2 Rigid Conduit Material: Rigid, thickwall, zinc coated conduit by Allied, Republic, Wheatland or approved equal. Fittings shall be threaded type by Thomas & Betts, Bridgeport, or Appleton. Right and left couplings shall not be used; conduit couplings of the Erikson type shall be used at location requiring such joints.

5.3 Electrical Metallic Tubing (EMT) Material: Tubing shall be zinc coated by one of manufacturers named for rigid conduit. Fittings shall be steel (not cast), raintight, set screw type as manufactured by Thomas & Betts, Steel City, Bridgeport, Appleton or approved equal.

5.4 Flexible Conduit at Motor or Equipment Connections: Provide neoprene jacketed liquid-tight flexible conduit (with ground conductor) equal to Anaconda Sealtite. At fixture connections provide flexible steel conduit by one of manufacturers named for rigid conduit.

5.5 Flexible Conduit: Where existing conditions will not allow or will make very difficult the installation of rigid or EMT conduit, it will be permissible to run zinc-coated steel flexible metal conduit. This condition will not allow MC cable use. Provide with ground conductor.

5.6 Plastic Conduit Material: Carlon type 40 heavy wall rigid PV-Duit (Polyvinyl-chloride), or approved equal by Kraley or Southwestern with matching elbows, fittings, etc. Provide ground conductor. Change to rigid conduit for elbows up through slab or above grade.

5.7 Conduit Sizes: Comply with NEC, Chapter 9. Minimum size 1/2 inch.

5.8 Cast Metal Conduit Fittings: As manufactured by Appleton, Crouse-Hinds, Killark or approved equal, and of the form and type applicable to the installation. Not to be used where other types are specified.

5.9 Layout: Install all conduit concealed except in equipment rooms and where exposed runs are specifically indicated. Keep runs at least 6 inches from flues, hot water pipes and other heat sources. Eliminate trapped runs insofar as possible. Do not run conduit in cavity of exterior walls.

5.9.1 Generally follow the conduit layout shown on the drawings. However, the layout is diagrammatic only and must be adjusted for structural conditions, built-in equipment and other causes. Off- sets are not indicated and must be furnished as required.

5.9.2 Run concealed conduits in direct line with long sweep bends and offsets where practicable. Install exposed conduit with runs parallel or perpendicular to walls, structural members, or intersections of vertical planes and ceilings, with right-angle turns consisting of cast metal fittings or symmetrical bends. Where conduits are indicated exposed overhead, runs down to wall outlets shall be concealed to wall.

5.10 Installation: Securely fasten conduits to all sheet metal outlets, cabinets, junction and pull boxes with locknuts and bushings taking care to see that stout mechanical and solid electrical connections are obtained. Thread rigid conduit so that ends meet in couplings; cut ends square, ream smooth and drawn up tight. Cap conduit ends to keep out water and trash during construction.

5.10.1 Avoid field made bends where possible, but where necessary, use a proper hickey or conduit-bending machine. Make no bends with radius less than six times the conduit diameter, nor more than 90 degrees. Make changes in direction with pull boxes, symmetrical bends and cast-metal fittings. Replace crushed and deformed conduits.

5.10.2 Where installation below grade, completely coat rigid steel conduit, couplings and elbows with two coats of asphaltum paint. Provide 30” minimum cover where in yard or below paved area.

5.11 Marking of Underground Lines: Warning tape shall be installed approximately 12" below ground surface. Tape shall be vinyl plastic, red in color, with "Caution - Electric Line Buried Below", or words to that effect, printed thereon.

5.11.1 Conduits crossing other utilities shall have 12" minimum vertical clearance. Conduits paralleling other utilities shall have 12" minimum horizontal clearance. Other utilities may have other requirements, and contractor is instructed to contact those utilities (i.e. water, sewer, gas).

5.12 Support and Anchoring: All conduits, concealed or exposed, shall be supported and substantially fastened to not more than eight feet. Support with approved types of galvanized wall brackets, ceilings trapeze, clamps, or other approved devices. Attach supporting devices with screws, bolts, expansion sleeves or other workmanlike means appropriate to the surface. In stud walls, secure to studs as required so that conduit is immovable.

5.13 Empty Conduit: Provide #14 galvanized fish wire with 14 inch free ends.

5.14 Terminated Conduit: Provide bushings on ends where auxiliary system conduit raceway is stubbed out into an attic space, adjacent to back board, etc.

5.15 Pull Boxes: Galvanized sheet metal screw-cover type as produced by B & C Metal Stamping Company. Provide as required to avoid excessive runs or bends between outlets (generally not over three 90 degree bends per run between boxes).

5.15.1 Label all junction box and pull box covers to indicate contents (F.A., Panel & Circuit Number, I.C., Etc.).

5.16 Installation in Concrete: At slabs on grade, elevated slabs and/or any structural slab, conduit 3/4” and smaller may run in slab if approved by Structural Engineer or Architect. Run larger conduits below slab. No conduit shall be run in or through any structural member unless approved by the structural engineer. Where adequate support cannot be obtained by wiring to reinforced steel, obtain support with solid iron stakes (which may be driven through membrane) cut off flush with slab after pouring. At turn-ups of adjacent runs of exposed conduit, obtain alignment by wiring members to a temporary horizontal member.

5.17 Expansion Joints: Where conduits pass through or across building expansion joints, provide hot-dipped galv. expansion fittings with bonding jumpers.

## 6 OUTLET BOXES

6.1 General: Except as noted, boxes shall be standard cold rolled steel galvanized or sherardized at least 1-1/2" deep, of metal at least 1/16" thick; sized to accommodate devices and conductors per NEC Article 370; product of Crouse-Hinds, O-Z/Gedney, Thomas & Betts or approved equal.

6.2 Ceiling and Wall Bracket Outlets: 4" octagonal boxes with plaster rings appropriate for finish surface.

6.3 Typical Boxes (For Switches, Receptacles & Auxiliary Systems): 4" square boxes ganged as required. Furnish with 3/4" plaster rings where employed in plaster, 1" tile covers where used in ceramic tile, 1" plaster rings where set in exposed concrete, and as otherwise appropriate for surface and construction.

6.4 Boxes in Exposed (Or Thin Coated Plastered) Masonry: Where conduit connections permit, employ solid flush-type, square cornered, masonry boxes with turned-in device holders; otherwise employ typical box with 1-1/2" square cut tile cover.

6.5 Boxes Used With Exposed Conduit: 4" square utility boxes. Label covers with permanent marker indicating contents (Fire Alarm, Intercom, Panel/Circuit Number, etc.).

6.6 Boxes Used with Recessed Lighting Fixtures: Provide a 4" square box with blank cover adjacent to each fixture group. Generally attach to underside of structure above, in accessible location, to accommodate a 4' to 6' flexible conduit connection to each fixture or fixture run.

6.7 Boxes in Dry-Wall Construction: Sectional type switch boxes at least 2-1/2" deep may be used instead of typical box (but not where dry wall finish is applied over masonry back-up and not where multi-gang devices occur).

6.8 Mounting and Supports: Boxes which are not imbedded in masonry or concrete shall be fastened to the structure in a manner specified for conduits. Each flush wall box shall be anchored to a steel back strap that spans the studs.

6.9 Locations: The drawings indicate approximate locations only; determine the exact location at the building in view of all structural and architectural conditions. Obtain Architect's verification of final locations. No outlets shall be mounted back-to-back in rated walls. Stagger boxes as required on opposite sides of studs, on separate studs, separate CMU blocks, etc. as required.

6.9.1 Where outlets at different levels are shown adjacent, install in one vertical line where possible. At counters adjust heights to avoid conflicts with splash backs, upper cabinets and other equipment.

6.9.2 No lighting controls shall be located behind an open door unless where double doors occur. Unless shown near a podium or entry into a room, locate controller outlets on the lock side of door and so that first controller in a single or gang installation is approximately 6" to 10" from the door jamb. If this section is contradictory with the plans, then contact the architect or engineer for clarification prior to rough-in. Avoid conflict with wainscot caps by adjusting height slightly up or down as directed.

6.10 Mounting Heights: Unless noted or directed otherwise, locate outlet centers above the finished floor as follows:

| | |
|---|---|
| Lighting Controllers, generally | 3' - 10" |
| Receptacles, generally | 1' - 6" |
| Thermostats | 3' - 10" (A.D.A. Requirement) |
| Television/Monitor Outlets | 6' - 0" |
| Telephone/Data Outlets | 1' - 6" |
| Fire Alarm Manual Station | Operable handle at 44” |
| Fire Alarm Speaker/Light | Light lens at 82” |

## 7 CONDUCTORS

7.1 Material: Copper with not less than 98% conductivity; solid type THHN for No. 10 and smaller and stranded type THWN for No. 8 and larger; 600 volt insulation. Product of Triangle, Southwire, American Wire or approved equal, with manufacturer's name, type insulation, and conductor size imprinted on jacket at regular intervals.

7.2 Sizes: AWG sizes as noted. Phase and ground conductors shall not be smaller than #12. Multi-circuit runs shall contain a neutral conductor (color coded as indicated below) for each phase conductor in the run. Where branch circuit runs exceed 100 feet in length, increase to next larger size.

7.3 Installation: Do not pull conductors until conduit run is complete and the building has been closed to the weather. Use only U/L approved lubricant to facilitate pulling of conductors. No multi-wire branch circuits shall be run on this project. Provide a neutral conductor for each phase conductor per color coding scheme stated in these specifications. No more than three circuits shall be installed in a raceway unless shown otherwise.

7.4 Joints: For solid conductors, make joints with solderless type connectors (Ideal, "Wing-Nut", Buchanan "B-Cap" or approved equal). Make taps or splices of stranded conductors with T & B compression "C" or "Lock-tite" connectors, and cover with Okoweld or Scotch #33 Electrical Tape so that the insulation is equal to the conductor insulation. Fixture outlets shall have a loop or end not less than eight inches long left for connection to fixture. Conductors in capped outlets shall have taped ends. Make splices and taps only in junction boxes and wireways. Connections and splices within in-grade pullboxes or where considered wet locations shall be made with devices rated for wet locations for the number and size of the conductors (NSI Polaris Blue Insulated Connector series or approved equal U/L rated for direct burial or submersible applications).

7.5 Color Coding: Follow NEC Section 210-5. Equipment grounds shall be green. Conductors shall be identified by colored insulation throughout if wires are No. 10 AWG or smaller. For wires larger than No. 10, use colored tape band on black insulation.

Color coding for 120/208 volt system shall be:

Phase A: Black
Phase B: Red
Phase C: Blue
Neutral for Phase A: White with Black Stripe
Neutral for Phase B: White with Red Stripe
Neutral for Phase C: White with Blue Stripe
Ground: Green

## 8 PANELS AND SAFETY SWITCHES

8.1 Safety Switches: Provide for all motors and other equipment as indicated or required by Code, NEMA heavy duty type quick make quick-break, in NEMA-1 enclosure with interlocking covers. Provide with fuses as indicated. Where exposed to the weather or moisture, furnish NEMA-3R enclosures. Switches for motor circuits shall be horsepower rated. Switches shall accept only Class R Fuses. Provide with padlocks where accessible to public.

8.1.1 Non-fused single-phase motor disconnect switches may be wall switches as specified under Wiring Devices.

8.2 Panels: Deadfront, UL labeled, single door type with flush combination pull, catch and lock. All locks keyed alike. Interiors factory assembled. Back boxes shall be galvanized and have a 20" minimum width. Fronts shall have standard gray factory finish. Panels used for service equipment shall be UL labeled for that use. Type, catalog and style numbers shown on the drawings refer to Square D. Equal equipment manufactured by Siemens, GE, Eaton or approved equal will be accepted; all panels and cabinets shall be by the same manufacturer. Panels shall have metal directory holders welded to door, flush metal latches and concealed trim clamps. Surface mounted panels shall have door-in-a-door construction (hinged door for easy access). No back-fed main breakers or sub-feed breakers are allowed except where approved prior to bid or noted on schedule. The main breakers shall be located at top or bottom of busbars depending on direction of feed.

8.2.1 The number and rating of circuit breakers and future spaces shall be as scheduled. Branch breakers in panels shall be numbered. All breakers shall have labels or be referenced to a directory indicating the load they serve. Provide a label on cover stating panel name, voltage and phase, and where it is fed from.

8.2.2 Circuit breakers shall be fully rated so that a breaker at any point in system shall be capable of interrupting available short circuit at that point. The panel used for service entrance equipment shall be UL labeled for that use.

8.3 Future Panel Circuits: Stub out six empty 1" conduits for each flush mounted panelboard to an accessible location above lay-in ceiling (or attic) and to crawl space if available. Where "space only" is indicated, provided all copper work and make provisions for mounting circuit breakers are added, no additional parts or changes to the structure or bus work are required.

8.4 Fuses: Provide complete set of fuses for all switches and panels. Furnish rated as shown; for motor loads size as recommended by motor supplier.

8.4.1 Provide Bussmann Class RK1, dual element fuses for sizes up to 600 amps and Class L, time delay for sizes 601 to 6000 amps. Equal fuses by Gould, Littelfuse or approved equal may be used.

8.5 Circuit Breakers: Circuit breakers shall be bolted-in-place molded case breakers. Two and three pole breakers shall have common trip action and be interchangeable with single pole breakers. Breakers indicated GFI shall have integral ground fault protection with test switch.

8.5.1 All breakers 800 amps and larger shall be electronic type with adjustable settings. Breakers 1200 amps and larger shall be equipped with an energy reducing maintenance switch with local status indicator to comply with NEC 240.87.

8.6 Identification: Provide identification as required in NEC 408.4. On the door provide the panel name, voltage/phase and the source of supply. All panels shall have permanent circuit markers. A typewritten directory card showing equipment and areas controlled shall be provided in holder on inside door. Panels without covers shall have nameplates mounted beside each breaker. Provide arc-flash hazard warning labels in new panels and in the existing panels where new work is performed if not existing in those panels per NEC 110.16 and 110.21.

8.7 Mounting: Mount panels with center of top switch or circuit 6'-0" above the floor maximum. Carefully align covers which occur side by side in finished areas.

8.7.1 Protect from plastering and masonry operations with temporary cardboard covers.

8.8 Coordination and Size Requirements: If the power distribution equipment is larger than that shown, then it is the responsibility of the contractor to modify the electrical space to incorporate the equipment and the modified layout must be acceptable to the engineer. Otherwise, another manufacturer of the equipment shall be used.

8.9 Pre Ordered Panelboards and Switchboards: The owner has ordered and purchased the panels and switchboards noted on the plans due to long shipping times on these items. The contractor shall install and connect these items.

## 9 ARC FLASH STUDY AND LABELS

9.1 Coordination and Size Requirements Description: The panelboard/ switchboard manufacturer shall provide a complete arc flash hazard analysis the distribution system to determine incident energy, arc flash protection boundaries, and required PPE for all electrical equipment in the facility. The calculations shall comply with latest versions of NFPA-70E and IEEE-1584.

9.2 The analysis shall consist of the following:

9.2.1 Field data collection by qualified personnel (as defined by NFPA 70E).

9.2.2 Data entry and system one-line modeling in commercially available power system software.

9.2.3 Model verification.

9.2.4 Coordination of breakers settings.

9.2.5 Short Circuit and equipment verification study.

9.2.6 Protective device coordination study.

9.2.7 Arc flash hazard study.

9.2.8 Detailed report and findings of the analysis.

9.2.9 Electronic copies of the Project Report and the System Modeling File.

9.2.10 Hard copies of the project report.

9.3 The analysis and procedures shall comply with the following standards and recommended practices for power system studies.

9.3.1 NFPA-70E, 2021 Standard for Electrical Safety in the Workplace

9.3.2 IEEE-1584-2018

9.3.3 IEEE-242 “Buff Book” Protection and Coordination of Industrial Power Systems

9.3.4 IEEE-399 “Brown Book” Power System Analysis

9.3.5 IEEE-141 “Red Book” Electric Power Distribution for Industrial Plants

9.4 Data Collection

9.4.1 Field data collection shall be performed by qualified (as defined by NFPA 70E – 2004) personnel to ensure accurate equipment modeling. Contact local utility for available fault current to site.

9.4.2 Field personnel shall have up-to-date training in electrical safety and shall supply and utilize their own Personal Protective Equipment for electrical shock hazards and arc flash hazards.

9.4.3 Field data collection and system modeling shall be based on the system represented by design drawings.

9.4.4 Equipment shall be visually inspected to collect the necessary nameplate data used in the analysis. Contractor is responsible for visual verification of this data, including transformers, switchboards and breakers, relays, direct-acting trip units, etc. Data that may not be readily accessible or may not have nameplate data such as conductors, busway, etc. can be taken from drawings.

9.5 System Modeling

9.5.1 The system model shall be developed using a commercially available, fully integrated software package that meets the performance specifications developed in this Section. To ensure compliance with NFPA-70E 2004, ANSI, and IEEE Standards, and OSHA mandates, no exceptions or substitutions to the performance specification are allowed.

9.5.2 The system model shall be laid out in one drawing and in a manner that provides for easy viewing of all analysis results.

9.5.3 All one-line symbols shall be spaced properly to facilitate viewing results on the one-line.

9.5.4 Equipment names used in the modeling software shall be identical to the equipment and naming convention shown on the existing facility drawings and equipment unless conflicts exist.

9.5.5 The software shall model each operating mode in a manner such that each mode is a scenario or change case from the base case. Each scenario shall be a simple differential algorithm storing only the difference from the base case and the scenario. Modifications to the base case model shall automatically update all scenarios to eliminate the necessity to store complete databases for each condition, providing for a manageable file size that can be Emailed and eliminating the associated time, man hours, and errors with updating each database individually.

9.5.6 Project files created by the software shall be single files and not project directories containing multiple files. The file shall be self-contained and have all necessary information to describe the one-line, system data, settings, and analysis information. Files shall be easily transferable to any site via Email or disk and operable with no setting changes to the database file to eliminate the maintenance and administrative problems associated with multi-file project directories, and to provide an easy method to transfer the file for engineering review.

9.5.7 The software shall accurately model daisy-chained panels, and sub-transformers without the use of intermediate buses, nodes or fake impedances.

9.5.8 All molded case (MCCB) and fuse data shall be modeled based on the actual nameplate data including manufacturer, type, style, trip device, and actual settings. Generic substitutions or assumptions shall not be allowed unless data cannot be field verified. All assumptions shall be documented in the report.

9.5.9 All overcurrent relay types for the distribution system shall be modeled on the one-line diagram (and database) including phase and ground overcurrent, differential, residual, ground neutral, etc. to establish a complete and detailed system model where protective device data can be easily modified and updated by the facility and all data is available for a comprehensive protective device coordination study if required in the future.

9.5.10 All equipment modeling must have a corresponding one-line diagram symbol.

9.5.11 All system modeling shall conform to accepted modeling practices as outlined in IEEE-399 “Brown Book”. Contractor may provide more advanced modeling techniques where compliance with the specification is maintained.

9.6 Model Verification

9.6.1 The system model shall be verified by reviewing the results of short circuit current flows for all buses/equipment in the system. The results shall be viewed on each branch and total flow into a bus/equipment on the system one-line diagram.

9.7 Breaker Coordination

9.7.1 The study performed shall also provide settings of breakers for coordination with upstream breakers. Breaker settings shall be such that load breakers trip before breakers serving panels. Coordinate GFI settings for similar conditions. All adjustable breakers shall be set per coordination study prior to completion of project. Where settings cannot be adjusted, provide in report the conflicts present with recommendations to correct the situation.

9.8 Short Circuit Study

9.8.1 A short circuit study shall be performed to verify all equipment duties in the system. The calculations shall comply with ANSI C37.010, C37.13, C37.5, IEEE-141, and IEEE-399. The short circuit study shall verify the system electrical equipment is properly rated to withstand and interrupt the expected bolted and arcing faults in the system. Improperly rated and applied equipment may not protect personnel against arc flash hazards even if properly applied PPE is used. The software program must comply with the above standards in order to properly verify equipment installed in North America.

9.8.2 The equipment duty verification shall determine both the line side and load side fault current through each equipment and use the highest current to verify equipment ratings. Standard bus faults are not acceptable for protective devices in that they do not accurately model the current through the device and consequently they provide erroneous results. For solidly grounded systems, both three-phase and single-line-to-ground faults should be modeled.

9.8.3 Equipment duty results shall be graphically displayed on the electrical one-line as well as tabular report format.

9.8.4 The results of the equipment duty verification tabular format report shall provide the following data:

- Equipment name and Voltage.

- Manufacture, type, style, and ratings of the device
- Actual line or load side currents through the device and percent over/under duty
- Flag for the device showing VIOLATION or WARNING level for visual identification
- A report of all problem areas shall be provided. A recommended action list shall be provided for all underrated equipment in the system.

9.9 Protective Device Coordination Review or Study

9.9.1 A PDC review shall be performed in order to determine if the system protection characteristics are sufficient to provide reliable power to the facility. The PDC review will also determine if the existing settings entered in the software will provide proper personnel protection in the arc flash portion of this study. For facilities where the main distribution is low voltage (under 600 volts) and only instantaneous breakers or fuses are used, this section may not apply.

9.9.2 The PDC software shall provide complete integration of the one-line, database, short circuit, protective device coordination and arc flash analysis functions to provide accurate calculations and avoid errors and inefficiencies associated with multiple data entry programs. Programs using separate PDC or TCC plotting packages are not allowed. Complete PDC integration is defined as the following:

9.9.3 TCC’s shall be developed by simply selecting (highlighting) with the mouse the one-line area to be coordinated. The TCC shall automatically be plotted for the selected area including all short circuit levels. The TCC plot shall automatically include the selected one-line area in a drag and drop window on the TCC showing all one-line attributes without user additions required. These attributes shall automatically include all short circuit currents and voltages displayed on the main one-line, equipment names, etc. and update automatically without additional user input.

9.9.4 Each TCC shall have momentary (1/2 cycle), interrupting (1-4 cycle), and 30 cycle short circuit currents (tick marks) displayed on the TCC plot for each protective device or as required to properly model the tripping characteristics of the device. The tick marks shall be user adjustable for visual appearance. The purpose is to provide accurate tripping currents for each device.

9.9.5 The software model shall allow each protective device to model momentary (1/2 cycle), interrupting (1-4 cycle), and 30 cycle short circuit currents simultaneously depending on the characteristics of the device.

9.9.6 The software shall model remote voltages and currents for any single fault and display them on the TCC showing all trip cutoffs based on the remote currents.

9.9.7 The software shall model and display time difference calculations for any selected pair of protective devices. The difference calculator shall include bracketing bars with the calculated difference to clearly show the selective time between the devices. The calculated time shall update dynamically for instant visual setting as the devices are dragged (settings modified). In addition, Windows tool tips shall clearly show the time difference and the protective device settings for all devices as they are dynamically changed or set to allow the user to accurately determine the proper setting between devices in the most efficient manner, reducing coordination time and providing more accurate results.

9.9.8 TCC’s shall have the ability to display short circuit currents and arc flash hazard results within the fully integrated system one-line in the PDC focus. Short circuit currents are available at any equipment with a single mouse click. Short circuit currents and arc flash hazard values shall change on the fly as the protective device settings change, allowing the user to instantly see the results of PDC changes and the associated impact to short circuit currents and arc flash hazard values.

9.9.9 The software model shall provide a detailed library for the most common protective devices available in North America. The library shall be user definable.

9.10 Arc Flash Study

9.10.1 A detailed arc flash study shall be performed to determine potential arc flash incident energies, arc flash boundaries, shock hazard boundaries and proper personal protective equipment (PPE) for all energized electrical system equipment tasks for the electrical system studied. The calculations shall comply with NFPA-70E 2004, and IEEE-1584. Bolted short circuit calculations used in the above standards shall comply with ANSI C37.010, C37.13, C37.5, IEEE-141, and IEEE-399. The purpose of this study is to determine arc flash hazards in conformance with NFPA-70E and arc flash calculations in compliance with NFPA 70E Article 130.1(A)(2) for all equipment in the facility. The software program used in this study shall comply with the above standards. No substitutions in calculation methods will be allowed.

9.10.2 The arc flash study shall determine the following results for each system mode of operation. The results shall be provided in spreadsheet format for each mode and electrical system location to provide easy viewing and comparison. Worst-case arc flash energy levels shall be flagged and the spreadsheet comparison table shall be capable of providing its output directly to high quality vinyl label printers. The calculations shall, as a minimum, include a comparison of both 100% and 85% arcing currents for low voltage equipment for each electrical system configuration or operating mode, indicating worst-case arc flash hazards. The spreadsheet results shall include:

- Upstream equipment device name and ANSI function, i.e. 51/50, etc.
- Equipment type, i.e. switchgear, MCC, Panel, VFD, etc.
- Equipment arc gap.
- Bolted and estimated arcing fault current at the fault point (equipment) in symmetrical amperes. The estimated arcing current should be based on the arcing current equations used.
- Trip time, opening time, and total clearing time (total Arc time) of the protective device.
- Worst-case arc flash boundary for each bus/equipment in the model.
- Worst-case arc flash hazard incident energy in cal/cm2 for each bus/equipment in the model.
- Worst-case personal protective equipment (PPE) for each bus/equipment in the model.
- Working distances for up to five different distances showing items 7, 8, and 9 for each distance.

- Indicate “Danger/Hazardous” areas where incident energy is greater than 40 cal/cm2 and provide recommendations to reduced arc flash energy levels for these areas.
- Flag results where 85% arcing current provided worst-case results.

9.10.3 Each mode of operation shall include a detailed write-up indicating areas where incident energy calculations and PPE requirements are higher than calculated in the normal operating mode.

9.10.4 Contractor shall provide a detailed arc flash analysis report including as a minimum:

- Methodology.
- Information Sources.
- Key Assumptions.
- Arc Flash Energy and other consideration for various System Modes of Operation.
- Arc Energy at 100% and reduced currents.
- IEEE 1584-2002 Considerations.
- Overcurrent Protective Device Changes, Replacements or Setting Changes implemented in study to reduce arc flash hazard exposure.
- Explanation of Data in Arc Flash Hazard Report Tables.
- NFPA 70E Information.

  Shock Hazards with covers removed.

  Shock Hazard Approach Boundaries.

  Limited Approach Boundary.

  Restricted Approach Boundary.

  Prohibited Approach Boundary.

  Arc Flash Hazard Boundaries.

9.10.5 Results of Arc Flash Hazard Analysis for high voltage, medium voltage and low voltage systems, including:

- Working distances.
- Energy Levels.
- PPE Requirements.
- Recommendations to reduce arc flash hazard energy and exposure.

  Arc Flash Hazard Report.

Hard Copies.

Electronic Copy in Adobe Acrobat format (5.0 or later).

9.10.6 Electronic file for Power System Modeling Software as developed and utilized for this analysis. Contractor shall provide printed labels and signage for all equipment and locations in the system from the project study file. The labels shall be UV resistant vinyl labels (white with orange warning strip and black letters) conforming to ANSI-Z535. The labels shall be printable directly from the power system software utilized for the study with a Duralabel, Brady PowerMark or GlobalMark printer. Contractor shall install labels on all equipment and signage at locations to reflect the study results.

## 10 SWITCHBOARDS

10.1 General: Switchboards shall be dead front type, completely metal enclosed self-supporting structure independent of wall supports. Switchboards shall consist of the required number of vertical sections bolted together to form one rigid switchboard. Switchboard construction shall be a rigid framework that will maintain its strength and rigidity during shipment. The sides and rear shall be covered with removable screw-on plates having formed edges all around. All covers shall be fabricated from code gauge steel and shall be provided with the necessary ventilated openings to maintain minimum temperature.

Switchboards shall be provided with adequate lifting means and shall be capable of being rolled or moved into installation position and bolted directly to the floor without the use of floor sills. Individual shipping sections shall be designed for bolting together at installation site. All necessary bolting hardware as well as main bus splices shall be supplied between adjacent shipping sections. All exterior and interior steel surfaces of the switchboards shall be properly cleaned and finished with gray baked enamel over a rust-inhibiting phosphatized coating.

The bus work shall be copper and shall be adequately braced to withstand mechanical forces exerted during short circuit conditions when directly connected to a power source having the available short circuit current of 65,000 amperes. The switchboard shall have circuit breakers series rated or fully rated to comply with those scheduled.

10.1.1 Provide a 3 phase, 4 wire surge arrestor and surge capacitor for control of lightning and voltage surges created from exterior sources. Devices shall be labeled for use ahead of the service disconnects and mounted in the switchboard.

10.1.2 A ground bus and lug shall be furnished firmly secured to each vertical section structure and shall extend the entire length of the switchboards.

Switchboard shall be completely factory assembled, wired and tested before delivery and shall bear UL labels. Designs shall meet NEC and NEMA standards as well as OSHA requirements. Switchboards shall be Square D or equivalent by G.E., Siemens, Eaton or approved equal.

Switchboard shall be approximate size shown on plans. If larger, then it is the responsibility of the contractor to modify the electrical space to incorporate the equipment and the modified layout must be acceptable to the engineer. All sections of the switchboard shall align. Construction shall allow maintenance of incoming line terminations, main device connections and all main bus bolted connections to be performed without rear access. The feeder or branch devices shall be removable from the front with the necessary device line and load connections front accessible. Branch breakers shall be as scheduled.

10.1.3 All breakers 800 amps and larger shall be electronic type with adjustable settings. Breakers 1200 amps and larger shall be equipped with an energy reducing maintenance switch with local status indicator to comply with NEC 240.87.

10.1.4 Identification: The switchboards shall be furnished with laminated engraved nameplates, approximately 1 inch by 3 inches, mounted with screws, for each breaker plus a main disconnect nameplate for each main.

## 11 SURGE PROTECTIVE DEVICES (SPD)

11.1 General: All SPD equipment shall have the latest listing or certification by UL 1449 and UL 1283 with labels identifying the compliance with these testings. The Maximum Continuous Operating Voltage (MCOV) of all suppression components shall not be less than 115% rated voltage. Equipment shall be in NEMA 1 enclosure with audible alarm with a silencing switch and status indicator lights on face. The audible alarm and indicator lights shall provide a warning of a decrease or loss in protection (not just indicate that power is on or off). The cover shall have a label to clearly state what the status of the lights and alarm indicate. Product shall have a minimum 5 year full replacement warranty for any defects or failures from transient surges.

11.2 Distribution Panel SPD: Provide an externally mounted SPD adjacent or above the service entrance panel. Unit shall be mounted as close as possible to breaker serving the unit. The minimum surge current capacity (single pulse rated) per phase (L-N mode + L-G mode) shall be 200KA minimum.

11.3 Branch Panel SPD: Equipment shall be integral to the panel. The unit shall mount to the panel buss bars and have uninterrupted wiring space on both sides for top or bottom feeds. If external, the unit shall be mounted as close as possible to breaker serving the unit (and flush in wall if panel is flush mounted). The minimum surge current capacity (single pulse rated) per phase (L-N mode + L-G mode) shall be 120KA minimum. EMI/RFI noise rejection filtering shall be no less than 50dB at 100KHz. Product shall have a minimum 5 year full replacement warranty for any defects or failures from transient surges.

11.4 Connections: Integral units shall be bolted to the panel buss bars.

11.5 Submittals: The following manufacturers may submit for review: Current Technology, Advanced Protection Technologies, LEA, Powerware, Liebert, Intermatic, Cutler Hammer, Siemens, Square D and GE. Submittal data shall include all literature to back up the requirements in these specifications and be highlighted or marked to indicate the model and accessories or options provided. The equipment must be submitted with certified test data per ANSI/IEEE C62.41 and ANSI/IEEE C62.45 for Category C3 (not to exceed 675 volts for 120/208 or 120/240 volt systems and not to exceed 1100 volts for 277/480 volt systems) and Category B3 (not to exceed 400V volts for 120/208 volt systems and not to exceed 800 volts for 277/480 volt systems).

## 12 DRY TYPE TRANSFORMER

12.1 Indoor Transformers: Provide Square D dry type transformers for conversion of 480 volts to lower voltages as scheduled. Transformers shall have Class H insulation and 4-2B% taps in high voltage winding (two above and two below rated voltage). All terminals shall be completely enclosed. Internal and spring type external vibration isolators shall be provided for noise control. Noise levels shall be less than NEMA standards. Equivalent transformers by GE, Siemens, Cutler-Hammer, or approved equal may be used. Provide all mounting brackets and accessories

## 13 LIGHTING FIXTURES

13.1 General: All units UL labeled. Drivers and internal wiring to be factory installed. Catalog numbers shown are for basic units; furnish complete with flexible connections, trim and other appurtenances necessary to the installation. Coordinate frames and fixtures with ceiling construction in each room before ordering.

13.2 Substitutions: Reference to a specific manufacturer's product is made only to establish a standard of quality and design, and to give a general description of the basic type desired. Substitutions will be subject to the approval of the Architect.

13.3 LED Fixtures: All LED fixtures shall have at least the initial delivered lumen output and the color temperature stated in the lighting fixture schedule. The CRI shall be 80 or better, a life expectancy of at least 50,000 hours at 70% lumen maintenance, minimum of 5 year warranty (including driver) and shall be tested in accordance with LM-79 and LM-80.

13.4 LED Driver: The LED driver shall be installed in an electrical enclosure. Driver shall be provided and warranted by the lighting fixture manufacturer. Driver shall have a Class A sound rating. It shall have a life expectancy of at least 50,000 hours. It shall comply with FCC rules and regulations. Coordinate voltage of driver with the circuit connected. Coordinate 0-10 volt dimming or other method so that it will be compatible with the controls specified.

13.5 Coordination: Contractor shall verify voltage of fixtures with the circuits to be connected to and coordinate fixture trims with ceilings in each area prior to placing an order.

13.6 Installation: Lay out work as shown, and to provide attractive and efficient arrangement; coordinate with work of other trades. Provide adequate and substantial supports for fixtures. Prior to final inspection clean fixtures and lamps with a soft cloth or sponge and detergent (not soap) solution. Each fixture shall be anchored to or in ceiling, wall, etc. as approved by the architect. Adjustable fixtures (track mounted, floodlights, etc.) shall be aimed as stated or as directed by the Owner or Architect.

13.6.1 Securely fasten troffers in exposed grid ceiling with integral or factory furnished grid clips and to structure (separate from ceiling supports) by means of cables or wires. Cable or wire fixture supports shall comply with specifications for anchoring a lay-in ceiling system with at least a wire or cable attached at two opposite corners of each fixture. Support wires shall be independent of each other and from supporting other trades. Provide color or tagging of the fixture support wires to distinguish them from the other trades support wires.

13.6.2 Suspended lighting fixtures shall be complete with stems and swivel hangers. Anchor stems to support 60 pounds each. Stem swivels shall match ceiling slope. Provide swivel stems for suspended high bay type fixtures to allow fixture movement.

13.7 Emergency Battery Lighting Units: Connect units to non-switched lighting circuit in area per manufacturer's installation instructions so that when power fails the unit will operate. If unit is furnished within a fixture, the normal operation controlled by a wall switch or control system shall remain but when the power fails, the unit will operate. Units separate from a specified fixture shall have the lamp heads aimed toward the floor along the means of egress.

13.8 Lighting Standards: Refer to detail on plans for luminaire and pole information. The poles shall be manufactured or furnished by the same manufacturer as the luminaire. Unless stated otherwise, poles shall be designed to withstand 90 miles per hour plus a 1.3 gust factor with luminaries and other accessories mounted. Poles longer than 20 feet shall have factory installed Aeolian vibration dampener.

## 14 WIRING DEVICES

14.1 General: Manufacturers and catalog numbers listed are used to establish style, type and quality. Equal devices by Hubbell, Leviton, Legrand and Eaton will be accepted. All devices shall have plaster ears. See kitchen plans for other devices required.

14.2 Installation: Unless otherwise noted install wall devices vertically, so that all devices of any given height will align exactly. Plates must be plumb and true with all four edges contacting wall surface. Mount receptacles with grounding terminals down. Do not install devices until plastering or other type wall covering has been completed; install ahead of painting work, but protect from paint spatter.

14.3 Duplex Receptacles: 125v/15a, flush duplex receptacles with side and back wiring, grounding terminal and breakoff fins for converting to 2-circuit use, Hubbell BR15. Color to be selected by the architect. Where a 20 amp circuit feeds only one receptacle, that receptacle shall be rated 20 amps (Hubbell BR20). Where indicated GFI, provide duplex receptacle with integral ground fault protection and test switch (Hubbell GFRST20). Where indicated WP, provide GFI protected weather resistant type duplex receptacle (Hubbell GFWRST20) in cast box with cast plates and lift cover.

14.4 Device Plates: Type appropriate for device of 302 stainless steel alloy. Provide single plate or proper gang where more than one device occurs. Furnish blank plates on outlets for future use.

14.4.1 At exposed conduit fittings or boxes employ galvanized steel utility box plates by box manufacturer.

14.5 Surface Raceway: Surface raceway shall be by Wiremold AL3300 series or approved equal. Raceway shall be one-channel type for power wiring and outlets. Raceway shall be extruded anodized aluminum with snap-in covers with wiring space available in raceway behind the receptacles. Provide duplex receptacles 24" on center. Provide a phenolic nameplate above each receptacle indicating the circuit it is connected to. Locate all raceways as directed by Architect. Provide with receptacles, plates, covers, feed-in boxes, supports, elbows, caps, connectors, etc. required for a complete installation.

14.6 Floor Outlet (2-Gang): Floor outlet shall be a multi-service recessed in floor type box with two gangs. Wiremold/Legrand Resource series floor box or approved equal. Provide brackets, plates, compartment separators, flush access covers, etc. as required for complete assembly. The floor box shall have two duplex receptacles. Wiremold # RFB2-OG where box is in concrete on grade and RFB2S-FC where in concrete on an elevated slab with an extra RFB-DR bracket and flanged blank top cover with tile/carpet insert. Cover color to be selected by the architect. Mount at exact location as directed by Architect. All floor boxes on elevated slabs shall be fire classified type.

14.7 Floor Outlet (4-Gang): Floor outlet shall be a multi-service recessed in floor type box with four gangs. Wiremold/Legrand Evolution series floor box or approved equal. Provide brackets, plates, compartment separators, flush access covers, etc. as required for complete assembly. The floor box shall have two duplex receptacles and two compartments for auxiliary systems use. Wiremold EFB45S-OG where box is in concrete on grade and EFB45S-FC22 where in concrete on an elevated slab. Provide with brackets and plates to accept two duplex receptacles and one data outlet and one A/V outlet and flanged blank top cover with tile/carpet insert. Coordinate plates and accessories required for devices with owner's IT and A/V departments. Cover color to be selected by the architect. Mount at exact location as directed by Architect. All floor boxes on elevated slabs shall be fire classified type.

14.8 8" diameter poke thru devices may be used in lieu of 4-Gang floor boxes where the poke thru device is accessible from below. 6" diameter poke thru devices may be used in lieu of 2-Gang floor boxes where the poke thru device is accessible from below. Poke thru devices shall be Wiremold Evolution Series or equal and contain the compartments, accessories, outlets, plates, etc. as specified.

## 15 LIGHTING CONTROLS

15.1 General: Provide type controller described herein and all accessories required for a complete installation. Locate occupancy sensors to monitor room or area installed as directed by the manufacturer. If a directional type, mount on ceiling in corner of room so that sensor will not detect motion outside of room. In toilets mount to cover entrance doorway and individual stalls. Low voltage units require a power supply/relay unit and shall be located above an accessible ceiling in same space. All low voltage wiring shall be in conduit unless noted. All wiring (quantity and type) shall be as recommended by the manufacturer.

15.2 Wall Switches: 120/277v, 20a, flush enclosed, quiet type switches. Color to be selected by Architect. Hubbell Specification Grade, 1221, 1222, 1223, 1224 series as required. Provide similar 20a and 30a switches as indicated.

15.3 PIR & Ultrasonic Wall Switch Sensor: Shall use PIR and ultrasonic detection and can operate on 120/277 volts. Dip switches shall be available to change operation settings. Switch shall be Hubbell LHMTS (single pole) or LHDCMTD (where indicated two pole) with cover plate or approved equal. Unit shall have at least a 5 year warranty. Color choices of device shall be white, gray, black, light almond, ivory and submitted to the architect for selection. Program for occupancy sensing (auto on) or vacancy sensing (manual on) as stated in the description. Inform the user of the space the adjustable settings available and program the switch for their preferences. Instruct the user how to operate the switch.

15.4 PIR & Ultrasonic Wall Dimmer Sensor: Shall use PIR and ultrasonic detection and can operate on 120/277 volts. Dimming method is 0-10 volt. Dip switches shall be available to change operation settings. Switch shall be Hubbell LHDMMTS with cover plate or approved equal. Unit shall have at least a 5 year warranty. Color choices of device shall be white, gray, black, light almond, ivory and submitted to the architect for selection. Program for occupancy sensing (auto on to 50% light output) or vacancy sensing (manual on) as stated in the description. Inform the user of the space the adjustable settings available and program the switch for their preferences. Instruct the user how to operate the switch.

15.5 Digital Load Control System: Provide a system of compatible products that controls the lighting and receptacles in the same room and can operate on 120/277 volts. The ceiling mounted occupancy sensors and wall switches connect to the controllers with Cat 5e cables. The components shall have at least a 5 year warranty. Connect the components as recommended by manufacturer. Many of the components specified have the same model number, but can be programed to perform different functions. Program the components to perform the function stated on the drawings. The individual components are as follows:

- Non-Dim Room Controller: Single relay room controller for one circuit of lighting control. Hubbell NXRCFX-1RD-UNV or equal.
- One Zone Dimming Room Controller: One relay room controller with 0-10 volt dimming capable of on/off and/or raise/lower one zone of lighting. This device shall also have an integral time clock that can be used for programming a schedule of operation. Hubbell NXRCFX-1RD-UNV or equal.
- Two Zone Dimming Room Controller: Two relay room controller with 0-10 volt dimming capable of on/off and/or raise/lower two zones of lighting on the same circuit. This device shall also have an integral time clock that can be used for programming a schedule of operation. Hubbell NXRCFX-2RD-UNV or equal.
- Three Zone Dimming Room Controller: Provide a one zone and a two zone controller as required.

- Wall Controller (Non-Dimming): Two buttons to turn lighting on and off. Hubbell NXSW-OO or equal. Color to be selected by the architect.
- Dimming Wall Controllers: Four buttons to turn lighting on and off and raise/lower the light level. Provide a dimming wall switch for each zone of lighting controlled. Hubbell NXSW-ORLO or equal. Color to be selected by the architect.
- Dual Technology Occupancy Sensor on Ceiling: Ceiling mounted sensor with PIR and ultrasonic detection. Hubbell NXOS-OM with range model to cover area installed or equal.
- AV Interface: Provide an interface device to allow each zone to be controlled from Audio Visual control devices via RS232. Hubbell NXAVM or equal.
- Interconnection Cable: Provide pre-made or field cut Cat 5e plenum rated cables terminated with RJ45 style plugs.

15.6 Spare: Provide 10% of each component with a minimum of one per type. Deliver to owner at end of project.

15.7 Settings: Install with factory recommended settings for space located. Dip switches shall be available to change operation settings. Electrical contractor shall expect to make up to three (3) trips to the site during the one year building warranty to fine tune and adjust any occupancy sensors the owner desires.

15.8 Installation: All sensors shall be mounted on ceiling unless noted. Provide brackets as required for installation. Refer to wiring diagrams on the plans for multiple sensor and power supply/relay requirements, adding wall switches and loads. Provide quantity of sensors and relays as recommended by manufacturer to cover area and operate all circuits and lighting. Actual connections, conductor type and quantity required shall be as instructed by the manufacturer. Provide plenum rated cables where required. Those that require aiming shall be positioned to cover area installed. The low voltage cables and/or wiring shall be installed in conduit separate from the power conductors or run exposed in a neat and orderly manner and attached to the lighting circuit conduits within 12” from luminaire and box and at least 24” maximum intervals throughout run. Control wiring shall be run in conduit where access or replacement is not possible (in walls, above hard ceilings, etc.).

15.9 Submittal: Substitutions to the sensors above shall be submitted for review. Substituted products shall bring to engineer’s attention all differences if their product verses that specified. Variations in the design for better operation are welcomed. Those by Watt Stopper are listed by catalog number in order to establish a standard and state features and operation desired.

15.10 Pre-Commissioning: Each lighting system manufacturer shall have a trained representative visit the job site prior to the final inspection date and test all lighting control equipment they supplied. The test shall verify proper operation, calibration, adjustments and programming required to satisfy the owner while complying with the energy code. A report shall be delivered to Mills-Conoly Engineering, P.C. stating the results of the test.

## 16 TELEPHONE/DATA/TV SYSTEMS

16.1 Scope: Provide a complete system of outlets, conduit raceways, terminal backboards, cabling, racks, patch panels, jacks, etc. for systems as shown. Refer to specification section 27 00 00 for cabling, jacks, racks, patch panels and other equipment and work required.

16.2 Backboards: Provide 4' x 8' x 3/4" plywood backboards at locations indicated to receive equipment. Coat with two coats of fire retardant paint on both sides and all edges.

16.3 Raceway System: Conduit raceway (3/4" minimum size) same as specified for power wiring. Generally outlets shall be wall outlet boxes. Provide blank plates (same specification as those in wiring device section) for one-half the outlets shown. The remainder outlets shall have plates furnished by Owner's telephone installation contractor. Install plates on outlets directed by Owner or by Architect. Provide #14 galv. pull wire in all runs, and bushings on conduit ends. At backboard terminate conduits neatly and uniformly at edge of backboard.

16.4 Cable Trays: Provide a cable tray system complete with all bends, offsets, elbows, couplings, supports, etc. All components shall be free of burrs or sharp edges. Tray shall be MonoSystems Power-Tray or approved equal. Tray shall be aluminum construction, metal basket type, 4" deep by 12" or 18" (see plans) wide with 9" rung spacing. Coordinate layout with other trades. Suspend tray above ceiling and provide 12" above tray for installation of cables. Provide conduit adaptors as required to anchor conduit to tray. Coordinate with ducts, piping, structure, etc. Provide level changes as required and as directed by architect. Trays shall be supported for weight of 120 pounds per foot. Cable tray to be installed and supported according to NEMA standards.

16.5 Cable Hooks: Provide a system of hooks mounted to wall above accessible ceilings for support of cables. All components shall be free of burrs or sharp edges. Shall be Mono-Systems, Inc. “The Hook” system or approved equal. Hooks shall be aluminum construction, each to be 6" deep by 6" wide and spaced 36" on center. Coordinate layout with other trades. Mount on corridor wall and provide supports for spans to continue at intersections. Coordinate with ducts, piping, structure, etc. Provide level changes as required and as directed by architect. The hooks may be used for telephone, data and television systems. The fire alarm and intercom systems shall be in dedicated raceways.

16.6 Sleeves in Walls: Where sleeves are shown in non-rated walls, provide a 4” EMT conduit nipple through wall with plastic bushings on each end. Where sleeves are shown in rated walls, provide one of the following systems that allow cables to the installed and/or removed without disruption of sealant system:

16.6.1 FlameStopper Thru-Wall Fitting by Wiremold Company. Where 2” nipples are shown, provide the 2” thru-wall fitting (#FS2R-GA) with 2” EMT conduit sized per wall thickness and number indicated. Where 4” nipples are shown, provide the 4” thru-wall fitting (#FS4R-GA) with 4” EMT conduit sized per wall thickness and number indicated. Install system as directed by manufacturer’s installation instructions.

16.6.2 EZ-Path fire rated pathway by Specified Technologies, Inc. The fire rated pathways shall be U/L listed for rating of wall penetrated. Each sleeve shall have a 3”x3”x10.5” opening with an internal sealing system. Provide number of sleeves as required to match area of conduit nipples shown. Provide all pathways, trim kits, sealant around sleeves, etc. as required for a complete installation.

## 17 EQUIPMENT CONNECTIONS AND CONTROLS

17.1 General: Provide electrical connections to all equipment as shown and as described in other sections and as outlined below. For equipment supplied with portable cords provide receptacles to match plugs on cords. Connect all equipment ready for operation, in accordance with detail wiring diagrams furnished by the equipment manufacturer and in cooperation with the respective subcontractor.

17.2 Connections: Provide safety switches for all motors and equipment as indicated or required by NEC. Connect all motors and equipment to equipment terminal boxes with flexible conduit with ground conductor. Where terminal boxes are not provided, terminate flexible conduit in suitable condulet and make connections.

17.3 Disconnecting Means: All equipment required by Code to have a disconnecting means and is not furnished with the equipment, shall be provided whether shown or not. If not shown on the plans and the panel is not within sight, then provide a safety switch with fusing to meet these specifications and the codes. Where breakers in panels are serving as disconnects, then the breaker shall be HACR rated and be sized per the maximum allowable by the nameplate (coordinate sizing with equipment supplier).

17.4 Safety Switch Sizes: The safety switches are sized on the plans according to the data supplied during the design and NEC requirements. In many situations the switch is too large and fuse reducers are required to meet the nameplate maximum fuse size. Therefore, the electrical contractor has the option to fully coordinate with the supplier of the equipment and change the breaker and switch size as required prior to ordering of material or provide the fuse reducers. Any change shall be approved by the engineer and shall meet NEC.

17.5 Motors and Motor Starters: Furnishing and installation of motors is specified under various Sections. Connect for correct rotation. Starters are specified to be furnished with motors. Install and connect all starter (except such starters which are an integral part of the specific equipment).

17.6 HVAC Equipment: Furnish all branch circuit wiring to air handling units, heat pumps, rooftop units, packaged units, unit heaters, fans, control panel, and other equipment so as to provide a complete power wiring system. Control equipment and control conduit wiring is specified under Section 25.

17.6.1 Control devices to be included in the branch circuits except those furnished integral with the equipment will be delivered by the HVAC Contractor and installed by the Electrical Contractor.

17.6.2 Provide all thermostat outlets and conduits for HVAC controls. Coordinate with the mechanical contractor for total number and exact location of outlets required. Conduits shall be 1/2" minimum with pull wire.

17.6.3 Outlets for thermostats shall be 4-inch square boxes mounted flush with wall. Provide single or double gang plaster rings as directed by the HVAC contractor.

17.6.4 Conduits for controls may be combined for multiple control circuits to control panel. Coordinate conduit requirements with HVAC Contractor.

17.7 Kitchen Equipment: Dishwasher, booster heaters, serving equipment, ice machine, hood lights, walk-in cooler and freezer, refrigerator, cooking equipment, sink heater, and other kitchen equipment will be furnished and installed under another section or by the Owner. Rough-in and connect in accordance with shop drawings or instruction by supplier. Provide seals in all conduits entering refrigerated spaces. Provide all necessary wiring between compressors and walk-in coolers and freezers. Confirm requirements for equipment furnished and provide conduit, wiring, breakers, switches, etc. actually required for equipment.

17.8 Miscellaneous Equipment: Electric water coolers, water heaters, hand dryers, circulating pumps, aquastats, time clocks, etc. and associated controls will be furnished and installed by under other sections or by Owner. Roughing in and connections for equipment shall be as directed by Suppliers. Outlet for electric water cooler shall be GFI type and mounted at an accessible location below the unit.

## 18 MISCELLANEOUS ITEMS

18.1 Nameplates: Provide 1" x 3" laminated phenolic nameplates (with 1/4" high black letters on white) on disconnect switches, panels, terminal cabinets, controllers, pullboxes, and on other equipment as required by code. Nameplates shall identify the equipment as referenced on the drawings and provide available short circuit current values where required by code. Furnish list for approval. Apply with contact bond adhesive.

18.2 Wiring Troughs/Auxiliary Gutters: Of sizes shown, constructed of code gage galvanized steel, with screw covers. Of NEMA 3R construction where mounted outdoors or exposed to moist conditions. Square-D, B & C, General Switch or approved equal.

18.3 Photo-Electric Switches: Switches shall be SPST, 2300 watt, 277 volt, Intermatic K4133. Equal units by Intermatic, GE or Fisher-Pierce will be accepted. Mount on cast box on conduit stubbed 14" above roof. Shall be U/L listed for voltage and contact rating specified.

18.4 Time Switch: One channel, 24 hour, astronomic programmable electronic time switch with battery backup, 20 amp SPST contacts, NEMA 1 enclosure and will accept 120 or 277 volt input. Tork #DWZ100A or approved equal. Shall be U/L listed for voltage and contact rating specified.

18.5 Padlocks: Padlocks shall be heavy duty brass type, weatherproof. All padlocks shall be keyed the same and match owner's keying system. Provide one key per padlock. Provide padlocks on safety switches and other non-lockable items accessible to public.

18.6 Relays: Relays shall be Square D or equal. NEMA I enclosures, contacts as noted, coil voltage, contact number, contact type, and contact rating as indicated or required.

## 19 AREA OF REFUGE INTERCOM SYSTEM

19.1 General: Provide a complete interior system for area of refuge. System shall be complete with equipment, wiring, connections, signage, ready for operation. System shall meet latest requirements of A.D.A. code.

19.2 Equipment: Shall be Cornell Communication Solutions series 4200 or approved equal as follows:

| | |
|---|---|
| Secondary Stations | #4201 |
| Master Station | #A4204 with auto-dialer unit coordinated with Trenholm State Community College |
| Power Supply | #8216 |

19.3 Installation: Install stations flush mounted in wall, 3’-10” above floor. Locate power supply above accessible ceiling or in a utility type room as directed by the Architect. Provide all conduit, wiring, boxes, etc. in accordance with manufacturer’s recommendation. Install master station adjacent to fire alarm system annunciator and provide power as required.

19.4 Operation: Depressing call button on secondary station shall sound signal and light annunciator on master station. Operation of switch on master station shall establish two-way communication with selected secondary station. If no response is issued in a designated time, then a call shall be placed to a designated location by the College which will allow two-way communication.

19.5 Signage: The Cornell system has refuge signage with operating instructions on the face plates. If a substitution does not have the ADA approved signage, then provide the following:

Signs shall be adjacent to secondary stations and master station. Signs shall be by Andco, Bell, Allenite, Best or equal meeting ADA requirements. Sign shall be sized as required, frameless with wording and braille mechanically etched into 1/16” etchable, durable, water soluable polymer, adhesive laminated to 1/8” photo polymer. Raised letters shall be painted with high contrast to non-glare background, sans serif style, upper case and 5/8” high. Both braille and letters shall be raised 1/32” from background. Because the above signage requirements are strict and must comply with ADA, it is recommended for the electrical contractor to negotiate with the general contractor to have these signs furnished with the architectural signage package.

At master station provide sign which states:
AREA OF REFUGE.
FIREMAN'S INTERCOM STATION.
A LIT LED INDICATES ASSISTANCE NEEDED.

At each secondary station provide sign which states:
AREA OF REFUGE.
PRESS BUTTON ON INTERCOM
STATION AND ANNOUNCE CONDITION.
RELEASE BUTTON AND WAIT FOR REPLY.

## 20 FIRE ALARM SYSTEM

20.1 General: Provide a complete analog addressable fire alarm system with all wiring, equipment, etc. System shall be EST4 or equivalent by Gamewell, Notifier or Johnson Controls. Characteristics of the equipment and the circuits throughout the system shall be such that the system will operate satisfactorily in every respect. Install all components required so future additions will operate as a complete system. The system shall conform to applicable provisions of ADA, ANSI, National Fire Protection Association (NFPA) Publications and all State and local ordinances.

20.2 City Submittal: Once approved by engineer, fire alarm shop drawings shall be submitted to Montgomery Fire/Rescue Bureau of Inspections for approval.

20.3 Qualifications: The fire alarm system shall be supplied by an authorized distributor for equipment furnished. The personnel that makes final connections and certifies this system shall be:

20.3.1 Factory trained by proposed system manufacturer.

20.3.2 Is N.I.C.E.T. level 2 or higher certified for automatic fire alarm systems.

20.4 State Requirements: The State Fire Marshal requires Fire Alarm Contractors to be certified through their office. All Fire Alarm Contractors performing work must comply with this requirement.

20.5 Normal System Operation: Actuation of any manual station, flow valve, heat detector, smoke detector or any initiating device shall cause the following operations to occur, unless otherwise specified:

20.5.1 Operate all audible signals continuously until silenced by an authorized person.

20.5.2 Flash all strobe lights continuously until the system has been reset at the control panel or annunciator.

20.5.3 Annunciate location on fire alarm control panel and annunciator.

20.5.4 Duct smoke detectors at mechanical units shall have contacts and relays for use by HVAC Contractor to stop associated unit.

20.5.5 Transmit signal to remote location.

20.5.6 Smoke detectors in elevator lobbies, elevator shaft, and elevator equipment room shall additionally send signal to elevator controls for emergency recall operation. Heat detectors in elevator shafts, and elevator equipment room shall additionally cause emergency shutdown of elevator equipment and removal of power from elevator equipment as required by NFPA 101 and ANSI 17. Coordinate with elevator contractor for time delay contacts. Provide all necessary relays, time delay relays, wiring, etc. required.

20.5.7 Closing of an OS&Y valve or PIV valve from full open position and low air sensed from pressure switch shall cause trouble signal in system and shall indicate location of valve operated.

20.5.8 Release smoke doors.

20.6 Equipment Supplier: Must maintain an office within 100 miles of job site, must be authorized factory service representative for equipment supplied, and must directly supervise final connection and testing. Submit letter certifying system for proper installation and operation.

20.7 Power Supply: Provide primary power supply from a circuit breaker with lock on device in panel.

20.8 Equipment: To be Edwards System Technology as follows:

20.8.1 Control Panel: The control panel shall be an EST 4 analog addressable panel with a local alphanumeric display and printer capability. The panel shall provide for all necessary power requirements as dictated by the total system. Standby batteries shall be furnished to comply with all applicable codes. Provide transmitter (digital type, dialer type, etc.) compatible with equipment at remote monitoring station as directed by Owner. Panel shall have built-in TVSS protection on power and transmitter circuits.

20.8.2 Pull Stations: Manual pull stations shall be semi-flush mounted, with addressable elements and double action assemblies. EST SIGA-278. Reset of station shall be by key operation (not screw).

20.8.3 Ceiling Smoke Detectors: Ceiling smoke detectors shall be analog addressable multi-criteria type with addressable base. Detectors shall be programmed for verification. EST SIGA-OSD with SIGA-SB4 base.

20.8.4 Heat Detectors: Heat detectors shall be analog addressable type set to temperature settings as required for the location and purpose intended. EST SIGA-HRD with SIGA-SB4 base for 135° fixed and rate-of-rise type. Provide equipment as required for 190° rating.

20.8.5 Door Holders: Flush mounted in wall with door fitting. Locate and install as directed by architect. Anchor holder to withstand 50 pound pull. Provide with brushed aluminum finish. Provide brushed aluminum shim plate on door as directed by Architect to adjust door to wall. Where door is located too far from wall to use shims (as determined by Architect), provide aluminum arm (design as approved by Architect) to bridge space.

20.8.6 Duct Detectors: Duct smoke detectors shall be photoelectric type with sampling tubes furnished to comply with NFPA requirements. EST SIGA-OSD with mounting plate, housing and duct tube. Provide a remote LED light in a viewable location when detector is above a ceiling or in a non-visible location.

20.8.7 Speaker/Flashing Light Units: Wall or ceiling mounted as shown. Audible/visual signals shall comply with all ADA requirements and sound levels determine the DB ratings of each device. Combination speaker/strobe lights shall be 30 candela or 110 candela. In toilets provide strobe lights only (15 candela). EST Genesis G4 Series. Mount wall units 80" above floor.

20.8.8 Annunciator: Remote alphanumeric annunciator shall be designed and equipped to receive, monitor and annunciate signals from devices and circuits installed throughout the building. EST Model 4-ANN Series.

20.8.9 Zone Modules: Zone modules for connecting hood extinguishing systems, sprinkler alarm and other contact devices shall be #SIGA-CT1 or #SIGA-CT2 as required.

20.8.10 Control Relay Modules: Control relay modules for HVAC unit control, etc. shall be provided as required and shall be #SIGA-CR as required and relay type coordinated with other equipment.

20.8.11 Miscellaneous: The sprinkler flow switch will be furnished by respective contractor and installed by the same. Make all connections required.

20.8.12 Relays: NEMA 1 with coils to match system, and contacts as required for A/C unit control and other functions. Enclosure to be red with nameplate. Connect to operate with smoke detectors, addressable elements, etc. Relay to disconnect elevator power shall be time delay type coordinated with elevator contractor.

20.8.13 Voice Evacuation System: The system shall consist of separate panel integrated with fire alarm control panel, speakers, flashing lights, amplifier (sized for area and speaker quantity), microphone, digital recorder, batteries, remote microphone capability and additional items required for a complete and code complying system. The system shall be sized for the amplification required with built-in digital message repeater. The speaker/flashing light units shall be 30 candela or 75 candela. EST genesis G4 Series.

20.9 Electrical Supervision: The system shall be electrically supervised against opens and grounds on both station and alarm circuits, and also against loss of electrical power on either leg of the main power supply (Class B, Style C). Trouble of this nature will cause a "Trouble Bell" or buzzer to sound at the control panel and remote location until trouble is corrected, but will not cause a false alarm to sound.

20.10 Installation: Provide all outlet boxes, backboxes, junction boxes, wiring, connections, etc., to provide a complete system. All wiring, boxes, conduits, etc. shall be in accordance with manufacturer’s recommendations for the equipment supplied, and lay out shall be modified accordingly. Fire alarm shall be identified on panel and annunciator as approved by the Architect. Install duct detectors as directed by HVAC Contractor. Provide zone modules and Control relay modules as required.

20.10.1 Wiring shall be in accordance with the manufacturer’s wiring diagrams and in compliance with NFPA Pamphlet No. 72. Interior wiring shall be Code approved, run in conduit in accordance with the wiring section of the specification. System shall be tested free from grounds and shorts and left in perfect operating condition.

20.10.2 Provide programming of system as required and directed by local authority. The wording and indications on alpha-numeric displays will be approved by local authority. Connect signals to have strobes continue to operate when a silence command is issued at the annunciator or control panel.

20.10.3 The fire alarm control panels in buildings A, B, C & D shall be interlinked together by fiber optic cable in conduit separated from data systems as recommended by manufacturer. The fire alarm system in buildings A, B, C & D shall operate as one. If a link is broken between buildings' fire alarm panels, then the fire alarm system shall operate independently of the others.

20.11 Testing: The fire alarm system shall be inspected and tested as detailed in NFPA 72 Chapter 7. Provide to Architect and Owner a completed Inspection and Testing Form as detailed in NFPA 72 Chapter 7-5.

20.12 Submittal: Provide a wiring diagram of system for approval. Conduit and wiring is not shown on plans and shall be designed and drawn for submittal and installation purposes. Equipment Contractor shall furnish complete point by point wiring diagram on a floor plan for approval prior to installation. Diagram shall show all equipment, conduit, type and number of conductors, etc. required for system to be installed. A typical diagram will not be acceptable. Provide documentation proving qualifications of installation personnel. Submit all devices and wiring diagram at same time or the submittal will automatically be rejected.

## 21 BORING (HORIZONTAL DIRECTIONAL DRILLING)

21.1 General: For underground work under parking areas or large areas of finished surfaces (other than grass), utilize horizontal directional drilling (HDD) method to install the conduit. This work shall include all services, equipment, materials, and labor for the complete and proper installation and protection of the environment. Boring depths shall not affect the surface grade.

21.2 Equipment: The directional drilling equipment shall consist of a directional drilling rig of sufficient capacity to perform the bore and pullback of the conduit, a drilling fluid mixing and delivery system of sufficient capacity to successfully complete the underground crossing of the unaffected surface, a guiding system to accurately guide boring operations and trained and competent personnel to operate the system. All equipment shall be in good, safe operating condition with sufficient supplies, materials, and spare parts on hand to maintain the system in good working order for the duration of the project.

21.2.1 Drilling Rig: The directional drilling machine shall consist of a hydraulically powered system to rotate, push and pull hollow drill pipe into the ground at a variable angle while delivering a pressurized fluid mixture to a guidable drill (bore) head. The machine shall be anchored to the ground to withstand the pulling, pushing and rotating pressure required to complete the crossing. The hydraulic power system shall be self-contained with sufficient pressure and volume to power drilling operations. Hydraulic system shall be free of leaks. Rig shall have a system to monitor and record maximum pull-back pressure during pull back operations.

21.2.2 Drill Head: The drill head shall be steerable by changing its rotation and shall provide the necessary cutting surfaces and drilling fluid jets.

21.2.3 Mud Motors (if required): Mud motors shall be of adequate power to turn the required drilling tools.

21.2.4 Drill Pipe: Shall be constructed of high quality 4130 seamless tubing, grade D or better, with threaded box and pins. Tool joints should be hardened to 32-36 RC.

21.2.5 Pipe Rollers: Pipe rollers, if required, shall be of sufficient size to fully support the weight of the pipe while being hydro-tested and during pull-back operations. Sufficient number of rollers shall be used to prevent excess sagging of the pipe.

21.2.6 Pipe Rammers: Hydraulic or pneumatic pipe rammers may only be used if necessary and with the authorization of Engineer.

21.2.7 Restrictions: Other devices or utility placement systems for providing horizontal thrust other than those previously defined in the preceding sections shall not be used unless approved by the Engineer prior to commencement of the work. Consideration for approval will be made on an individual basis for each specified location. The proposed device or system will be evaluated prior to approval or rejection on its potential ability to complete the utility placement satisfactorily without undue stoppage and to maintain line and grade within tolerances prescribed by the particular conditions of the project.

21.3 Guidance System: Requirements: The Guidance System shall be of a proven type and shall be setup and operated by personnel trained and experienced with this system. The Operator shall be aware of any magnetic anomalies and shall consider such influences in the operation of the guidance system if using a magnetic system.

21.4 Drilling Fluid (Mud) System:

21.4.1 Mixing System: A self-contained, closed, drilling fluid mixing system shall be of sufficient size to mix and deliver drilling fluid composed of bentonite clay, potable water and appropriate additives. Mixing system shall be able to molecularly shear individual bentonite particles from the dry powder to avoid clumping and ensure thorough mixing. The drilling fluid reservoir tank shall be sized for adequate storage of the mud. Mixing system shall continually agitate the drilling fluid during drilling operations.

21.4.2 Drilling Fluids: Drilling fluid shall be composed of clean water and an appropriate additive. Water shall be from a clean source with a pH of 8.5 – 10 and/or as per mixing requirements of the Manufacturer. Water of a lower pH or with excess calcium shall be treated with the appropriate amount of sodium carbonate or equal. The water and additives shall be mixed thoroughly and be absent of any clumps or clods. No hazardous additives may be used. Drilling fluid shall be maintained at a viscosity sufficient to suspend cutting and maintain the integrity of bore wall.

21.4.3 Delivery System: The mud pumping system shall have a minimum capacity to supply mud in accordance with the drilling equipment pull-back rating at a constant required pressure. The delivery system shall have filters in-line to prevent solids from being pumped into the drill pipe. Connections between the pump and drill pipe shall be relatively leak-free. Used drilling fluid and drilling fluid spilled during drilling operations shall be contained and properly disposed of. A berm, minimum of 12” high, shall be maintained around drill rigs, drilling fluid mixing system, entry and exit pits and drilling fluid recycling system (if used) to prevent spills into the surrounding environment. Pumps and or vacuum truck(s) of sufficient size shall be in place to convey excess drilling fluid from containment areas to storage facilities.

21.5 Execution: All personnel shall be fully trained in their respective duties as part of the directional drilling crew and in safety.

21.5.1 Site Work: Prior to any alterations to work-site, contractor shall photograph entire work area, including entry and exit points. Photos shall be digital format jpg files delivered to Architect with dates and locations. After work is completed provide photos taken from same locations showing condition of site.

21.5.2 Drill Path Survey: Entire drill path shall be accurately surveyed with entry and exit stakes placed in the appropriate locations within the areas indicated on drawings. If contractor is using a magnetic guidance system, drill path will be surveyed for any surface geomagnetic variations or anomalies.

21.5.3 Environmental Protection: Contractor shall place silt fence between all drilling operations and any drainage, wetland, waterway, or other area designated for such protection by contract documents, state, federal and local regulations. Additional environmental protection necessary to contain any hydraulic or drilling fluid spills shall be put in place, including berms, liners, turbidity curtains and other measures. Contractor shall adhere to all applicable environmental regulations. Fuel or oil may not be stored in bulk containers within 200’ of any water-body or wetland.

21.5.4 Safety: Contractor shall adhere to all applicable state, federal and local safety regulations and all operations shall be conducted in a safe manner. Safety meetings shall be conducted at least weekly with a written record of attendance and topic submitted to Engineer.

21.5.5 Pipe: Pipe shall be fused together in one length, if space permits. Pipe will be placed on pipe rollers before pulling into bore hole with rollers spaced close enough to prevent excessive sagging of pipe. Pipe to be high density polyethylene (HDPE) with appropriate fittings.

21.5.6 Pilot Hole: Pilot hole shall be drilled on bored path with no deviations greater than 5% of depth over a length of 100’. In the event that pilot does deviate from bore path more than 5% of depth in 100’, Contractor will notify Engineer and Engineer may require Contractor to pull-back and re-drill from the location along bore path before deviation. In the event that a drilling fluid fracture, inadvertent returns or returns loss occurs during pilot hole drilling operations, contractor shall cease drilling, wait at least 30 minutes, inject a quantity of drilling fluid with a viscosity exceeding 120 seconds as measured by a March funnel and then wait another 30 minutes. If mud fracture or returns loss continues, contractor will cease operations and notify Architect. Architect and Contractor will discuss additional options and work will then proceed accordingly.

21.5.7 Reaming: Upon successful completion of pilot hole, Contractor will ream bore hole to a minimum of 25% greater than outside diameter of pipe using the appropriate tools. Contractor will not attempt to ream at one time more than the drilling equipment and mud system are designed to safely handle.

21.5.8 Pull-Back: After successfully reaming bore hole to the required diameter, Contractor will pull the pipe through the bore hole. In front of the pipe will be a swivel. Once pull-back operations have commenced, operations must continue without interruption until pipe is completely pulled into bore hole. During pull-back operations Contractor will not apply more than the maximum safe pipe pull pressure at any time. In the event that the pipe becomes stuck, Contractor will cease pulling operations to allow any potential hydro-lock to subside and will commence pulling operations. If pipe remains stuck, Contractor will notify Architect. Architect and Contractor will discuss options and then work will proceed accordingly.

21.5.9 Site Restoration: Following drilling operations, Contractor will de-mobilize equipment and restore the work-site to original condition. All excavations will be backfilled and compacted to 95% of original density. Landscaping will be restored to original. All mud shall be disposed of by the Contractor.

## 22 LIGHTNING PROTECTION SYSTEM

22.1 Scope: Provide a system of lightning protection for building and roof. Provide air terminals on top of roof as directed by Architect. Locate downleads and ground rods as directed by Architect. Install lightning protection components and systems according to UL 96A, LPI-175, and NFPA 780.

22.2 Requirements: System materials in general shall be copper and high copper content bronze castings, and shall be the standard product of a manufacturer regularly engaged in the production of lightning protection systems. All materials for this system shall be as manufactured by Thompson Lightning Protection, Inc., or approved equal. Material shall comply in weight, size and composition for the class of structure to be protected, as specified under the above mentioned codes. The system shall consist of all necessary cables, air terminals, mounting bases, fittings, couplings, connectors, fasteners, etc., as required to give a complete and coordinated system. All cable and all air terminals used shall bear UL label.

22.3 Shop Drawings: Complete shop drawings shall be submitted to the Architect prior to start of work. If any departures of consequence from the Shop Drawings are deemed necessary by the Contractor, secure approval thereof before work is resumed and completed.

22.4 Materials: All fittings except cable holders shall be heavy-duty type made from bronze castings. Pressure plates made from stamped or pressed

metal parts or fittings, utilizing crimp-type pressure devices will not be allowed. All bolts, screws, and related type hardware shall be stainless steel. Do not combine materials that can form an electrolytic couple that will accelerate corrosion in the presence of moisture unless moisture is permanently excluded from junction of such materials.

22.5 Conductors: System conductors shall be concealed except in mechanical space chases, and storage spaces. All main downleads and roof risers shall be concealed within the building walls. Location of downleads and ground rods shall be in areas approved by Architect. Leads to be run in PVC plastic conduit with roof cable penetrations made utilizing approved thru-roof connectors. Conduit terminations to be located as directed by Architect so as to allow future inspections. Use conductors with protective coatings where conditions would cause deterioration or corrosion of conductors.

22.6 Bonding: Bonding of all metallic objects and systems at steeple shall be complete. Primary bonds for metal bodies of conductance shall be bonded with appropriate fittings and full size conductor. Any connection between dissimilar metals shall be made with approved bimetallic connectors.

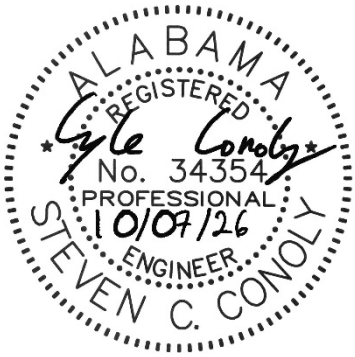
22.7 Ground Connections: Ground connections to earth shall be made with ¾" x 10' long copper clad ground rods and shall be driven to minimum depth of 12 feet or more as necessary to reach permanent moisture. In addition to artificial grounding, one ground shall be connected with full-size conductor to the water system at the point at which the water source enters the building. Also, provide common ground connection between the lightning system and electric system.

# SECTION 26 40 00

# RADIO FREQUENCY (RF) BDA-BASED SIGNAL BOOSTER SYSTEMS

# (IN- BUILDING RADIO SYSTEM COVERAGE)

The following seal, signed and dated,
acknowledge that Steven Cyle Conoly of Mills-Conoly
Engineering, P.C. prepared these specifications:




## PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Provisions of the Contract and of the Contract Documents apply to this Section.

1.2 SYSTEM DESCRIPTION

Provide Emergency Responder Radio Coverage throughout the building as required by International Fire Code 510 2021 version. The system shall be designed, provided, installed and tested to comply with the code and the City of Montgomery Fire Department requirements. Provide all equipment, boxes, raceways, conduits, wiring, etc. required for a complete and operational system. Provide power to devices as required from emergency panels. Provide fire alarm system monitoring as required by the code.

2.1 DEFINITIONS

A. BDA: Bi-directional amplifier in-building radio communication system that brings wireless signals into a structure from outside, amplifies those signals with a signal booster, and then evenly distributes the amplified signals throughout a structure via a Distributed Antenna System (DAS). The system also amplifies signals originating inside the building and transmits them outside.

2.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For headend and distribution system. Include plans, elevations, sections, details and attachments to other work.

1. Show fabrication and installation details for equipment.
2. Functional Block Diagram: Show single-line interconnections between components for headend and distribution system. Show cable types and sizes.
3. Dimensioned Plan and Elevations of Headend Equipment: Show access and workspace requirements.
4. Wiring Diagrams: For power, signal, and control wiring and transmission cable, include cross connects, taps, and other connections cords.

C. Design Calculations: Calculate signal attenuation budget and show calculated line and equipment losses for the system based on the functional block diagram, to show that proposed system layout can be expected to perform up to specification. Calculate signal strength from sources to endpoints. Allowable losses between components and user interface shall be used to determine size and type of cable.

D. Coordination Drawings: Include dimensioned plan and elevation views of components and enclosures. Show access and workspace requirements.

E. Equipment List: Include each piece of equipment and include model number, manufacturer, serial number, location, and date of original installation. Insert testing record of each piece of adjustable equipment, listing name of person testing, date of test, and description of as-left set points.

F. Field quality-control reports.

G. Operation and Maintenance Data: For headend and distribution system to include in emergency, operation, and maintenance manuals.

## PART 2 - PRODUCTS

2.1 GENERAL

A. The contractor shall design, furnish, install, and warranty a complete signal booster system. The installed system shall include all hardware, bi-directional amplifiers, band-pass filters, surge suppressors, lightning protection, UPS, transmission lines, power cabling, antennas, and other components necessary for a complete operational system as specified and as acceptable to the local authorities having jurisdiction. Conduit routing shall be approved by the architect.

## 2.2 RADIO FREQUENCY (RF) BDA-BASED SIGNAL BOOSTER SYSTEMS

A. In-building signal booster systems shall receive and re-transmit the entire uplink/downlink frequency band utilized by the regional emergency service provider(s). The contractor shall confirm with the regional emergency service provider(s) as to the specific frequencies used by the various agencies. This system shall be state-of-the-art, operating bi-directionally and in full duplex. The system shall be fully compatible with and function on Locality's Public Safety Radio System.

B. BDA shall be capable of providing in building coverage for all the cellular networks as identified by the owner.

C. Completed installations (including cabling) shall comply with all applicable codes and standards, including County Building and Electrical Codes, NFPA, ANSI, NEC, OSHA, EIA, IEEE, R-56, etc., as well as the FCC Rules and Regulations, as applicable. Equipment provided shall be UL listed and FCC type accepted for this specific application. Compliance to codes and standards shall extend to include proper grounding, bonding and surge.

D. The system shall provide digital signal strength coverage over 95% area on each floor/level of the equipped building, or in specific areas defined by Locality in a Scope of Work document for a particular building or site. Systems shall provide a minimum digital and analog overage of Circuit Merit (CM) 3, with a reliability factor of 95%. A Coverage Acceptance Test shall be executed prior to final acceptance of an installed system. Coverage acceptance testing shall be based on audio quality performance in evenly spaced test grids in the defined service areas. A minimum of 20 tests will be taken per floor/level. Total number of test grids will be determined by the Owner, based on the size of the space per floor/level.

E. Provide uninterruptable power source(s) (UPS) capable of maintaining the system operational for a minimum of 90 minutes.

F. During initial installation, each system shall be optimized to perform in accordance with the specifications set forth in the system design, manufacturer's specifications and FCC regulations. The contractor shall ensure that uplink and downlink levels are properly set and consistent with design expectations. The contractor shall further ensure that noise and spurious products are held within limits set forth in the system design, manufacturer's specifications and FCC regulations. Prior to system acceptance, for each active BDA, booster amplifier, etc., the contractor shall submit a Proof of Performance certification, that lists the design expectations, actual measurements, and if applicable, FCC specifications for the following parameters:

1. Worst case BDA uplink input level, in dBm.
2. Worst case BDA uplink output level, in dBm.
3. BDA downlink input level, in dBm.
4. BDA downlink output level, in dBm.
5. Noise and spurious products, BDA uplink output, in dBc.

6. Noise and spurious products, BDA downlink output, in dBc.

G. The original Proof of Performance report shall be submitted to Owner's project manager, and a copy of the Proof of Performance report shall be affixed to its associated equipment.

H. The system is designated for in-building use and shall be designed and quoted as follows: Design and appearance will be of "finished" construction, i.e. shall be concealed and/or unobtrusive in finished areas. Flush mount ceiling antennae may be acceptable on a case-by- case basis. Unless indicated otherwise, wire mold and surface conduit installations will not be acceptable unless approved in writing by the Architect in advance.

## PART 3 - EXECUTION

3.1 WARRANTY

A. The contractor shall provide a full one-year warranty to cover installation and all equipment, software, and components; the warranty shall commence upon the Owner's final acceptance of the facility. Under warranty coverage, the successful contractor shall provide same business day response time for system malfunctions.

B. The contractor shall perform optimization of each system during the initial warranty period, sixty (60) to ninety (90) days prior to warranty expiration. This optimization task is separate from the initial optimization performed during system installation. The contractor shall include pricing for annual system optimization to be included as part of post-warranty maintenance. Actual scope of work for annual optimization and maintenance will vary on a case-by-case basis, but typically will consist of the following:

1. Optimize the system to perform in accordance with the specifications set forth in the system design, manufacturer's specifications and FCC regulations.
2. Ensure that uplink and downlink levels are properly set and are consistent with design specifications.
3. Ensure that noise and spurious products are held within limits set forth in the system design, manufacturer's specifications and FCC regulations.

C. Update the Proof of Performance records for the system, listing the design expectations, actual measurements, and if applicable, FCC specifications for the following parameters:

1. Worst case BDA uplink input level, in dBm.
2. Worst case BDA uplink output level, in dBm.
3. BDA downlink input level, in dBm.
4. BDA downlink output level, in dBm.
5. Noise and spurious products, BDA uplink output, in dBc.
6. Noise and spurious products, BDA downlink output, in dBc.

D. The updated Proof of Performance report shall be submitted to the Owner, and a copy of the updated Proof of Performance report shall be affixed to its associated equipment.

E. Contractor shall provide a 20 amp dedicated 120 volt circuit from the emergency electrical panel to power this equipment. Breaker shall have lock-on device.

F. Contractor shall provide a monitor module from the fire alarm system for supervision of the radio system.

G. Visually inspect outside antenna installation. Correct any issues found with the antenna mounting hardware, grounding system, or outside cabling.

H. Visually inspect inside BDA or booster amplifier equipment installation. Correct any issues found with RF cabling, electrical connection, or equipment mounting.

I. Clean equipment fans, filters and other ventilation system components.

J. Inspect and replace any defective indicator lights.

K. Test UPS system performance for proper fallback to battery power and the duration of battery operation.

L. Test fault reporting system for proper operation and reporting of system faults.

M. Submit a written Preventive Maintenance Report to the Owner, listing the results of the optimization and preventive maintenance effort. The report shall include the Proof of Performance report for active RF components, and details of any other discrepancies found and corrective actions taken.

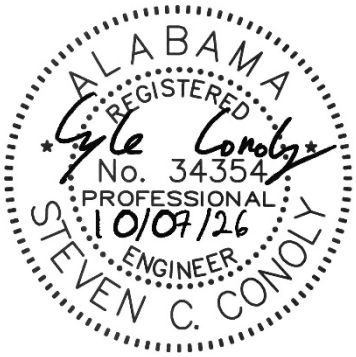
N. All as-built drawings shall be submitted to the Owner at completion, which shall include antenna system layout and all associated hardware, along with specification sheets. Include RF measurements taken.

**END OF SECTION 26 40 00**

# SECTION 27 00 00

# TELECOMMUNICATIONS

The following seal, signed and dated, acknowledge that Cyle Conoly of Mills-Conoly Engineering, P.C. prepared these specifications:



# SECTION 270526 - GROUNDING AND BONDING FOR COMMUNICATIONS SYSTEMS

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

A. Section Includes:

1. Grounding conductors.
2. Grounding connectors.
3. Grounding busbars.
4. Grounding labeling.

### 1.3 DEFINITIONS

A. BCT: Bonding conductor for telecommunications.

B. TGB: Telecommunications grounding busbar.

C. TMGB: Telecommunications master grounding busbar.

### 1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For communications equipment room signal reference grid. Include plans, elevations, sections, details, and attachments to other work.

### 1.5 INFORMATIONAL SUBMITTALS

A. As-Built Data: Plans showing as-built locations of grounding and bonding infrastructure, including the following:
1. BCT, TMGB, TGBs, and routing of their bonding conductors.

B. Qualification Data: For Installer, ]installation supervisor, and field inspector.

C. Field quality-control reports.

1.6 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For grounding to include in emergency, operation, and maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.

1. Installation Supervision: Installation shall be under the direct supervision of ITS Level 2 Installer, who shall be present at all times when Work of this Section is performed at Project site.
2. Field Inspector: Currently registered by BICSI as a designer RCDD or Technician to perform the on-site inspection.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with UL 467 for grounding and bonding materials and equipment.

C. Comply with TIA-607-B.

2.2 CONDUCTORS

A. Comply with UL 486A-486B.

B. Insulated Conductors: Stranded copper wire, green or green with yellow stripe insulation, insulated for 600 V, and complying with UL 83.

1. Ground wire for custom-length equipment ground jumpers shall be No. 6 AWG, 19-strand, UL-listed, Type THHN wire.
2. Cable Tray Equipment Grounding Wire: No. 6 AWG.

C. Cable Tray Grounding Jumper:

1. Not smaller than No. 6 AWG and not longer than 12 inches (300 mm). If jumper is a wire, it shall have a crimped grounding lug with two holes and long barrel for two crimps. If jumper is a flexible braid, it shall have a one-hole ferrule. Attach with grounding screw or connector provided by cable tray manufacturer.

D. Bare Copper Conductors:

1. Solid Conductors: ASTM B 3.
2. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.

3. Bonding Jumper: Tinned-copper tape, braided conductors terminated with two-hole copper ferrules; 1-5/8 inches (41 mm) wide and 1/16 inch (1.6 mm) thick.

## 2.3 CONNECTORS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Burndy; Part of Hubbell Electrical Systems.
2. ERICO International Corporation.
3. Harger Lightning & Grounding.
4. ILSCO.
5. O-Z/Gedney; a brand of Emerson Industrial Automation.
6. Thomas & Betts Corporation; A Member of the ABB Group.

B. Irreversible connectors listed for the purpose. Listed by an NRTL as complying with NFPA 70 for specific types, sizes, and combinations of conductors and other items connected. Comply with UL 486A-486B.

C. Compression Wire Connectors: Crimp-and-compress connectors that bond to the conductor when the connector is compressed around the conductor. Comply with UL 467.

1. Electroplated tinned copper, C and H shaped.

D. Busbar Connectors: Cast silicon bronze, solderless compressiontype, mechanical connector; with a long barrel and two holes spaced on 5/8- or 1-inch (15.8- or 25.4-mm) centers for a two-bolt connection to the busbar.

## 2.4 GROUNDING BUSBARS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Burndy; Part of Hubbell Electrical Systems.
2. ERICO International Corporation.
3. Harger Lightning & Grounding.
4. ILSCO.
5. O-Z/Gedney; a brand of Emerson Industrial Automation.
6. Thomas & Betts Corporation; A Member of the ABB Group.

B. TGB: Predrilled rectangular bars of hard-drawn solid copper, 1/4 by 2 inches (6.3 by 50 mm) in cross section, length as indicated on Drawings. The busbar shall be for wall mounting, shall be NRTL listed as complying with UL 467, and shall comply with TIA-607-B.

1. Predrilling shall be with holes for use with lugs specified in this Section.
2. Mounting Hardware: Stand-off brackets that provide at least a 2-inch (50-mm) clearance to access the rear of the busbar. Brackets and bolts shall be stainless steel.
3. Stand-off insulators for mounting shall be Lexan or PVC. Comply with UL 891 for use in 600-V switchboards, impulse tested at 5000 V.

C. Rack and Cabinet Grounding Busbars: Rectangular bars of hard-drawn solid copper, accepting conductors ranging from No. 14 to No. 2/0 AWG, NRTL listed as complying with UL 467, and complying with TIA-607-B. Predrilling shall be with holes for use with lugs specified in this Section.

1. Cabinet-Mounted Busbar: Terminal block, with stainless-steel or copper-plated hardware for attachment to the cabinet.
2. Rack-Mounted Vertical Busbar: 72 or 36 inches (1827 or 914 mm) long, with stainless-steel or copper-plated hardware for attachment to the rack.

## 2.5 IDENTIFICATION

A. Comply with requirements for identification products in Section 270553 "Identification for Communications Systems."

# PART 3 - EXECUTION

## 3.1 EXAMINATION

A. Examine the ac grounding electrode system and equipment grounding for compliance with requirements for maximum ground-resistance level and other conditions affecting performance of grounding and bonding of the electrical system.

B. Inspect the test results of the ac grounding system measured at the point of BCT connection.

C. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

D. Proceed with connection of the BCT only after unsatisfactory conditions have been corrected.

## 3.2 INSTALLATION

A. Bonding shall include the ac utility power service entrance, the communications cable entrance, and the grounding electrode system. The bonding of these elements shall form a loop so that each element is connected to at least two others.

B. Comply with NECA 1.

C. Comply with TIA-607-B.

## 3.3 APPLICATION

A. Conductors: Install solid conductor for No. 8AWG and smaller and stranded conductors for No. 6AWG and larger unless otherwise indicated.

1. The bonding conductors between the TGB and structural steel of steel-frame buildings shall not be smaller than No. 6 AWG.

B. Underground Grounding Conductors: Install bare copper conductor, No. 2 > AWG minimum.

C. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
3. Connections to Structural Steel: Welded connectors.

D. Conductor Support:

1. Secure grounding and bonding conductors at intervals of not less than 36 inches (900 mm).

E. Grounding and Bonding Conductors:

1. Install in the straightest and shortest route between the origination and termination point, and no longer than required. The bend radius shall not be smaller than eight times the diameter of the conductor. No one bend may exceed 90 degrees.
2. Install without splices.
3. Support at not more than 36-inch (900-mm) intervals.
4. Install grounding and bonding conductors in 3/4-inch (21-mm) PVC conduit until conduit enters a telecommunications room. The grounding and bonding conductor pathway through a plenum shall be in EMT. Conductors shall not be installed in EMT unless otherwise indicated.

    a. If a grounding and bonding conductor is installed in ferrous metallic conduit, bond the conductor to the conduit using a grounding bushing that complies with requirements in Section 270528 "Pathways for Communications Systems," and bond both ends of the conduit to a TGB.

## 3.4 GROUNDING BUSBARS

A. Indicate locations of grounding busbars on Drawings. Install busbars horizontally, on insulated spacers 2 inches (50 mm) minimum from wall, 12 inches (300 mm) above finished floor unless otherwise indicated.

B. Where indicated on both sides of doorways, route bus up to top of door frame, across top of doorway, and down; connect to horizontal bus.

## 3.5 CONNECTIONS

A. Bond metallic equipment in a telecommunications equipment room to the grounding busbar in that room, using equipment grounding conductors not smaller than No. 6 AWG.

B. Stacking of conductors under a single bolt is not permitted when connecting to busbars.

C. Assemble the wire connector to the conductor, complying with manufacturer's written instructions and as follows:

1. Use crimping tool and the die specific to the connector.
2. Pretwist the conductor.
3. Apply an antioxidant compound to all bolted and compression connections.

D. Interconnections: Interconnect all TGBs with the TMGB with the telecommunications backbone conductor. If more than one TMGB is installed, interconnect TMGBs using the grounding equalizer conductor. The telecommunications backbone conductor and grounding equalizer conductor size shall not be less than 2 kcmils/linear foot (1 sq. mm/linear meter) of conductor length, up to a maximum size of No. 3/0 AWG unless otherwise indicated.

E. Telecommunications Enclosures and Equipment Racks: Bond metallic components of enclosures to the telecommunications bonding and grounding system. Install vertically mounted rack grounding busbar unless the enclosure and rack are manufactured with the busbar. Bond the equipment grounding busbar to the TGB No. 2 AWG bonding conductors.

F. Structural Steel: Where the structural steel of a steel frame building is readily accessible within the room or space, bond each TGB and TMGB to the vertical steel of the building frame.

G. Electrical Power Panelboards: Where an electrical panelboard for telecommunications equipment is located in the same room or space, bond each TGB to the ground bar of the panelboard.

H. Rack- and Cabinet-Mounted Equipment: Bond powered equipment chassis to the cabinet or rack grounding bar. Power connection shall comply with NFPA 70; the equipment grounding conductor in the power cord of cord- and plug-connected equipment shall be considered as a supplement to bonding requirements in this Section.

## 3.6 GROUNDING UNDERGROUND DISTRIBUTION SYSTEM COMPONENTS

A. Duct-Bank Grounding Conductor: Bury 12 inches (300 mm) above duct bank when indicated as part of duct-bank installation.

B. Comply with IEEE C2 grounding requirements.

C. Grounding Manholes and Handholes: Install a driven ground rod through manhole or handhole floor, close to wall, and set rod depth so 4 inches (100 mm) extends above finished floor. If necessary, install ground rod before manhole is placed and provide No. 1/0 AWG bare, tinned-copper conductor from ground rod into manhole through a waterproof sleeve in manhole wall. Protect ground rods passing through concrete floor with a double wrapping of pressure-sensitive insulating tape or heat-shrunk insulating sleeve from 2 inches (50 mm) above to 6 inches (150 mm) below concrete. Seal floor opening with waterproof, nonshrink grout.

D. Grounding Connections to Manhole Components: Bond exposed-metal parts such as inserts, cable racks, pulling irons, ladders, and cable shields within each manhole or handhole, to ground rod or grounding conductor. Make connections with No. 4 AWG minimum, bonding conductor. Train conductors level or plumb around corners and fasten to manhole walls. Connect grounding conductors to cable armor and cable shields according to written instructions by manufacturer of splicing and termination kits.

3.7 IDENTIFICATION

A. Labels shall be preprinted or computer-printed type.
   1. Label TGB(s) with "fs-TGB," where "fs" is the telecommunications space identifier for the space containing the TGB.

3.8 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to perform tests and inspections.

B. Perform tests and inspections.

C. Tests and Inspections:

   1. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
   2. Test the bonding connections of the system using an ac earth ground-resistance tester, taking two-point bonding measurements in each telecommunications equipment room containing a TGB and using the process recommended by BICSI TDMM. Conduct tests with the facility in operation.

      a. Measure the resistance between the busbar and the nearest available grounding electrode. The maximum acceptable value of this bonding resistance is 100 milliohms.

   3. Test for ground loop currents using a digital clamp-on ammeter, with a full-scale of not more than 10 A, displaying current in increments of 0.01 A at an accuracy of plus/minus 2.0 percent.

      a. With the grounding infrastructure completed and the communications system electronics operating, measure the current in every conductor connected to the TMGB and in each TGB. Maximum acceptable ac current level is 1 A.

D. Excessive Ground Resistance: If resistance to ground at the BCT exceeds 5ohms, notify Architect promptly and include recommendations to reduce ground resistance.

E. Grounding system will be considered defective if it does not pass tests and inspections.

F. Prepare test and inspection reports.

END OF SECTION 270526

# SECTION 270528 - PATHWAYS FOR COMMUNICATIONS SYSTEMS

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

A. Section Includes:

1. Metal conduits and fittings.
2. Nonmetallic conduits and fittings.
3. Optical-fiber-cable pathways and fittings.
4. Boxes, enclosures, and cabinets.
5. Polymer-concrete handholes and boxes for exterior underground cabling.

B. Related Requirements:

1. Section 260000 "Electrical" specifies cable trays for communications pathways installed by this Section.

2. Section 260000 "Electrical" specifies cable hooks for communications pathways installed by this Section.

3. Section 260000 "Electrical" specifies wall sleeves for communications pathways installed by this Section.

### 1.3 DEFINITIONS

A. GRC: Galvanized rigid conduit.

B. IMC: Intermediate metal conduit.

### 1.4 ACTION SUBMITTALS

A. Product data for the following:
1. Wireways and fittings.
2. Boxes, enclosures, and cabinets.
3. Underground handholes and boxes.

1.5 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Pathway routing plans, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of items involved:

1. Structural members in paths of pathway groups with common supports.
2. HVAC and plumbing items and architectural features in paths of conduit groups with common supports.
3. Underground ducts, piping, and structures in location of underground enclosures and handholes.

B. Qualification Data: For professional engineer.

C. Source quality-control reports.

PART 2 - PRODUCTS

2.1 METAL CONDUITS AND FITTINGS

A. Description: Metal raceway of circular cross section with manufacturer-fabricated fittings.

B. General Requirements for Metal Conduits and Fittings:

1. Listed and labeled as defined in NFPA 70, by a nationally recognized testing laboratory, and marked for intended location and application.
2. Comply with TIA-569-D.

C. GRC: Comply with ANSI C80.1 and UL 6.

D. IMC: Comply with ANSI C80.6 and UL 1242.

E. EMT: Comply with ANSI C80.3 and UL 797.

F. Fittings for Metal Conduit: Comply with NEMA FB 1 and UL 514B.

1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 1203 and NFPA 70.
2. Fittings for EMT:

a. Material: Steel or die cast.
b. Type: compression.

3. Expansion Fittings: PVC or steel to match conduit type, complying with UL-467, rated for environmental conditions where installed, and including flexible external bonding jumper.
4. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch (1 mm), with overlapping sleeves protecting threaded joints.

G. Joint Compound for IMC, GRC Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

## 2.2 NONMETALLIC CONDUITS AND FITTINGS

A. Description: Nonmetallic raceway of circular section with manufacturer-fabricated fittings.

B. General Requirements for Nonmetallic Conduits and Fittings:

1. Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
2. Comply with TIA-569-D.

C. RNC: Type EPC-40-PVCcomplying with NEMA TC 2 and UL 651 unless otherwise indicated.

D. Rigid HDPE: Comply with UL 651A.

E. Continuous HDPE: Comply with UL 651A.

F. Fittings: Comply with NEMA TC 3; match to conduit or tubing type and material.

G. Solvents and Adhesives: As recommended by conduit manufacturer.

## 2.3 OPTICAL-FIBER-CABLE PATHWAYS AND FITTINGS

A. Description: Comply with UL 2024; flexible-type pathway with a circular cross section, approved for plenum riser or general-use installation unless otherwise indicated.

B. Listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.

C. Comply with TIA-569-D.

## 2.4 BOXES, ENCLOSURES, AND CABINETS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Crouse-Hinds, an Eaton business.
2. Hoffman; a brand of Pentair Equipment Protection.
3. Hubbell Incorporated.
4. Milbank Manufacturing Co.
5. MonoSystems, Inc.
6. Oldcastle Enclosure Solutions.
7. O-Z/Gedney; a brand of Emerson Industrial Automation.

B. General Requirements for Boxes, Enclosures, and Cabinets:

1. Comply with TIA-569-D.
2. Boxes, enclosures, and cabinets installed in wet locations shall be listed and labeled as defined in NFPA 70, by an NRTL, and marked for use in wet locations.
3. Box extensions used to accommodate new building finishes shall be of same material as recessed box.
4. Device Box Dimensions: 4 inches square by 2-1/8 inches deep (100 mm square by 60 mm deep)
5. Gangable boxes are prohibited.

C. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.

D. Cast-Metal Access, Pull, and Junction Boxes: Comply with NEMA FB 1 and UL 1773, cast aluminumwith gasketed cover.

## 2.5 POLYMER-CONCRETE HANDHOLES

A. Description: Molded of sand and aggregate; bound together with polymer resin; and reinforced with steel, fiberglass, or a combination of the two.

B. General Requirements for Polymer Concrete Handholes:

1. Boxes and handholes for use in underground systems shall be listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
2. Boxes installed in wet areas shall be listed and labeled as defined in NFPA 70, by an NRTL, and marked for intended location and application.
3. Comply with TIA-569-D

C. Configuration: Designed for flush burial with open bottom unless otherwise indicated.

D. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure and handhole location.

1. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.
2. Cover Legend: Molded lettering, "COMMUNICATIONS"

E. Conduit Entrance Provisions: Conduit-terminating fittings shall mate with entering ducts for secure, fixed installation in enclosure wall.

F. Handholes [24 Inches Wide by 24 Inches Long (300 mm Wide by 600 mm Long)] and Larger: Have inserts for cable racks and pulling-in irons installed before concrete is poured.

## 2.6 SOURCE QUALITY CONTROL FOR UNDERGROUND ENCLOSURES

A. Handhole and Pull-Box Prototype Test: Test prototypes of handholes and boxes for compliance with SCTE 77. Strength tests shall be for specified tier ratings of products supplied.

1. Tests of materials shall be performed by an independent testing agency.

PART 3 - EXECUTION

3.1 PATHWAY APPLICATION

A. Outdoors: Apply pathway products as specified below unless otherwise indicated:

1. Exposed Conduit: GRC or IMC
2. Concealed Conduit, Aboveground: GRC or IMC.
3. Underground Conduit: RNC, Type EPC-40-PVC
4. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.

B. Indoors: Apply pathway products as specified below unless otherwise indicated:

1. Exposed, Not Subject to Physical Damage: EMT.
2. Exposed, Not Subject to Severe Physical Damage: EMT
3. Exposed and Subject to Severe Physical Damage: GRC or IMC. Pathway locations include the following:

    a. Loading dock.
    b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
    c. Mechanical/Electrical/Boiler rooms.
    d. Gymnasiums

4. Concealed in Ceilings and Interior Walls and Partitions: EMT or innerduct.
5. Damp or Wet Locations: GRC or IMC.
6. Pathways for Optical-Fiber or Communications Cable in Spaces Used for Environmental Air: EMT
7. Pathways for Optical-Fiber or Communications-Cable Risers in Vertical Shafts: Riser-type, optical-fiber-cable pathway EMT
8. Pathways for Concealed General-Purpose Distribution of Optical-Fiber or Communications Cable: General-use, optical-fiber-cable pathway, Riser-type, optical-fiber-cable pathway, Plenum-type, optical-fiber-cable pathway, or EMT.
9. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4 stainless steel units in institutional and commercial kitchens and damp or wet locations.

C. Minimum Pathway Size: 3/4-inch (21-mm) trade size for copper and aluminum cables, and 1 inch (25 mm) for optical-fiber cables.

D. Pathway Fittings: Compatible with pathways and suitable for use and location.

1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
3. EMT: Use compression, steelfittings. Comply with NEMA FB 2.10.

E. Do not install aluminum conduits, boxes, or fittings in contact with concrete or earth.

F. Install surface pathways only where indicated on Drawings.

3.2 INSTALLATION

A. Comply with the following standards for installation requirements except where requirements on Drawings or in this Section are stricter:

1. NECA 1.
2. NECA/BICSI 568.
3. TIA-569-D.
4. NECA 101
5. NECA 102.
6. NECA 105.
7. NECA 111.

B. Comply with NFPA 70 limitations for types of pathways allowed in specific occupancies and number of floors.

C. Comply with requirements in Section 270528.29 "Hangers and Supports for Communications Systems" for hangers and supports.

D. Keep pathways at least 6 inches (150 mm) away from parallel runs of flues and steam or hot-water pipes. Install horizontal pathway runs above water and steam piping.

E. Complete pathway installation before starting conductor installation.

F. Arrange stub-ups so curved portions of bends are not visible above finished slab.

G. Install no more than the equivalent of two 90-degree bends in any pathway run. Support within 12 inches (300 mm) of changes in direction. Utilize long radius ells for all optical-fiber cables.

H. Conceal rigid conduit within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.

I. Support conduit within 12 inches (300 mm) of enclosures to which attached.

J. Stub-ups to Above Recessed Ceilings:

1. Use EMT, IMC, or RMC for pathways.
2. Use a conduit bushing or insulated fitting to terminate stub-ups not terminated in hubs or in an enclosure.

K. Threaded Conduit Joints, Exposed to Wet, Damp, Corrosive, or Outdoor Conditions: Apply listed compound to threads of pathway and fittings before making up joints. Follow compound manufacturer's written instructions.

L. Coat field-cut threads on PVC-coated pathway with a corrosion-preventing conductive compound prior to assembly.

M. Terminate threaded conduits into threaded hubs or with locknuts on inside and outside of boxes or cabinets. Install insulated bushings on conduits terminated with locknuts.

N. Install pathways square to the enclosure and terminate at enclosures with locknuts. Install locknuts hand tight plus one additional quarter-turn.

O. Do not rely on locknuts to penetrate nonconductive coatings on enclosures. Remove coatings in the locknut area prior to assembling conduit to enclosure, to assure a continuous ground path.

P. Cut conduit perpendicular to the length. For conduits of 2-inch (50-mm) trade size and larger, use roll cutter or a guide to ensure cut is straight and perpendicular to the length.

Q. Install pull wires in empty pathways. Use polypropylene or monofilament plastic line with not less than 200-lb (90-kg) tensile strength. Leave at least 12 inches (300 mm) of slack at each end of pull wire. Secure pull wire, so it cannot fall into conduit. Cap pathways designated as spare alongside pathways in use.

R. Surface Pathways:

1. Install surface pathway for surface telecommunications outlet boxes only where indicated on Drawings.
2. Install surface pathway with a minimum 2-inch (50-mm) radius control at bend points.
3. Secure surface pathway with screws or other anchor-type devices at intervals not exceeding 48 inches (1200 mm) and with no less than two supports per straight pathway section. Support surface pathway according to manufacturer's written instructions. Tape and glue are not acceptable support methods.

S. Pathways for Optical-Fiber and Communications Cable: Install pathways, metal and nonmetallic, rigid and flexible, as follows:

1. 3/4-Inch (21-mm) Trade Size and Smaller: Install pathways in maximum lengths of 50 feet (15 m).
2. 1-Inch (25-mm) Trade Size and Larger: Install pathways in maximum lengths of 75 feet (23 m).
3. Install with a maximum of two 90-degree bends or equivalent for each length of pathway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.

T. Install pathway-sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed pathways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install pathway-sealing fittings according to NFPA 70.

U. Install devices to seal pathway interiors at accessible locations. Locate seals, so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all pathways at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
2. Where an underground service pathway enters a building or structure.
3. Where otherwise required by NFPA 70.

V. Comply with manufacturer's written instructions for solvent welding PVC conduit and fittings.

W. Expansion-Joint Fittings:

1. Install in each run of aboveground RNC that is located where environmental temperature change may exceed 30 deg F (17 deg C), and that has straight-run length that exceeds 25 feet (7.6 m). Install in each run of aboveground RMC that is located where environmental temperature change may exceed 100 deg F (55 deg C), and that has straight-run length that exceeds 100 feet (30 m).
2. Install type and quantity of fittings that accommodate temperature change listed for each of the following locations:

    a. Outdoor Locations Not Exposed to Direct Sunlight: 125 deg F (70 deg C) temperature change.
    b. Outdoor Locations Exposed to Direct Sunlight: 155 deg F (86 deg C)temperature change.
    c. Indoor Spaces Connected with Outdoors without Physical Separation: 125 deg F (70 deg C) temperature change.
    d. Attics: 135 deg F (75 deg C) temperature change.

3. Install fitting(s) that provide expansion and contraction for at least 0.00041 inch per foot of length of straight run per deg F (0.06 mm per meter of length of straight run per deg C) of temperature change for PVC conduits. Install fitting(s) that provide expansion and contraction for at least 0.000078 inch per foot of length of straight run per deg F (0.0115 mm per meter of length of straight run per deg C) of temperature change for metal conduits.
4. Install expansion fittings at all locations where conduits cross building or structure expansion joints.
5. Install each expansion-joint fitting with position, mounting, and piston setting selected according to manufacturer's written instructions for conditions at specific location at time of installation. Install conduit supports to allow for expansion movement.

X. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.

Y. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.

## 3.3 INSTALLATION OF UNDERGROUND CONDUIT

A. Direct-Buried Conduit:

1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom as specified in Section 312000 "Earth Moving" for pipe of less than 6 inches (150 mm) in nominal diameter.
2. Install backfill as required.
3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12

inches (300 mm) of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as required.

4. Install manufactured duct elbows for stub-ups at poles and equipment and at building entrances through floor unless otherwise indicated. Encase elbows for stub-up ducts throughout length of elbow.
5. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through floor.

    a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches (75 mm) of concrete around conduit for a minimum of 12 inches (300 mm) on each side of the coupling.
    b. For stub-ups at equipment mounted on outdoor concrete bases and where conduits penetrate building foundations, extend steel conduit horizontally a minimum of 60 inches (1500 mm) from edge of foundation or equipment base. Install insulated grounding bushings on terminations at equipment.

6. Warning Planks: Bury warning planks approximately 12 inches (300 mm) above direct-buried conduits, but a minimum of 6 inches (150 mm) below grade. Align planks along centerline of conduit.
7. Underground Warning Tape: Comply with requirements in Section 270553 "Identification for Communications Systems."

## 3.4 INSTALLATION OF UNDERGROUND HANDHOLES AND BOXES

A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting conduits to minimize bends and deflections required for proper entrances.

B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch (12.5-mm) sieve to No. 4 (4.75-mm) sieve and compacted to same density as adjacent undisturbed earth.

C. Elevation: In paved areas, set so cover surface will be flush with finished grade. Set covers of other enclosures 1 inch (25 mm) above finished grade.

D. Install handholes with bottom below frost line, below grade.

E. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables, but short enough to preserve adequate working clearances in enclosure.

F. Field cut openings for conduits according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

## 3.5 PROTECTION

A. Protect coatings, finishes, and cabinets from damage or deterioration.

1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 270528

# SECTION 270528.29 - HANGERS AND SUPPORTS FOR COMMUNICATIONS SYSTEMS

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

A. Section Includes:

1. Steel slotted support systems for communication raceways.
2. Conduit and cable support devices.
3. Support for conductors in vertical conduit.
4. Mounting, anchoring, and attachment components, including powder-actuated fasteners, mechanical expansion anchors, concrete inserts, clamps, through bolts, toggle bolts, and hanger rods.

### 1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for the following:

a. Slotted support systems, hardware, and accessories.
b. Clamps.
c. Hangers.
d. Sockets.
e. Eye nuts.
f. Fasteners.
g. Anchors.
h. Saddles.

2. Include rated capacities and furnished specialties and accessories.

B. Shop Drawings: For fabrication and installation details for communications hangers and support systems.

1. Trapeze hangers. Include product data for components.
2. Steel slotted-channel systems.
3. Equipment supports.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Reflected ceiling plan(s) and other details, drawn to scale, on which the following items are shown and coordinated with each other, using input from installers of the items involved:

1. Suspended ceiling components.
2. Ductwork, piping, fittings, and supports.
3. Structural members to which hangers and supports will be attached.
4. Size and location of initial access modules for acoustical tile.
5. Items penetrating finished ceiling, including the following:

a. Luminaires.
b. Air outlets and inlets.
c. Sprinklers.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Surface-Burning Characteristics: Comply with ASTM E 84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame Rating: Class 1.
2. Self-extinguishing according to ASTM D 635.

2.2 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32-inch-(10-mm-) diameter holes at a maximum of 8 inches (200 mm) o.c. in at least one surface.
1. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
2. Material for Channel, Fittings, and Accessories: Galvanized steel].
3. Channel Width: Selected for applicable load criteria.
4. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
5. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
6. Channel Dimensions: Selected for applicable load criteria.

B. Conduit and Cable Support Devices: Steelclamps, hangers, and associated fittings, designed for types and sizes of raceway or cable to be supported.

C. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for nonarmored communications conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces

as required to suit individual conductors or cables supported. Body shall be made of malleable iron.

D. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Powder-Actuated Fasteners: Threaded-steel stud for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

2. Mechanical-Expansion Anchors: Insert-wedge-type zinc-coated steel for use in hardened portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

3. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
4. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.
6. Toggle Bolts: All-steelspringhead type.
7. Hanger Rods: Threaded steel.

## PART 3 - EXECUTION

### 3.1 APPLICATION

A. Comply with the following standards for application and installation requirements of hangers and supports, except where requirements on Drawings or in this Section are stricter:

1. NECA 1.
2. NECA/BICSI 568.
3. TIA-569-D.
4. NECA 101
5. NECA 102.
6. NECA 105.
7. NECA 111.

B. Comply with requirements in Section 078413 "Penetration Firestopping" for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.

C. Comply with requirements for pathways specified in Section 270528 "Pathways for Communications Systems."

D. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMTs, IMCs, and RMCs as required byNFPA 70. Minimum rod size shall be 1/4 inch (6 mm) in diameter.

E. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.

F. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch (38-mm) and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

## 3.2 SUPPORT INSTALLATION

A. Raceway Support Methods: In addition to methods described in NECA 1, EMT IMCand RMC may be supported by openings through structure members, according to NFPA 70.

B. Strength of Support Assemblies: Where not indicated, select sizes of components, so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb (90 kg).

C. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten communications items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.
2. To Masonry: Use approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
3. To Existing Concrete: Use expansion anchor fasteners.
4. Instead of expansion anchors, powder-actuated-driven threaded studs, provided with lock washers and nuts, may be used in existing standard-weight concrete 4 inches (100 mm) thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches (100 mm) thick.
5. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts].
6. To Light Steel: Sheet metal screws.
7. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate.

D. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

## 3.3 PAINTING

A. Touchup: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces.

1. Apply paint by brush or spray to provide minimum dry film thickness of 2.0 mils (0.05 mm).

B. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas, and apply galvanizing-repair paint to comply with ASTM A 780.

END OF SECTION 270528.29

# SECTION 270543 - UNDERGROUND PATHWAYS AND STRUCTURES FOR COMMUNICATION SYSTEMS

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

A. Section Includes:

1. Metal conduit and fittings, including GRC and PVC-coated GRC.
2. Rigid nonmetallic duct.
3. Duct accessories, including rigid innerduct and fabric innerduct.
4. Polymer concrete handholes and boxes with polymer concrete cover.

### 1.3 DEFINITIONS

A. Direct-Buried: Duct or a duct bank that is buried in the ground, without any additional casing materials, such as concrete.

B. Duct: A single duct or multiple ducts. Duct may be either installed singly or as component of a duct bank.

C. Duct Bank:

1. Two or more ducts installed in parallel, with or without additional casing materials.
2. Multiple duct banks.

D. GRC: Galvanized rigid conduit.

E. IMC: Intermediate metal conduit.

F. RNC: Rigid nonmetallic conduit.

G. Trafficways: Locations where vehicular or pedestrian traffic is a normal course of events.

### 1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include duct-bank materials, including spacers and miscellaneous components.

2. Include duct and conduits and their accessories, including elbows, end bells, bends, fittings, duct spacers and solvent cement.
3. Include accessories for manholes, handholes, and boxes
4. Include underground-line warning tape.

B. Shop Drawings:

1. Factory-Fabricated Handholes and Boxes Other Than Precast Concrete:

a. Include dimensioned plans, sections, and elevations, and fabrication and installation details.
b. Include duct entry provisions, including location and duct size.
c. Include cover design.
d. Include grounding details.
e. Include dimensioned locations of cable rack inserts, and pulling-in and lifting irons.

## 1.5 INFORMATIONAL SUBMITTALS

A. Duct and Duct-Bank Coordination Drawings: Show duct profiles and coordination with other utilities and underground structures.

1. Include plans and sections, drawn to scale, and show bends and locations of expansion fittings.
2. Drawings shall be signed and sealed by a qualified professional engineer.

B. Product Certificates: For concrete and steel used in precast concrete handholes, as required by ASTM C 858.

C. Qualification Data: For professional engineer and testing agency responsible for testing nonconcrete handholes and boxes.

D. Source quality-control reports.

E. Field quality-control reports.

## 1.6 MAINTENANCE MATERIALS SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

B. Furnish cable-support stanchions, arms, and associated fasteners in quantities equal to 5percent of quantity of each item installed.

## 1.7 QUALITY ASSURANCE

A. Testing Agency Qualifications: Qualified according to ASTM E 329 for testing indicated.

1.8 FIELD CONDITIONS

A. Interruption of Existing Communications Service: Do not interrupt communications service to facilities occupied by Owner or others unless permitted under the following conditions, and then only after arranging to provide temporary communications service according to requirements indicated:

1. Notify Owner no fewer than two > days in advance of proposed interruption of communications service.
2. Do not proceed with interruption of communications service without Owner's written permission.

B. Ground Water: Assume ground-water level is at grade level unless a lower water table is noted on Drawings.

PART 2 - PRODUCTS

2.1 METAL CONDUITS AND FITTINGS

A. GRC: Comply with ANSI C80.1 and UL 6.

B. General Requirements for Metal Conduits and Fittings:

1. Listed and labeled as defined in NFPA 70, by a nationally recognized testing laboratory, and marked for intended location and application.
2. Comply with TIA-569-C and TIA-758-C.

2.2 RIGID NONMETALLIC DUCTS

A. Underground Plastic Utilities Duct: Type EPC-40-PVC RNC, complying with NEMA TC 2 and UL 651, with matching fittings complying with NEMA TC 3 by same manufacturer as duct.

B. General Requirements for Nonmetallic Ducts and Fittings:

1. Listed and labeled as defined in NFPA 70, by a nationally recognized testing laboratory, and marked for intended location and application.
2. Comply with TIA-569-C and TIA-758-C.

2.3 FLEXIBLE NONMETALLIC DUCTS

A. HDPE Duct: Type EPEC 40-HDPEcomplying with NEMA TC 7 and UL 651A.

1. Listed and labeled as defined in NFPA 70, by a nationally recognized testing laboratory, and marked for intended location and application.
2. Comply with TIA-569-C and TIA-758-C.

2.4 DUCT ACCESSORIES

A. Rigid Innderduct: Corrugated HDPE duct, orange in color, designed for installation within a duct or pathway.

B. Fabric Innerduct: Continuous, polyester, singlemulti -pocket fabric innerduct, with internal pull tape and tracer wire.

C. Duct Spacers: Factory-fabricated rigid PVC interlocking spacers, sized for type and size of duct with which used, and selected to provide minimum duct spacing indicated while supporting duct during concreting or backfilling.

D. Underground-Line Warning Tape: Underground-line warning tape specified in Section 270553 "Identification for Communications Systems."

2.5 POLYMER CONCRETE HANDHOLES AND BOXES WITH POLYMER CONCRETE COVER

A. Description: Molded of sand and aggregate, bound together with a polymer resin, and reinforced with steel or fiberglass or a combination of the two.

B. Standard: Comply with SCTE 77. Comply with tier requirements in "Underground Enclosure Application" Article.

C. Color: Gray.

D. Configuration: Units shall be designed for flush burial and have openbottom unless otherwise indicated.

E. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure.

F. Cover Finish: Nonskid finish shall have a minimum coefficient of friction of 0.50.

G. Cover Legend: Molded lettering, "COMMUNICATIONS

H. Direct-Buried Wiring Entrance Provisions: Knockouts equipped with insulated bushings or end-bell fittings, selected to suit box material, sized for wiring indicated, and arranged for secure, fixed installation in enclosure wall.

I. Duct Entrance Provisions: Duct-terminating fittings shall mate with entering duct for secure, fixed installation in enclosure wall.

J. Handholes 24 inches wide by 24 inches long (300 mm wide by 600 mm long) and larger shall have factory-installed inserts for cable racks and pulling-in irons.

2.6 SOURCE QUALITY CONTROL

A. Nonconcrete Handhole and Pull-Box Prototype Test: Test prototypes of manholes and boxes for compliance with SCTE 77. Strength tests shall be for specified tier ratings of products supplied.

1. Tests of materials shall be performed by an independent testing agency.
2. Strength tests of complete boxes and covers shall be by either an independent testing agency or manufacturer. A qualified registered professional engineer shall certify tests by manufacturer.
3. Testing machine pressure gages shall have current calibration certification, complying with ISO 9000 and ISO 10012, and traceable to NIST standards.

PART 3 - EXECUTION

3.1 PREPARATION

A. Coordinate layout and installation of duct, duct bank, manholes, handholes, and boxes with final arrangement of other utilities, site grading, and surface features as determined in the field. Notify Architect if there is a conflict between areas of excavation and existing structures or archaeological sites to remain.

B. Coordinate elevations of duct and duct-bank entrances into manholes, handholes, and boxes with final locations and profiles of duct and duct banks, as determined by coordination with other utilities, underground obstructions, and surface features. Revise locations and elevations as required to suit field conditions and to ensure that duct runs drain to manholes and handholes, and as approved by Architect.

C. Clear and grub vegetation to be removed, and protect vegetation to remain.

3.2 UNDERGROUND DUCT APPLICATION

A. Duct for Communications: Type EPC-40-PVCRNC, in direct-buried duct bank unless otherwise indicated.

B. Underground Duct Crossing Paved PathsWalks and DrivewaysRoadways [and Railroads]: Type EPC-40-PVC RNC, encased in reinforced concrete.

C. Stub-Ups for Communications: Concrete-encased RNC.

3.3 UNDERGROUND ENCLOSURE APPLICATION

A. Handholes and Boxes for Communications:

1. Units in Roadways and Other Deliberate Traffic Paths: Precast concrete. AASHTO HB 17, H-10 structural load rating.

2. Units in Driveway, Parking Lot, and Off-Roadway Locations, Subject to Occasional, Nondeliberate Loading by Heavy Vehicles: Polymer concrete, SCTE 77, Tier 15 structural load rating.
3. Units in Sidewalk and Similar Applications with a Safety Factor for Nondeliberate Loading by Vehicles: Polymer concrete units, SCTE 77, Tier 8structural load rating.
4. Cover design load shall not exceed the design load of the handhole or box.

## 3.4 EARTHWORK

A. Excavation and Backfill: Comply with Section 312000 "Earth Moving," but do not use heavy-duty, hydraulic-operated, compaction equipment.

B. Restoration: Replace area immediately after backfilling is completed

C. Restore surface features at areas disturbed by excavation, and re-establish original grades unless otherwise indicated.

D. Restore areas disturbed by trenching, storing of dirt, cable laying, and other work.

E. Cut and patch existing pavement in the path of underground duct, duct bank, and utility structures according to the "Cutting and Patching" Article in Section 017300 "Execution."

## 3.5 DUCT AND DUCT-BANK INSTALLATION

A. Where indicated on Drawings, install duct, spacers, and accessories into the duct configuration shown. Duct installation requirements in this Section also apply to duct bank.

B. Install duct and duct bank according to NEMA TCB 2 and TIA-758-C.

C. Slope: Pitch duct and duct bank a minimum slope of 1:100 down toward manholes and handholes and away from buildings and equipment. Slope duct and duct bank from a high point in runs between two manholes, to drain in both directions.

D. Curves and Bends: Use 5-degree angle couplings for small changes in direction. Use manufactured long sweep bends with a minimum radius of [48 inches (1200 mm)] [12.5 feet (4 m)] [25 feet (7.5 m)], both horizontally and vertically, at other locations unless otherwise indicated.

1. Duct and duct banks shall have maximum of two 90-degree bends, or the total of all bends shall be no more 180 degrees between pull points.

E. Joints: Use solvent-cemented joints in duct and fittings, and make watertight according to manufacturer's written instructions. Stagger couplings, so those of adjacent ducts do not lie in same plane.

F. Installation Adjacent to High-Temperature Steam Lines: Where duct or duct banks are installed parallel to underground steam lines, perform calculations showing the duct or duct bank will not be subject to environmental temperatures above 40 deg C. Where environmental temperatures are calculated to rise above 40 deg C, and anywhere the duct or duct bank crosses above an

underground steam line, install insulation blankets listed for direct burial to isolate the duct bank from the steam line.

G. End-Bell Entrances to Manholes and Concrete and Polymer Concrete Handholes: Use end bells, spaced approximately 6 inches (150 mm) o.c. for 4-inch (100-mm) duct, and vary proportionately for other duct sizes.

1. Begin change from regular spacing to end-bell spacing 10 feet (3 m) from the end bell without reducing duct slope and without forming a trap in the line.
2. Expansion and Deflection Fittings: Install an expansion and deflection fitting in each duct in the area of disturbed earth adjacent to manhole or handhole. Install an expansion fitting near the center of all straight-line direct-buried duct and duct banks, with calculated expansion of more than 3/4 inch (19 mm).
3. Grout end bells into structure walls from both sides to provide watertight entrances.

H. Terminator Entrances to Manholes and Concrete and Polymer Concrete Handholes: Use manufactured, cast-in-place duct terminators, with entrances into structure spaced approximately 6 inches (150 mm) o.c. for 4-inch (100-mm) duct, and vary proportionately for other duct sizes.

1. Begin change from regular spacing to terminator spacing 10 feet (3 m) from the terminator without reducing duct slope and without forming a trap in the line.
2. Expansion and Deflection Fittings: Install an expansion and deflection fitting in each duct in the area of disturbed earth adjacent to manhole or handhole. Install an expansion fitting near the center of all straight-line duct or duct bank, with calculated expansion of more than 3/4 inch (19 mm).

I. Building Wall Penetrations: Make a transition from underground duct to GRC at least 10 feet (3 m) outside the building wall, without reducing duct slope away from the building or forming a trap in the duct. Use fittings manufactured for RNC duct-to-GRC conduit transition. Install GRC penetrations of building walls as specified in Section 270544 "Sleeves and Sleeve Seals for Communications Pathways and Cabling."

J. Sealing: Provide temporary closure at terminations of duct that has cables pulled. Seal spare ducts at terminations. Use sealing compound and plugs to withstand at least 15-psig (1.03-MPa) hydrostatic pressure.

K. Innerduct: Install immediately after mandreling duct. Provide three innerducts per duct.

L. Pulling Cord: Install 200-lbf- (1000-N-m) test nylon cord in empty duct [and innerduct].

M. Direct-Buried Duct and Duct Banks:

1. Excavate trench bottom to provide firm and uniform support for duct and duct bank. Comply with requirements in Section 312000 "Earth Moving" for preparation of trench bottoms for duct less than 6 inches (150 mm) in nominal diameter.
2. Install duct with a minimum of 3 inches (75 mm) between duct for like services and 6 inches (150 mm) between power and signal duct.
3. Width: Excavate trench 12 inches (300 mm) wider than duct or duct bank on each side.
4. Width: Excavate trench 3 inches (75 mm) wider than duct or duct bank on each side.

5. Depth: Install top of duct or duct bank at least 36 inches (900 mm) below finished grade unless otherwise indicated.
6. Set elevation of bottom of duct or duct bank below frost line.
7. Support duct on duct spacers coordinated with duct size, duct spacing, and outdoor temperature.
8. Spacer Installation: Place spacers close enough to prevent sagging and deforming of duct, with not less than fourspacers per 20 feet (6 m) of duct. Place spacers within 24 inches (600 mm) of duct ends. Stagger spacers approximately 6 inches (150 mm) between tiers. Secure spacers to earth and duct to prevent floating during concreting. Tie entire assembly together using fabric straps; do not use tie wires or reinforcing steel that may form conductive or magnetic loops around duct or duct bank.
9. Elbows: Install manufactured duct elbows for stub-ups, at building entrances through floor, and at changes of direction in duct unless otherwise indicated. Encase elbows for stub-ups throughout length of elbow. Extend encasement minimum of 36 inches (900 mm) beyond elbow joints.
10. Install manufactured GRC elbows for stub-ups, at building entrances, and at changes of direction in duct.

    a. Couple GRC to duct with adapters designed for this purpose, and encase coupling with 3 inches (75 mm) of concrete.
    b. For equipment mounted on outdoor bases, extend GRC horizontally a minimum of 60 inches (1500 mm) from edge of equipment pad or foundation. Install insulated grounding bushings on terminations at equipment.

11. After installing first tier of duct, backfill and compact. Start at tie-in point and work toward end of duct run, leaving duct at end of run free to move with expansion and contraction, as temperature changes during this process. Repeat procedure after placing each tier. After placing last tier, hand place backfill to 4 inches (100 mm) over duct and hand tamp. Firmly tamp backfill around duct to provide maximum supporting strength. Use hand tamper only. After placing controlled backfill over final tier, make final duct connections at end of run and complete backfilling with normal compaction. Comply with requirements in Section 312000 "Earth Moving" for installation of backfill materials.

    a. Place minimum of 3 inches (75 mm) of sand as a bed for duct and duct bank. Place sand to a minimum of 6 inches (150 mm) above top level of duct and duct bank.
    b. Place minimum of 6 inches (150 mm) of engineered fill above concrete encasement of duct bank.

N. Underground-Line Warning Tape: Bury nonconducting underground-line warning tape specified in Section 270553 "Identification for Communication Systems" no less than 12 inches (300 mm) above all concrete-encased duct and duct bank and approximately 12 inches (300 mm) below grade. Align tape parallel to and within 3 inches (75 mm) of centerline of duct bank. Provide an additional warning tape for each 12-inch (300-mm) increment of duct-bank width over a nominal 18 inches (450 mm). Space additional tapes 12 inches (300 mm) apart, horizontally.

## 3.6 INSTALLATION OF HANDHOLES AND BOXES OTHER THAN PRECAST CONCRETE

A. Install handholes and boxes level and plumb and with orientation and depth coordinated with connecting duct, to minimize bends and deflections required for proper entrances. Use box extension if required to match depths of duct and duct bank, and seal joint between box and extension as recommended by manufacturer.

B. Unless otherwise indicated, support units on a level bed of crushed stone or gravel, graded from 1/2-inch (12.5-mm) sieve to No. 4 (4.75-mm) sieve and compacted to same density as adjacent undisturbed earth.

C. Elevation: In paved areas and trafficways, set cover flush with finished grade. Set covers of other handholes 1 inch (25 mm) above finished grade.

D. Install handholes and boxes with bottom below frost line, below grade.

E. Install removable hardware, including pulling eyes, cable stanchions, cable arms, and insulators, as required for installation and support of cables and conductors and as indicated. Select arm lengths to be long enough to provide spare space for future cables, but short enough to preserve adequate working clearances in enclosure.

F. Field cut openings for duct according to enclosure manufacturer's written instructions. Cut wall of enclosure with a tool designed for material to be cut. Size holes for terminating fittings to be used, and seal around penetrations after fittings are installed.

## 3.7 GROUNDING

A. Ground underground duct, duct bank, and utility structures according to Section 270526 "Grounding and Bonding for Communications Systems."

## 3.8 FIELD QUALITY CONTROL

A. Perform the following tests and inspections and prepare test reports:

1. Demonstrate capability and compliance with requirements on completion of installation of underground duct, duct bank, and utility structures.
2. Pull solid aluminum or wood test mandrel through duct to prove joint integrity and adequate bend radii, and test for out-of-round duct. Provide a minimum 12-inch- (300-mm-) long mandrel equal to duct size minus 1/4 inch (6 mm). If obstructions are indicated, remove obstructions and retest.
3. Test handhole grounding to ensure electrical continuity of grounding and bonding connections. Measure and report ground resistance as specified in Section 270526 "Grounding and Bonding for Communications Systems."

B. Correct deficiencies and retest as specified above to demonstrate compliance.

3.9 CLEANING

A. Pull leather-washer-type duct cleaner, with graduated washer sizes, through full length of duct until duct cleaner indicates that duct is clear of dirt and debris.

B. Clean internal surfaces of manholes, including sump.

1. Sweep floor, removing dirt and debris.
2. Remove foreign material.

END OF SECTION 270543

# SECTION 270553 - IDENTIFICATION FOR COMMUNICATIONS SYSTEMS

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

A. Section Includes:

1. Color and legend requirements for labels and signs.
2. Labels.
3. Bands and tubes.
4. Tapes.
5. Signs.
6. Cable ties.
7. Fasteners for labels and signs.

### 1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for communications identification products.

B. Identification Schedule:

1. Backbone Cabling: Riser diagram showing each communications room, backbone cable, and proposed backbone cable designation.
2. Racks: Scaled drawings indicating location and proposed designation.
3. Patch Panels: Enlarged scaled drawings showing rack row, number, and proposed designations.

## PART 2 - PRODUCTS

### 2.1 PERFORMANCE REQUIREMENTS

A. Comply with NFPA 70 and TIA 606-B.

B. Comply with ANSI Z535.4 for safety signs and labels.

C. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

D. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes.

## 2.2 COLOR AND LEGEND REQUIREMENTS

A. Equipment Identification Labels:

1. Black letters on a white field.

## 2.3 LABELS

A. Vinyl Wraparound Labels: Preprinted, flexible labels laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing label ends.

B. Snap-Around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeves, with diameters sized to suit diameters of raceway or cable they identify, that stay in place by gripping action.

C. Self-Adhesive Wraparound Labels: Preprinted, 3-mil- (0.08-mm-) thick, vinyl flexible labels with acrylic pressure-sensitive adhesive.
1. Self-Lamination: Clear; UV-, weather- and chemical-resistant; self-laminating protective shields over the legend. Labels sized such that the clear shield overlaps the entire printed legend.
2. Marker for Labels: Machine-printed, permanent, waterproof black ink recommended by printer manufacturer.

D. Self-Adhesive Labels: Vinyl, thermal, transfer-printed, 3-mil- (0.08-mm-) thick, multicolor, weather- and UV-resistant, pressure-sensitive adhesive labels, configured for intended use and location.
1. Minimum Nominal Size:

a. 1-1/2 by 6 inches (37 by 150 mm) for raceway and conductors.
b. 3-1/2 by 5 inches (76 by 127 mm) for equipment.
c. As required by authorities having jurisdiction.

## 2.4 BANDS AND TUBES

A. Snap-Around, Color-Coding Bands: Slit, pretensioned, flexible, solid-colored acrylic sleeves, 2 inches (50 mm) long, with diameters sized to suit diameters of raceway or cable they identify, that stay in place by gripping action.

## 2.5 UNDERGROUND-LINE WARNING TAPE

A. Tape:

1. Recommended by manufacturer for the method of installation and suitable to identify and locate underground communications utility lines.
2. Printing on tape shall be permanent and shall not be damaged by burial operations.
3. Tape material and ink shall be chemically inert and not subject to degradation when exposed to acids, alkalis, and other destructive substances commonly found in soils.

B. Color and Printing:

1. Comply with ANSI Z535.1, ANSI Z535.2, ANSI Z535.3, and ANSI Z535.4.
2. Inscriptions for Orange-Colored Tapes: "TELEPHONE CABLE, CATV CABLE, COMMUNICATIONS CABLE, OPTICAL-FIBER CABLE" <Insert inscription>.

C. Tag: Type I

1. Pigmented polyolefin, bright colored, compounded for direct-burial service.
2. Width: 3 inches (75 mm).
3. Thickness: 4 mils (0.1 mm).
4. Weight: 18.5 lb/1000 sq. ft. (9.0 kg/100 sq. m).
5. Tensile according to ASTM D 882: 30 lbf (133.4 N) and 2500 psi (17.2 MPa).

## 2.6 SIGNS

A. Baked-Enamel Signs:
1. Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application.
2. 1/4-inch (6.4-mm) grommets in corners for mounting.
3. Nominal Size: 7 by 10 inches (180 by 250 mm).

B. Laminated-Acrylic or Melamine-Plastic Signs:
1. Engraved legend.
2. Thickness:

a. For signs up to 20 sq. in. (129 sq. cm), minimum 1/16 inch (1.6 mm) thick.
b. For signs larger than 20 sq. in. (129 sq. cm), 1/8 inch (3.2 mm) thick.
c. Engraved legend with black letters on white face
d. Self-adhesive.
e. Framed with mitered acrylic molding and arranged for attachment at applicable equipment.

## 2.7 CABLE TIES

A. General-Purpose Cable Ties: Fungus inert, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.

1. Minimum Width: 3/16 inch (5 mm).
2. Tensile Strength at 73 deg F (23 deg C) according to ASTM D 638: 12,000 psi (82.7 MPa).
3. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).

4. Color: Black, except where used for color-coding.

B. UV-Stabilized Cable Ties: Fungus inert, designed for continuous exposure to exterior sunlight, self-extinguishing, one piece, self-locking, and Type 6/6 nylon.

1. Minimum Width: 3/16 inch (5 mm).
2. Tensile Strength at 73 deg F (23 deg C) according to ASTM D 638: 12,000 psi (82.7 MPa).
3. Temperature Range: Minus 40 to plus 185 deg F (Minus 40 to plus 85 deg C).
4. Color: Black.

C. Plenum-Rated Cable Ties: Self-extinguishing, UV stabilized, one piece, and self-locking.

1. Minimum Width: 3/16 inch (5 mm).
2. Tensile Strength at 73 deg F (23 deg C) according to ASTM D 638: 7000 psi (48.2 MPa).
3. UL 94 Flame Rating: 94V-0.
4. Temperature Range: Minus 50 to plus 284 deg F (Minus 46 to plus 140 deg C).
5. Color: Black.

## 2.8 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Paint: Comply with requirements in painting Sections for paint materials and application requirements. Retain paint system applicable for surface material and location (exterior or interior).

B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

# PART 3 - EXECUTION

## 3.1 PREPARATION

A. Self-Adhesive Identification Products: Before applying communications identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.

## 3.2 INSTALLATION

A. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.

B. Install identifying devices before installing acoustical ceilings and similar concealment.

C. Verify identity of each item before installing identification products.

D. Coordinate identification with Project Drawings, manufacturer's wiring diagrams, and operation and maintenance manual.

E. Apply identification devices to surfaces that require finish after completing finish work.

F. Install signs with approved legend to facilitate proper identification, operation, and maintenance of communications systems and connected items.

G. Elevated Components: Increase sizes of labels, signs, and letters to those appropriate for viewing from the floor.

H. Vinyl Wraparound Labels:

1. Secure tight to surface of raceway or cable at a location with high visibility and accessibility.
2. Attach labels that are not self-adhesive type with clear vinyl tape, with adhesive appropriate to the location and substrate.
3. Provide label 6 inches (150 mm) from cable end.

I. Snap-Around Labels:

1. Secure tight to surface at a location with high visibility and accessibility.
2. Provide label 6 inches (150 mm) from cable end.

J. Self-Adhesive Wraparound Labels:

1. Secure tight to surface at a location with high visibility and accessibility.
2. Provide label 6 inches (150 mm) from cable end.

K. Self-Adhesive Labels:

1. On each item, install unique designation label that is consistent with wiring diagrams, schedules, and operation and maintenance manual.
2. Unless otherwise indicated, provide a single line of text with 1/2-inch- (13-mm-) high letters on 1-1/2-inch- (38-mm-) high label; where two lines of text are required, use labels 2 inches (50 mm) high.

L. Snap-Around, Color-Coding Bands: Secure tight to surface at a location with high visibility and accessibility.

M. Underground-Line Warning Tape:

1. During backfilling of trenches, install continuous underground-line warning tape directly above cable or raceway at 6 to 8 inches (150 to 200 mm) below finished grade. Use multiple tapes where width of multiple lines installed in a common trench exceeds 16 inches (400 mm) overall.
2. Limit use of underground-line warning tape to direct-buried cables.
3. Install underground-line warning tape for direct-buried cables and cables in raceways.

N. Cable Ties: General purpose, except as listed below:

1. Outdoors: UV-stabilized nylon.
2. In Spaces Handling Environmental Air: Plenum rated.

3.3 IDENTIFICATION SCHEDULE

A. Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment. Install access doors or panels to provide view of identifying devices.

B. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations with high visibility. Identify by system and circuit designation.

C. Accessible Fittings for Raceways and Cables within Buildings: Identify covers of each junction and pull box with self-adhesive labels containing wiring system legend.

1. System legends shall be as follows:

a. Telecommunications.

D. Equipment Room Labeling:

1. Racks, Frames, and Enclosures: Identify front and rear of each with self-adhesive labels containing equipment designation.
2. Patch Panels: Label individual rows in each rack, starting at top and working down, with self-adhesive labels
3. Data Outlets: Label each outlet with a self-adhesive label indicating the following, in the order listed:

a. Room number being served.
b. Colon.
c. Faceplate number.

E. Backbone Cables: Label each cable with a vinyl-wraparound label indicating the location of the far or other end of the backbone cable. Patch panel or punch down block where cable is terminated should be labeled identically.

F. Locations of Underground Lines: Underground-line warning tape for copper, coaxial, hybrid copper/fiber, and optical-fiber cable.

G. Instructional Signs: Self-adhesive labels.

H. Warning Labels for Indoor Cabinets, Boxes, and Enclosures: Self-adhesive labels

1. Apply to exterior of door, cover, or other access.

I. Equipment Identification Labels:

1. Indoor Equipment: Laminated-acrylic or melamine-plastic sign].
2. Outdoor Equipment: Laminated-acrylic or melamine-plastic sign].

END OF SECTION 270553

# SECTION 271116 - COMMUNICATIONS RACKS, FRAMES, AND ENCLOSURES

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

A. Section Includes:
1. 19-inch freestanding and wall-mounted equipment cabinets.
2. Power strips.
3. Grounding.
4. Labeling.

B. Related Requirements:
1. Section 270526 "Grounding and Bonding for Telecommunications Equipment" for TMGBs and TGBs.
2. Section 271323 "Communications Optical Fiber Backbone Cabling" for optical-fiber data cabling associated with system panels and devices.

### 1.3 DEFINITIONS

A. Access Provider: An operator that provides a circuit path or facility between the service provider and user. An access provider can also be a service provider.

B. BICSI: Building Industry Consulting Service International.

C. LAN: Local area network.

D. RCDD: Registered communications distribution designer.

E. Service Provider: The operator of a telecommunications transmission service delivered through access provider facilities.

F. TGB: Telecommunications grounding bus bar.

G. TMGB: Telecommunications main grounding bus bar.

### 1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for equipment racks and cabinets.
2. Include rated capacities, operating characteristics, electrical characteristics, certifications, standards compliance, and furnished specialties and accessories.

B. Shop Drawings: For communications racks, frames, and enclosures. Include plans, elevations, sections, details, and attachments to other work.

1. Detail equipment assemblies and indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
2. Equipment Racks and Cabinets: Include workspace requirements and access for cable connections.
3. Grounding: Indicate location of TGB and its mounting detail showing standoff insulators and wall-mounting brackets.

## 1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer, qualified layout technician, installation supervisor, and field inspector.

## 1.6 QUALITY ASSURANCE

A. Installer Qualifications: Cabling installer must have personnel certified by BICSI on staff.

1. Layout Responsibility: Preparation of Shop Drawings shall be under direct supervision of RCDD.
2. Installation Supervision: Installation shall be under direct supervision of Technician , who shall be present at all times when Work of this Section is performed at Project site.
3. Field Inspector: Currently registered by BICSI as RCDD to perform on-site inspection.

# PART 2 - PRODUCTS

## 2.1 PERFORMANCE REQUIREMENTS

A. UL listed.

B. RoHS compliant.

## 2.2 19-INCH EQUIPMENT RACKS

A. Description: Four- post racks with threaded rails designed for mounting telecommunications equipment. Width is compatible with EIA/ECIA 310-E, 19-inch (482.6-mm) equipment mounting with an opening of 17.72-inches (450-mm) between rails.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Belden Inc.
2. Black Box Corporation
3. B-Line, an Eaton Business
4. Commscope, Inc.
5. Dell Inc.
6. Emerson Network Power Connectivity Solutions
7. Hubbell Premise Wiring
8. Leviton Manufacturing Co., Inc.
9. Middle Atlantic Products, Inc.
10. Ortronics, Inc.
11. Panduit Corp.
12. Tripp-Lite

C. General Requirements:

1. Frames: Modular units designed for telecommunications terminal support and coordinated with dimensions of units to be supported.
2. Material: Extruded steel
3. Finish: Manufacturer's standard, baked-polyester powder coat.
4. Color: Black

D. Floor-Mounted Racks:

1. Overall Height: 84 inches (2133.6 mm)
2. Overall Depth: 23 inches (584.2 mm)Upright Depth: 3 inches (76.2 mm)Four-Post Load Rating: 1000 lb (454 kg)
3. Number of Rack Units per Rack: 42

    a. Numbering: Everyrack units, on interior of rack.

4. Threads: 10-32.
5. Vertical and horizontal cable management channels, top and bottom cable troughs, grounding lug, and two power strips.
6. Base shall have a minimum of four mounting holes for permanent attachment to floor.
7. Top shall have provisions for attaching to cable tray or ceiling.
8. Self-leveling.

E. Wall-Mounted Racks:

1. Height: As indicated on Drawings
2. Depth: 23 inches (584.2 mm) As indicated on Drawings
3. Load Rating: 150 lb (65 kg)
4. Number of Rack Units per Rack:As indicated on Drawings.
5. Threads: 10-32
6. Wall Attachment: Four mounting holes.
7. Equipment Access: Integral swing.

F. Cable Management:

1. Metal, with integral wire retaining fingers.
2. Baked-polyester powder coat finish.
3. Vertical cable management panels shall have front and rear channels, with covers.
4. Provide horizontal crossover cable manager at the top of each relay rack, with a minimum height of two rack units each.

## 2.3 POWER STRIPS

A. Power Strips: Comply with UL 1363.

1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
2. Rack mounting.
3. Six 20-A, 120-V ac, NEMA WD 6, Configuration 5-20R receptacles.
4. LED indicator lights for power and protection status.
5. LED indicator lights for reverse polarity and open outlet ground.
6. Circuit Breaker and Thermal Fusing: When protection is lost, circuit opens and cannot be reset.
7. Cord connected with 15-foot (4.5-m) line cord.
8. Rocker-type on-off switch, illuminated when in on position.
9. Peak Single-Impulse Surge Current Rating: 33 kA per phase.
10. Protection modes shall be line to neutral, line to ground, and neutral to ground. UL 1449 clamping voltage for all three modes shall be not more than 330 V.

## 2.4 GROUNDING

A. Comply with requirements in Section 270526 "Grounding and Bonding for Communications Systems" for grounding conductors and connectors.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Burndy; Part of Hubbell Electrical Systems.
2. ERICO International Corporation.
3. Harger Lightning & Grounding.
4. ILSCO.
5. O-Z/Gedney; a brand of Emerson Industrial Automation.
6. Thomas & Betts Corporation; A Member of the ABB Group.

C. Rack and Cabinet TGBs: Rectangular bars of hard-drawn solid copper, accepting conductors ranging from No. 14 to No. 2/0 AWG, NRTL listed as complying with UL 467, and complying with TIA-606-B. Predrilling shall be with holes for use with lugs specified in this Section.
1. Rack-Mounted Horizontal TGB: Designed for mounting in 19- or 23-inch (482.6- or 584.2-mm) equipment racks. Include a copper splice bar for transitioning to an adjoining rack, and stainless-steel or copper-plated hardware for attachment to the rack.

2.5 LABELING

A. Comply with TIA-606-B and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1.

B. Comply with BICSI TDMM for layout of communications equipment spaces.

C. Comply with BICSI ITSIMM for installation of communications equipment spaces.

D. Bundle, lace, and train conductors and cables to terminal points without exceeding manufacturer's limitations on bending radii. Install lacing bars and distribution spools.

E. Coordinate layout and installation of communications equipment in racks and room. Coordinate service entrance configuration with service provider.

1. Meet jointly with system providers, equipment suppliers, and Owner to exchange information and agree on details of equipment configurations and installation interfaces.
2. Record agreements reached in meetings and distribute them to other participants.
3. Adjust configurations and locations of distribution frames, cross-connects, and patch panels in equipment spaces to accommodate and optimize configuration and space requirements of telecommunications equipment.
4. Adjust configurations and locations of equipment with distribution frames, cross-connects, and patch panels of cabling systems of other communications, electronic safety and security, and related systems that share space in equipment room.

F. Coordinate location of power raceways and receptacles with locations of communications equipment requiring electrical power to operate.

3.2 GROUNDING

A. Comply with NECA/BICSI 607.

B. Install grounding according to BICSI ITSIMM, "Bonding, Grounding (Earthing) and Electrical Protection" Ch.

C. Locate TGB to minimize length of bonding conductors. Fasten to wall, allowing at least 2 inches (50 mm) of clearance behind TGB. Connect TGB with a minimum No. 4 AWG grounding electrode conductor from TGB to suitable electrical building ground. Connect rack TGB to near TGB or the TMGB.

1. Bond the shield of shielded cable to patch panel, and bond patch panel to TGB or TMGB.

3.3 IDENTIFICATION

A. Coordinate system components, wiring, and cabling complying with TIA-606-B. Comply with requirements in Section 270553 "Identification for Communications Systems."

B. Paint and label colors for equipment identification shall comply with TIA-606-B for Class 2level of administration

C. Labels shall be machine printed. Type shall be 1/8 inch (3 mm) in height.

END OF SECTION 271116

# SECTION 271323 - COMMUNICATIONS OPTICAL FIBER BACKBONE CABLING

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

### 1.2 SUMMARY

A. Section Includes:
1. 9/125 micrometer single-mode, indoor-outdoor optical fiber cable (OS2).
2. 9/125 micrometer single-mode, inside plant optical fiber cable (OS1).
3. Optical fiber cable connecting hardware, patch panels, and cross-connects.
4. Cabling identification products.

### 1.3 DEFINITIONS

A. BICSI: Building Industry Consulting Service International.

B. Cross-Connect: A facility enabling the termination of cable elements and their interconnection or cross-connection.

C. RCDD: Registered Communications Distribution Designer.

### 1.4 OPTICAL FIBER BACKBONE CABLING DESCRIPTION

A. Optical fiber backbone cabling system shall provide interconnections between communications equipment rooms, main terminal space, and entrance facilities in the telecommunications cabling system structure. Cabling system consists of backbone cables, intermediate and main cross-connects, mechanical terminations, and patch cords or jumpers used for backbone-to-backbone cross-connection.

B. Backbone cabling cross-connects may be located in communications equipment rooms or at entrance facilities. Bridged taps and splitters shall not be used as part of backbone cabling.

### 1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Reviewed and stamped by RCDD.
1. System Labeling Schedules: Electronic copy of labeling schedules that are part of the cabling and asset identification system of the software.
2. Cabling administration drawings and printouts.

3. Wiring diagrams to show typical wiring schematics including the following:

    a. Telecommunications rooms plans and elevations.
    b. Telecommunications pathways.
    c. Telecommunications system access points.
    d. Telecommunications grounding system.
    e. Cross-connects.
    f. Patch panels.
    g. Patch cords.

4. Cross-connects and patch panels. Detail mounting assemblies, and show elevations and physical relationship between the installed components.

C. Optical fiber cable testing plan.

## 1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For RCDD, Installer, installation supervisor, and field inspector.

B. Source quality-control reports.

C. Product Certificates: For each type of product.

D. Field quality-control reports.

## 1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For optical fiber cable, splices, and connectors to include in maintenance manuals.

## 1.8 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Patch-Panel Units: One of each type.
2. Plugs: Ten of each type.
3. Jacks: Tenof each type.

## 1.9 QUALITY ASSURANCE

A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.

1. Layout Responsibility: Preparation of Shop DrawingsCabling Administration Drawings, and field testing program development by an RCDD.
2. Installation Supervision: Installation shall be under the direct supervision of Technician , who shall be present at all times when Work of this Section is performed at Project site.

3. Testing Supervisor: Currently certified by BICSI as an RCDD to supervise on-site testing.

B. Testing Agency Qualifications: Testing agency must have personnel certified by BICSI on staff.

1. Testing Agency's Field Supervisor: Currently certified by BICSI as an RCDD.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Test cables upon receipt at Project site.
1. Test optical fiber cable while on reels. Use an optical time domain reflectometer to verify the cable length and locate cable defects, splices, and connector, including the loss value of each. Retain test data and include the record in maintenance data.

1.11 COORDINATION

A. Coordinate layout and installation of telecommunications pathways and cabling with Owner's telecommunications and LAN equipment and service suppliers.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Backbone cabling system shall comply with transmission standards in TIA-568-C.1, when tested according to test procedures of this standard.

B. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 25 or less.
2. Smoke-Developed Index: 50 or less.

C. Telecommunications Pathways and Spaces: Comply with TIA-569-D.

D. Grounding: Comply with TIA-607-B.

2.2 9/125 MICROMETER, SINGLE-MODE, INDOOR-OUTDOOR OPTICAL FIBER CABLE

A. Description: Single mode, 9/125-micrometer, 6, 12, 24, 48, and 96 fibers, stranded loose tube, armored optical fiber cable.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. 3M.
2. Belden CDT Networking Division/NORDX.

3. Corning Cable Systems.
4. General Cable; General Cable Corporation.
5. Mohawk; a division of Belden Networking, Inc.
6. Superior Essex Inc.

C. Standards:

1. Comply with TIA-492CAAB for detailed specifications.
2. Comply with TIA-568-C.3 for performance specifications.
3. Comply with ICEA S-104-696 for mechanical properties.

D. Armored cable shall be steelarmored type.

E. Maximum Attenuation: 0.5dB/km at 1310 nm; 0.5 dB/km at 1550 nm.

F. Jacket:

1. Jacket Color: Black.
2. Cable cordage jacket, fiber, unit, and group color shall be according to TIA-598-D.
3. Imprinted with fiber count, fiber type, and aggregate length at regular intervals not to exceed 40 inches (1000 mm).

G. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444, UL 1651, and NFPA 70 for the following types:
1. Plenum Rated, Nonconductive: Type OFNP, complying with NFPA 262; Type OFNP in listed plenum communications raceway; or Type OFN, Type OFNG, Type OFNP, or Type OFNR in metallic conduit.
2. Plenum Rated, Armored (Conductive): Type OFCP, complying with NFPA 262.

2.3 9/125 MICROMETER, SINGLE-MODE, INSIDE PLANT OPTICAL FIBER CABLE (OS1)

A. Description: Single mode, 9/125-micrometer, 6 fibers unless otherwise indicated, tight buffered, optical fiber cable.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. 3M.
2. Belden CDT Networking Division/NORDX.
3. CommScope, Inc.
4. Corning Cable Systems.
5. General Cable; General Cable Corporation.
6. Superior Essex Inc.
7. SYSTIMAX Solutions; a CommScope Inc. brand.

C. Standards:

1. Comply with TIA-492CAAA for detailed specifications.
2. Comply with TIA-568-C.3 for performance specifications.
3. Comply with ICEA S-83-596 for mechanical properties.

D. Maximum Attenuation: 1.0 dB/km at 1310 nm; 1.0 dB/km at 1550 nm.

E. Jacket:

1. Jacket Color: Yellow.
2. Cable cordage jacket, fiber, unit, and group color shall be according to TIA-598-D.
3. Imprinted with fiber count, fiber type, and aggregate length at regular intervals not to exceed 40 inches (1000 mm).

F. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444, UL 1651, and NFPA 70 for the following types:

1. Plenum Rated, Nonconductive: Type OFNP, complying with NFPA 262.

## 2.4 OPTICAL FIBER CABLE HARDWARE

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Belden CDT Networking Division/NORDX.
2. Berk-Tek Leviton; a Nexans/Leviton alliance.
3. Corning Cable Systems.
4. Hubbell Premise Wiring.
5. Optical Cable Corporation.
6. Siemon Co. (The).

B. Standards:

1. Comply with Fiber Optic Connector Intermateability Standard (FOCIS) specifications of the TIA-604 series.
2. Comply with TIA-568-C.3.

C. Cross-Connects and Patch Panels: Modular panels housing multiple-numbered, duplex cable connectors.

1. Number of Connectors per Field: One for each fiber of cable or cables assigned to field, plus spares and blank positions adequate to suit specified expansion criteria.

D. Patch Cords: Factory-made, dual-fiber cables in 36-inch (900-mm) lengths.

E. Connector Type: Type SC complying with TIA-604-3-B, connectors.

F. Plugs and Plug Assemblies:

1. Male; color-coded modular telecommunications connector designed for termination of a single optical fiber cable.
2. Insertion loss not more than 0.25dB.
3. Marked to indicate transmission performance.

G. Jacks and Jack Assemblies:

1. Female; quick-connect, simplex and duplex; fixed telecommunications connector designed for termination of a single optical fiber cable.
2. Insertion loss not more than 0.25 dB.
3. Marked to indicate transmission performance.
4. Designed to snap-in to a patch panel or faceplate.

2.5 GROUNDING

A. Comply with requirements in Section 270526 "Grounding and Bonding for Communications Systems" for grounding conductors and connectors.

B. Comply with TIA-607-B.

2.6 IDENTIFICATION PRODUCTS

A. Comply with TIA-606-B and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

2.7 SOURCE QUALITY CONTROL

A. Testing Agency: Engage a qualified testing agency to evaluate cables.

B. Factory test multimode optical fiber cables according to TIA-526-14-B and TIA-568-C.3.

C. Factory test pre-terminated optical fiber cable assemblies according to TIA-526-14-B and TIA-568-C.3.

D. Cable will be considered defective if it does not pass tests and inspections.

E. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 ENTRANCE FACILITIES

A. Coordinate backbone cabling with the protectors and demarcation point provided by communications service provider.

3.2 WIRING METHODS

A. Wiring Method: Install cables in raceways and cable trays except within consoles, cabinets, desks, and countersConceal raceway and cables except in unfinished spaces.

1. Install plenum cable in environmental air spaces, including plenum ceilings.
2. Comply with requirements for pathways specified in Section 270528 "Pathways for Communications Systems."

B. Install cables in orange innerduct within cable trays and exposed.

C. Wiring within Enclosures: Bundle, lace, and train cables within enclosures. Connect to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools.

## 3.3 INSTALLATION OF OPTICAL FIBER BACKBONE CABLES

A. Comply with NECA 1, NECA 301, and NECA/BICSI 568.

B. General Requirements for Optical Fiber Cabling Installation:

1. Comply with TIA-568-C.1 and TIA-568-C.3.
2. Comply with BICSI ITSIMM, Ch. 6, "Cable Termination Practices."
3. Terminate all cables; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
4. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches (760 mm) and not more than 6 inches (150 mm) from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
5. Install lacing bars to restrain cables, to prevent straining connections, and to prevent bending cables to smaller radii than minimums recommended by manufacturer.
6. Bundle, lace, and train cable to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI ITSIMM, "Cabling Termination Practices" Chapter. Use lacing bars and distribution spools.
7. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation and replace it with new cable.
8. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
9. In the communications equipment room, provide a 10-foot- (3-m-) long service loop on each end of cable.
10. Pulling Cable: Comply with BICSI ITSIMM, Ch. 4, "Pulling Cable." Monitor cable pull tensions.
11. Cable may be terminated on connecting hardware that is rack or cabinet mounted.

C. Open-Cable Installation:

1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
2. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.

D. Group connecting hardware for cables into separate logical fields.

## 3.4 FIRESTOPPING

A. Comply with requirements in Section 078413 "Penetration Firestopping."

B. Comply with TIA-569-D, Annex A, "Firestopping."

C. Comply with BICSI ITSIMM, "Firestopping" Chapter.

3.5 GROUNDING

A. Install grounding according to BICSI ITSIMM, "Grounding (Earthing), Bonding, and Electrical Protection" Chapter.

B. Comply with TIA-607-B and NECA/BICSI-607.

C. Bond metallic equipment to the grounding bus bar, using not smaller than No. 6 AWG equipment grounding conductor.

3.6 IDENTIFICATION

A. Identify system components, wiring, and cabling complying with TIA-606-B. Comply with requirements for identification specified in Section 270553 "Identification for Communications Systems."

1. Administration Class:Class 2
2. Color-code cross-connect fields and apply colors to voice and data service backboards, connections, covers, and labels.

B. Paint and label colors for equipment identification shall comply with TIA-606-B for Class 2 level of administration

C. Comply with requirements in Section 271523 "Communications Optical Fiber Horizontal Cabling" for cable and asset management software.

D. Cable Schedule: Install in a prominent location in each equipment room and wiring closet. List incoming and outgoing cables and their designations, origins, and destinations. Protect with rigid frame and clear plastic cover. Furnish an electronic copy of final comprehensive schedules for Project.

E. Cabling Administration Drawings: Show building floor plans with cabling administration-point labeling. Identify labeling convention and show labels for telecommunications closets, backbone pathways and cables,] terminal hardware and positions, horizontal cables, work areas and workstation terminal positions, grounding buses and pathways, and equipment grounding conductors.

F. Cable and Wire Identification:

1. Label each cable within 4 inches (100 mm) of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated.
2. Each wire connected to building-mounted devices is not required to be numbered at device if color of wire is consistent with associated wire connected and numbered within panel or cabinet.
3. Exposed Cables and Cables in Cable Trays and Wire Troughs: Label each cable at intervals not exceeding 15 feet (4.5 m).
4. Label each unit and field within distribution racks and frames.

5. Identification within Connector Fields in Equipment Rooms and Wiring Closets: Label each connector and each discrete unit of cable-terminating and connecting hardware. Where similar jacks and plugs are used for both voice and data communication cabling, use a different color for jacks and plugs of each service.

G. Labels shall be preprinted or computer-printed type with printing area and font color that contrasts with cable jacket color but still complies with requirements in TIA 606-B, for the following:

1. Flexible vinyl or polyester that flexes as cables are bent.

## 3.7 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to test and inspect components, assemblies, and equipment installations, including connections.

B. Perform tests and inspections with the assistance of a factory-authorized service representative.

C. Tests and Inspections:

1. Visually inspect optical fiber jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments, and inspect cabling connections for compliance with TIA-568-C.1.
2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
3. Optical Fiber Cable Tests:

a. Test instruments shall meet or exceed applicable requirements in TIA-568-C.1. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.
b. Link End-to-End Attenuation Tests:

1) Horizontal and multimode backbone link measurements: Test at 850 or 1300 nm in one direction according to TIA-526-14-B, Method B, One Reference Jumper.
2) Attenuation test results for backbone links shall be less than 2.0 dB. Attenuation test results shall be less than those calculated according to equation in TIA-568-C.1.

D. Data for each measurement shall be documented. Data for submittals shall be printed in a summary report that is formatted similar to Table 10.1 in BICSI TDMM, or transferred from the instrument to the computer, saved as text files, and printed and submitted.

E. Remove and replace cabling where test results indicate that it does not comply with specified requirements.

F. End-to-end cabling will be considered defective if it does not pass tests and inspections.

G. Prepare test and inspection reports.

END OF SECTION 271323

# SECTION 271513 - COMMUNICATIONS COPPER HORIZONTAL CABLING

## PART 1 - GENERAL

### 1.1 SUMMARY

A. Section Includes:
   1. Category 6 twisted pair cable.
   2. Cable management system.
   3. Identification products.

### 1.2 DEFINITIONS

A. Cross-Connect: A facility enabling the termination of cable elements and their interconnection or cross-connection.

B. EMI: Electromagnetic interference.

C. FTP: Shielded twisted pair.

D. F/FTP: Overall foil screened cable with foil screened twisted pair.

E. F/UTP: Overall foil screened cable with unscreened twisted pair.

F. IDC: Insulation displacement connector.

G. Jack: Also commonly called an "outlet," it is the fixed, female connector.

H. LAN: Local area network.

I. Plug: Also commonly called a "connector," it is the removable, male telecommunications connector.

J. RCDD: Registered Communications Distribution Designer.

K. Screen: A metallic layer, either a foil or braid, placed around a pair or group of conductors.

L. Shield: A metallic layer, either a foil or braid, placed around a pair or group of conductors.

M. S/FTP: Overall braid screened cable with foil screened twisted pair.

N. S/UTP: Overall braid screened cable with unscreened twisted pairs.

O. UTP: Unscreened (unshielded) twisted pair.

1.3 COPPER HORIZONTAL CABLING DESCRIPTION

A. Horizontal cable cabling system shall provide interconnections between Distributor A, Distributor B, or Distributor C, and the equipment outlet, otherwise known as "Cabling Subsystem 1," in the telecommunications cabling system structure. Cabling system consists of horizontal cables, intermediate and main cross-connects, mechanical terminations, and patch cords or jumpers used for horizontal-to-horizontal cross-connection.

1. TIA-568-C.1 requires that a minimum of two equipment outlets be installed for each work area.
2. Horizontal cabling shall contain no more than one transition point or consolidation point between the horizontal cross-connect and the telecommunications equipment outlet.
3. Bridged taps and splices shall not be installed in the horizontal cabling.

B. A work area is approximately 100 sq. ft. (9.3 sq. m), and includes the components that extend from the equipment outlets to the station equipment.

C. The maximum allowable horizontal cable length is 295 feet (90 m). This maximum allowable length does not include an allowance for the length of 16 feet (4.9 m) to the workstation equipment or in the horizontal cross-connect.

1.4 ACTION SUBMITTALS

A. Product Data:
1. Category 6 twisted pair cable.
2. Cable management system.
3. Identification products.

B. Shop Drawings: Reviewed and stamped by RCDD.

1. System Labeling Schedules:
   a. Electronic copy of labeling schedules that are part of cabling and asset identification system of software.

2. Cabling administration Drawings and printouts.
3. Wiring diagrams and installation details of telecommunications equipment, to show location and layout of telecommunications equipment, including the following:

   a. Telecommunications rooms plans and elevations.
   b. Telecommunications pathways.
   c. Telecommunications system access points.
   d. Telecommunications grounding system.
   e. Telecommunications conductor drop locations.
   f. Typical telecommunications details.
   g. Mechanical, electrical, and plumbing systems.

C. Twisted pair cable testing plan.

D. Field quality-control reports.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For RCDD, installation supervisor, and field inspector.

B. Product Certificates: For each type of product.

C. Source quality-control reports.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For splices and connectors to include in maintenance manuals.

B. Software and Firmware Operational Documentation:

1. Software operating and upgrade manuals.
2. Program Software Backup: On USB media or compact disk, complete with data files.
3. Device address list.
4. Printout of software application and graphic screens.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.

1. Layout Responsibility: Preparation of Shop Drawings and cabling administration Drawings by an RCDD.
2. Installation Supervision: Installation shall be under the direct supervision of Level 2 Installer, who shall be present at all times when Work of this Section is performed at Project site.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Test cables upon receipt at Project site.

1. Test each pair of twisted pair cable for open and short circuits.

1.9 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install cables and connecting materials until wet work in spaces is complete and dry, and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Horizontal cabling system shall comply with transmission standards in TIA-568-C.1, when tested according to test procedures of this standard.

B. Telecommunications Pathways and Spaces: Comply with TIA-569-D.

C. Grounding: Comply with TIA-607-B.

2.2 GENERAL CABLE CHARACTERISTICS

A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with the applicable standard and NFPA 70 for the following types:

1. Communications, Plenum Rated:

a. Type CMP complying with UL 1685 or Type CMP in listed cable routing assembly.
b. Type CM, Type CMG, Type CMP, Type CMR, or Type CMX in metallic conduit installed according to NFPA 70, Article 300.22, "Wiring in Ducts, Plenums, and Other Air-Handling Spaces."

2. Communications, Non-Plenum Rated:
a. Type CMP or Type CMR in listed plenum or riser communications raceway.

B. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

C. RoHS compliant.

2.3 CATEGORY 6 TWISTED PAIR CABLE

A. Category 6 Twisted Pair Cable: Four-pair, balanced -twisted pair cable,certified to meet transmission characteristics of Category 6 cable at frequencies up to 250 MHz.

B. Standard: Comply with NEMA WC 66/ICEA S-116-732 and TIA-568-C.2 for Category 6 cables.

C. Conductors: 100-ohm, 23 AWG solid copper.

D. Shielding/Screening:Shielded twisted pairs (FTP)

E. Cable Rating: Riser/Plenum.

F. Jacket: thermoplastic. Color as indicated on drawings.

2.4 TWISTED PAIR CABLE HARDWARE

A. Twisted Pair Cable Hardware: Hardware designed to connect, splice, and terminate twisted pair copper communications cable.

B. General Requirements for Twisted Pair Cable Hardware:

1. Comply with the performance requirements of Category 6.
2. Comply with TIA-568-C.2, IDC type, with modules designed for punch-down caps or tools.
3. Cables shall be terminated with connecting hardware of same category or higher.

C. Connecting Blocks:

1. 110-style IDC for Category 5e.
2. 66-style IDC for Category 5e.
3. 110-style IDC for Category 6.
4. 110-style IDC for Category 6a.
5. Provide blocks for the number of cables terminated on the block, plus 25 percent spare, integral with connector bodies, including plugs and jacks where indicated.

6. Number of Terminals per Field: One for each conductor in assigned cables.

D. Patch Panel: Modular panels housing numbered jack units with IDC-type connectors at each jack location for permanent termination of pair groups of installed cables.

1. Features:

a. Universal T568A and T568B wiring labels.
b. Labeling areas adjacent to conductors.
c. 24 or 48 ports.

2. Construction: 16-gauge steel and mountable on 19-inch (483 mm) equipment racks.
3. Number of Jacks per Field: One for each four-pair

E. Patch Cords: Factory-made, four-pair cables in 48-inch (1200-mm) lengths; terminated with an eight-position modular plug at each end.
1. Patch cords shall have color-coded boots for circuit identification.

F. Plugs and Plug Assemblies:

1. Male; eight position; color-coded modular telecommunications connector designed for termination of a single four-pair, 100-ohm, unshielded or shielded twisted pair cable.
2. Standard: Comply with TIA-568-C.2.

G. Jacks and Jack Assemblies:

1. Female; eight position; modular; fixed telecommunications connector designed for termination of a single four-pair, 100-ohm, unshielded or shielded twisted pair cable.
2. Designed to snap-in to a patch panel or cover plate.
3. Standard: Comply with TIA-568-C.2.

H. Cover Plate:

1. Two/Four/Six port, vertical single gang cover plates designed to mount to single gang wall boxes.
2. Plastic Cover Plate: High-impact plastic. Coordinate color with Section 260533.16 "Boxes and Covers for Electrical Systems."
3. Metal Cover Plate: Complying with requirements in Section 260000 "Electrical"
4. For use with snap-in jacks accommodating any combination of twisted pair, optical fiber, and coaxial work area cords.

    a. Flush mounting jacks, positioning the cord at a 45-degree angle.

I. Legend:

1. Machine printed, in the field, using adhesive-tape label.
2. Snap-in, clear-label covers and machine-printed paper inserts.

## 2.5 IDENTIFICATION PRODUCTS

A. Comply with TIA-606-B and UL 969 for a system of labeling materials, including label stocks, laminating adhesives, and inks used by label printers.

## 2.6 SOURCE QUALITY CONTROL

A. Factory test cables on reels according to TIA-568-C.1.

B. Factory test twisted pair cables according to TIA-568-C.2.

C. Cable will be considered defective if it does not pass tests and inspections.

D. Prepare test and inspection reports.

# PART 3 - EXECUTION

## 3.1 WIRING METHODS

A. Routing:

1. Install cables in raceways and cable trays, except within consoles, cabinets, desks, and counters and except in accessible ceiling spaces, attics, and gypsum board partitions where unenclosed wiring method may be used. Conceal raceway and cables, except in unfinished spaces.

    a. Install plenum cable in environmental air spaces, including plenum ceilings.
    b. Comply with requirements for raceways and boxes specified in Section 270528 "Pathways for Communications Systems."

2. Conceal conductors and cables in accessible ceilings, walls, and floors where possible.

B. Wiring within Enclosures: Bundle, lace, and train cables within enclosures. Connect to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools. Install conductors parallel with or at right angles to sides and back of enclosure.

## 3.2 INSTALLATION OF PATHWAYS

A. Comply with Section 270528 "Pathways for Communications Systems."

B. Comply with Section 260529 "Hangers and Supports for Electrical Systems."

C. Drawings indicate general arrangement of pathways and fittings.

## 3.3 INSTALLATION OF TWISTED PAIR HORIZONTAL CABLES

A. Comply with NECA 1 and NECA/BICSI 568.

B. General Requirements for Cabling:

1. Comply with TIA-568-C.0, TIA-568-C.1, and TIA-568-C.2.
2. Comply with BICSI's "Information Transport Systems Installation Methods Manual (ITSIMM), Ch. 5, "Copper Structured Cabling Systems," "Cable Termination Practices" Section.
3. Install 110-style IDC termination hardware unless otherwise indicated.
4. Do not untwist twisted pair cables more than 1/2 inch (12 mm) from the point of termination to maintain cable geometry.
5. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
6. Consolidation points may be used only for making a direct connection to equipment outlets:

    a. Do not use consolidation point as a cross-connect point, as a patch connection, or for direct connection to workstation equipment.
    b. Locate consolidation points for twisted pair cables at least 49 feet (15 m) from communications equipment room.

7. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches (760 mm) and not more than 6 inches (150 mm) from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
8. Install lacing bars to restrain cables, prevent straining connections, and prevent bending cables to smaller radii than minimums recommended by manufacturer.
9. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI Information Transport Systems Installation Methods Manual, Ch. 5, "Copper Structured Cabling Systems," "Cable Termination Practices" Section. Use lacing bars and distribution spools.
10. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation, and replace it with new cable.

11. Cold-Weather Installation: Bring cable to room temperature before dereeling. Heat lamps shall not be used for heating.
12. In the data room, install a 10-foot- (3-m-) long service loop on each end of cable.
13. Pulling Cable: Comply with BICSI Information Transport Systems Installation Methods Manual, Ch. 5, "Copper Structured Cabling Systems," "Pulling and Installing Cable" Section. Monitor cable pull tensions.

C. Open-Cable Installation:

1. Install cabling with horizontal and vertical cable guides in telecommunications spaces with terminating hardware and interconnection equipment.
2. Suspend twisted pair cabling, not in a wireway or pathway, a minimum of 8 inches (200 mm) above ceilings by cable supports not more than 60 inches (1524 mm) apart.
3. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.

D. Group connecting hardware for cables into separate logical fields.

E. Separation from EMI Sources:

1. Comply with recommendations from BICSI's "Telecommunications Distribution Methods Manual" and TIA-569-D for separating unshielded copper communication cable from potential EMI sources, including electrical power lines and equipment.
2. Separation between open communications cables or cables in nonmetallic raceways and unshielded power conductors and electrical equipment shall be as follows:

    a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 5 inches (127 mm).
    b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 12 inches (300 mm).
    c. Electrical Equipment Rating More Than 5 kVA: A minimum of 24 inches (600 mm).

3. Separation between communications cables in grounded metallic raceways and unshielded power lines or electrical equipment shall be as follows:

    a. Electrical Equipment Rating Less Than 2 kVA: A minimum of 2-1/2 inches (64 mm).
    b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 6 inches (150 mm).
    c. Electrical Equipment Rating More Than 5 kVA: A minimum of 12 inches (300 mm).

4. Separation between communications cables in grounded metallic raceways, power lines, and electrical equipment located in grounded metallic conduits or enclosures shall be as follows:

    a. Electrical Equipment Rating Less Than 2 kVA: No requirement.
    b. Electrical Equipment Rating between 2 and 5 kVA: A minimum of 3 inches (76 mm).
    c. Electrical Equipment Rating More Than 5 kVA: A minimum of 6 inches (150 mm).

5. Separation between Communications Cables and Electrical Motors and Transformers, 5 kVA or HP and Larger: A minimum of 48 inches (1200 mm).
6. Separation between Communications Cables and Fluorescent Fixtures: A minimum of 5 inches (127 mm).

## 3.4 FIRESTOPPING

A. Comply with requirements in Section 260000 "Electrical."

B. Comply with TIA-569-D, Annex A, "Firestopping."

C. Comply with "Firestopping Systems" Article in BISCI's "Telecommunications Distribution Methods Manual."

## 3.5 GROUNDING

A. Comply with requirements in Section 260526 "Grounding and Bonding for Electrical Systems" for grounding conductors and connectors.

B. Install grounding according to the "Grounding, Bonding, and Electrical Protection" chapter in BICSI's "Telecommunications Distribution Methods Manual."

C. Comply with TIA-607-B and NECA/BICSI-607.

D. Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall, allowing at least a 2-inch (50-mm) clearance behind the grounding bus bar. Connect grounding bus bar to suitable electrical building ground, using a minimum No. 4 AWG grounding electrode conductor.

E. Bond metallic equipment to the grounding bus bar, using not smaller than a No. 6 AWG equipment grounding conductor.

## 3.6 IDENTIFICATION

A. Cable and Wire Identification:

1. Label each cable within 4 inches (100 mm) of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated.
2. Each wire connected to building-mounted devices is not required to be numbered at the device if wire color is consistent with associated wire connected and numbered within panel or cabinet.
3. Exposed Cables and Cables in Cable Trays and Wire Troughs: Label each cable at intervals not exceeding 30 feet.

B. Labels shall be preprinted or computer-printed type, with a printing area and font color that contrast with cable jacket color but still comply with TIA-606-B requirements for the following:

1. Cables use flexible vinyl or polyester that flexes as cables are bent.

3.7 FIELD QUALITY CONTROL

A. Tests and Inspections:

1. Visually inspect jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments, and inspect cabling connections for compliance with TIA-568-C.1.
2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
3. Test twisted pair cabling for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination but not cross-connection.

    a. Test instruments shall meet or exceed applicable requirements in TIA-568-C.2. Perform tests with a tester that complies with performance requirements in "Test Instruments (Normative)" Annex, complying with measurement accuracy specified in "Measurement Accuracy (Informative)" Annex. Use only test cords and adapters that are qualified by test equipment manufacturer for channel or link test configuration.

B. Data for each measurement shall be documented. Data for submittals shall be printed in a summary report that is formatted similarly to Table 10.1 in BICSI's "Telecommunications Distribution Methods Manual," or shall be transferred from the instrument to the computer, saved as text files, printed, and submitted.

C. Nonconforming Work:

1. End-to-end cabling will be considered defective if it does not pass tests and inspections.
2. Remove and replace cabling where test results indicate that they do not comply with specified requirements.

D. Collect, assemble, and submit test and inspection reports.

END OF SECTION 271513

# SECTION 31 0010
# SITE PROTECTION

## PART 1 GENERAL

### 1.01 RELATED DOCUMENTS

A. The General Provisions of the Contract including General and Supplementary Conditions and General Requirements apply to the work specified in this section.

### 1.02 DESCRIPTION

A. The Work of this Section includes the protection and preservation from injury or defacement of all vegetation and objects designated to remain. The contractor shall employ an arborist to instruct contractor on preservation of site trees to remain.

B. The Contractor is solely responsible for controlling runoff and siltation from the site and onto protected or undisturbed areas of the site or adjacent sites.

C. The Work of this Section is incidental to the Contract and will not be paid for separately except where unit prices may be in effect.

### 1.03 QUALITY ASSURANCE

A. Reference Standards:
   1. General:
      a. Listings: Issues listed by reference, including revisions of issuing authority, form part of this specification section to extent indicated. Issues listed are identified by number, edition, date, title, or other designation established by issuing authority. Issues subsequently referred to are referred to by an issuing authority abbreviation and a basic designation.
      b. Modification: Modifications (by Architect) to reference standards, if any, are noted with standard.
   2. Alabama Department of Transportation (ALDOT), Standard Specifications for Highway Construction, Latest Edition:
   3. Alabama handbook for "Erosion Control, Sediment Control, and Stormwater Management on Construction Sites and Urban Areas", published by Alabama Soil and Water Conservation Committee.
   4. Local Codes, Ordinances, Regulations.
   5. Local Codes, Ordinances, Regulations on tree protection.

B. Job Meeting: Before proceeding with site clearing operations, review site features to remain and be protected at the site with Owner and Architect.

C. Tree Damages: Extreme care to be taken to save trees that are shown to remain.
   1. If any trees to be saved are severely injured so as to cause a loss of natural character to the crown, or so as to impair the life support system or to cause death as a result of construction operation, the Contractor agrees to pay two hundred dollars ($200) per one inch (1”) of caliper, measured four feet (4’) above the ground, for trees one inch (1”) in caliper and larger, as fixed and liquidated damages, as determined by the Architect.
   2. Severely damaged trees requiring liquidated damages will be determined by the Architect. In lieu of liquidated damages replace trees damaged beyond repair or killed with trees of same specie and size.
   3. Damaged trees which are repairable as determined by the Architect shall be repaired by a qualified tree surgeon, approved by the Architect, and whose services will be at the Contractor’s expense.

4. Clean up and repair damages to Owner's satisfaction.

D. Site Damage
   1. If any protection materials or measures are dismantled, removed or altered, even temporarily, or if areas of the site designated to remain are utilized in any manner without the Architect's written authorization, the Contractor agrees to pay the Owner Five Hundred Dollars ($500) per infraction, as determined by the Architect, as fixed and liquidated damages.

E. Protect existing sidewalks and curbs to remain to include those in non-work areas.

## PART 2 PRODUCTS

### 2.01 PRODUCT/MATERIAL DESCRIPTION

A. Tree Protection Fencing:
   1. Provide and install six-foot (6') high chain link fence, including gates, in accordance with AHD Section 871.
   2. Zinc coated steel fabric or wire not less than (9) gauge.
   3. Hot-dipped galvanized steel fence supports, framing and fittings of specified sized and weights.
   4. Install at limits of tree protection fencing as required to protect tree canopy and roots.

## PART 3 EXECUTION

### 3.01 JOB CONDITIONS

A. It is intended that the part of the property on which new construction does not occur remain undisturbed and as is, except as noted on Drawings and in Specifications.

B. Confine storage of materials, temporary facilities, and staging to areas approved by the Architect.

C. Do not carry on construction operations or materials storage within five feet (5') of tree protection fencing.

### 3.02 TREE PROTECTION

A. Protect all trees and vegetation to be preserved against damage during construction operations by:
   1. Installation of chain link fence as required to protect trees.
   2. Installation of hay bales or silt fencing to protect vegetation to remain from siltation, as shown on Drawings or as directed.

B. Place tree protection before clearing, topsoil stripping, grading, or excavation is begun.

C. Maintain tree protection in good repair for the duration of the construction operation, or until directed to remove.

D. Protect Root Systems:
   1. Do not permit construction operations, storage material, construction, trailers, etc., within the tree protection fencing.
   2. Protect tree roots (area under tree canopy) from damage due to noxious materials in solution caused by run-off or spillage during mixing and placement of construction materials, or drainage from stored materials.
   3. Protect from flooding or excessive wetting.

E. Watering: In case of extreme drought during construction, provide water to specimen trees or groups of trees as determined by Architect.

F. Earthwork around trees:

1. Maintain existing grade within drip line of trees unless otherwise indicated; where necessary next to new construction, limit earthwork around trees as much as possible.
2. Where trenching or utilities is required within drip line, advise Architect before proceeding. Where roots are pruned, cut sharply and cleanly (do not chop or beak). Hand excavate where directed.
3. Do not allow exposed roots to dry out before permanent fill is placed; provide temporary cover, or pack with peat moss and wrap with burlap; keep moist.

G. Repair of Damaged Trees:
1. Repair tree damaged by construction operations promptly after damage occurs and in a manner acceptable to the Architect.

**END OF SECTION**

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# SECTION 31 0020
# EROSION CONTROL

## 1.01 GENERAL REQUIREMENTS

A. Division One is applicable in full hereto.

## 1.02 JOB CONDITIONS

A. Erosion control shall be employed during the construction period and shall include all necessary temporary measures required to prevent soil erosion from the site until permanent control and finished surfaces are installed.

B. Erosion control measures shall be considered incidental to all construction involving land disturbing activities.

## 1.03 QUALITY ASSURANCE

A. The Contractor shall comply with applicable codes, ordinances, rules, regulations, and laws of local, municipal, state or federal authorities having jurisdiction over the project. All required permits shall be obtained for construction operations by the Contractor.

B. The Contractor shall comply with all Local, State, and Federal requirements.

C. Industry Standards: ALDOT Standard Specifications for Highway Construction, unless otherwise noted.

## 1.04 SLOPE DRAINS

A. Temporary slope drains not detailed on the drawings may be constructed of pipe, fiber mats, rubble, Portland cement concrete, filter fabric, bituminous concrete, or plastic sheets.

B. Drainage fill for sediment traps shall be size 57 crushed stone meeting ASTM C33.

## 1.05 FILTER FABRIC

A. Silt Fences shall meet the requirements of ALDOT Specifications.

## 1.06 ROLLED EROSION CONTROL PRODUCTS

A. Drainable Rolled Erosion Control Products shall be provided where indicated on drawings and shall meet requirements of Alabama Depatment of Transportation Specification Section 659, ECP Type S2.

## 1.07 GENERAL

A. Temporary erosion control shall be directed toward and have the purpose of controlling soil erosion at its potential source. Downstream sediment entrapment measures shall be employed, but only as a backup to primary control at the source.

B. A continuing program of installation and maintenance of sediment control shall be employed during the construction period.

## 1.08 TEMPORARY EROSION CONTROL DURING CONSTRUCTION

A. Temporary erosion control construction shall be employed until such time as permanent paving, planting and restoration of natural areas is effective in control of erosion from the site.

B. Temporary Stabilization of Entrances to construction sites:
   1. Stabilize defined entrance ways using stone complying with requirements of ASTM C-33 No. 2 (1 ½” to 2 ½”) and filter fabric conforming to AASHTO M-288 and Sec. 810 of the Alabama Department of Transportation Specification.

2. Stabilized area shall be as indicated on the drawings; if not indicated, the area shall be at least 25’ wide and at least 6” thick.
3. Maintain the entrance way in such a manner as to prevent tracking or flowing of sediment onto existing paved road. This may require periodic additional top dressing of stone as conditions demand. Repair and/or clean out all facilities employed to trap sediment. Immediately clean up and remove all sediment spilled, dropped, washed or tracked onto pavement.

C. Sediment Barriers:
1. Temporary sediment barriers shall be located at all points where surface water flows from a construction area. This includes the entire perimeter of the construction area where the slope is outward and at inlets to all drainage structures.
2. Sediment barriers shall be constructed to remove sediments from flowing water through filtration and sedimentation. Primary filter media will consist of silt fences utilizing anchored filter cloth. Straw bales and/or crushed stone staked or otherwise securely held in place may be used for supplemental silt barriers where deemed necessary.
3. Sediment barriers shall be arranged to create ponding between them. Provisions shall be made for removing accumulated sediments and maintaining ponding capacity.
4. Sediment barriers shall be removed and the area restored when permanent erosion control is effective.

D. Grading Operations: Grading operations shall be scheduled so that the ground surface will be disturbed for the shortest possible time before permanent construction is installed. Large areas shall be maintained as flat as practicable to minimize soil transport through surface flow. Whenever steeper slopes or abrupt changes in grade are required, a diversion or berm shall be constructed at the top of the slope to cause the surface water to flow along the diversion to a control point to be transported downslope in a slope drain. In no case shall surface water be allowed to flow uncontrolled down slopes.

E. Slope Drains: Temporary drains shall be provided to convey surface water down slopes. Slope drains shall be provided with an apron at their tops to anchor them and properly direct water into them. Stone or rubble shall be placed at slope drain outlets to prevent scour at these points.

F. Storm Drainage System: As much of the permanent storm drainage system as is practicable shall be initially installed and surface water diverted into the system. The remainder of the storm drainage system shall be installed as soon as conditions will allow.
1. Temporary sediment barriers shall be maintained around drainage structures until final subgrade preparation is begun.

G. Ground Cover
1. All exposed soils sloping 7% or greater shall be protected by application of ground cover until construction of permanent surfaces begins.
2. Ground cover may consist of any effective erosion preventative treatment such as straw or other mulches, stone base, plastic sheets, fiber mats, plantings, etc.
3. All grassing or planting operations shall include mulching or hydroseeding as stabilization until ground cover by planting is effective.

**1.09 CLEANUP AND REMOVAL**

A. At the time permanent erosion control is effective, temporary devices and their accumulated sediments shall be removed.

B. If, because of the construction, accumulation of silt occurs in permanent detention basins, silt shall be removed by the Contractor.

**END OF SECTION**

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# SECTION 31 0519
# GEOSYNTHETICS FOR EARTHWORK

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Geotextile for protection.

B. Geogrid for reinforcement.

C. Geocomposite for drainage.

D. Geomembrane for barrier.

### 1.02 RELATED REQUIREMENTS

A. Section 31 1000 - Site Clearing.

B. Section 31 2200 - Grading.

C. Section 31 2316 - Excavation.

D. Section 31 2316.13 - Trenching.

E. Section 31 2323 - Fill.

F. Section 31 0020 - Erosion Control

### 1.03 REFERENCE STANDARDS

A. AASHTO M 288 - Standard Specification for Geotextiles; 2006.

B. ASTM D1621 - Standard Test Method for Compressive Properties Of Rigid Cellular Plastics; 2016.

C. ASTM D4355/D4355M - Standard Test Method for Deterioration of Geotextiles by Exposure to Light, Moisture and Heat in a Xenon Arc Type Apparatus; 2014.

D. ASTM D4491/D4491M - Standard Test Methods for Water Permeability of Geotextiles by Permittivity; 2020.

E. ASTM D4533/D4533M - Standard Test Method for Trapezoid Tearing Strength of Geotextiles; 2015.

F. ASTM D4595 - Standard Test Method for Tensile Properties of Geotextiles by the Wide-Width Strip Method; 2017.

G. ASTM D4632/D4632M - Standard Test Method for Grab Breaking Load and Elongation of Geotextiles; 2015a.

H. ASTM D4716/D4716M - Standard Test Method for Determining the (In-plane) Flow Rate per Unit Width and Hydraulic Transmissivity of a Geosynthetic Using a Constant Head; 2014.

I. ASTM D4751 - Standard Test Method for Determining Apparent Opening Size of a Geotextile; 2012.

J. ASTM D4833/D4833M - Standard Test Method for Index Puncture Resistance of Geomembranes, and Related Products; 2007 (Reapproved 2013).

K. ASTM D4873/D4873M - Standard Guide for Identification, Storage, and Handling of Geosynthetic Rolls and Samples; 2016.

L. ASTM D4886 - Standard Test Method for Abrasion Resistance of Geotextiles (Sandpaper/Sliding Block Method); 2018.

M. ASTM D5199 - Standard Test Method for Measuring the Nominal Thickness of Geosynthetics; 2012 (Reapproved 2019).

N. ASTM D5321/D5321M - Standard Test Method for Determining the Shear Strength of Soil-Geosynthetic and Geosynthetic-Geosynthetic Interfaces by Direct Shear; 2014.

O. ASTM D6241 - Standard Test Method for Static Puncture Strength of Geotextiles and Geotextile- Related Products Using a 50-mm Probe; 2014.

P. ASTM D6637/D6637M - Standard Test Method for Determining Tensile Properties of Geogrids by the Single or Multi-Rib Tensile Method; 2015.

Q. ASTM D6706 - Standard Test Method for Measuring Geosynthetic Pullout Resistance in Soil; 2001 (Reapproved 2013).

R. ASTM D7005/D7005M - Standard Test Method for Determining the Bond Strength (Ply Adhesion) of Geocomposites; 2016.

S. ASTM D7179 - Standard Test Method for Determining Geonet Breaking Force; 2018.

T. ASTM D7737/D7737M - Standard Test Method for Individual Geogrid Junction Strength; 2015.

U. ASTM D7877 - Standard Guide for Electronic Methods for Detecting and Locating Leaks in Waterproof Membranes; 2024.

V. ASTM G21 - Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi; 2015 (Reapproved 2021)e1.

W. GRI GM13 - Test Methods, Test Properties and Testing Frequency for High Density Polyethylene (HDPE) Smooth and Textured Geomembranes; 2021.

X. GRI GM17 - Test Methods, Test Properties and Testing Frequency for Linear Low Density Polyethylene (LLDPE) Smooth and Textured Geomembranes; 2021.

Y. GRI GM29 - Field Integrity Evaluation of Geomembrane Seams (and Sheet) Using Destructive and/or Nondestructive Testing; 2019.

Z. GRI GM32 - Geomembrane Seaming Using Data Acquisition Hot Wedge Welding Devices; 2019.

## 1.04 ADMINISTRATIVE REQUIREMENTS

A. Preinstallation Meeting: Conduct a preinstallation meeting one week prior to the start of the work of this section; require attendance by all affected installers.

B. Sequencing: Ensure that utility connections are achieved in an orderly and expeditious manner.

## 1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements for submittal procedures.

B. Product Data: Manufacturer's data on each product to be used, including physical properties, seaming materials, and installation instructions.

C. Shop Drawings:
   1. Indicate overall layout, dimensions, geotextile sheet and seam layout.
   2. Indicate anchorage, penetration, and seaming details.

D. Samples: Two sheets, ___ by ___ inches (___ by ___ mm) in size, indicating physical properties.

E. Manufacturer's Certification: Indicating the proposed geosynthetic function meets design requirements supported by applicable testing results.

F. Test Reports:
   1. Indicate results of field leakage tests.
   2. Indicate results of field interface friction tests.

G. Manufacturer's Instructions: Indicate seaming method.

H. Manufacturer's qualification statement.

I. Installer's qualification statement.

**1.06 QUALITY ASSURANCE**

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with at least three years of documented experience.

B. Installer Qualifications: Company specializing in performing work of the type specified and with at least three years of documented experience and approved by manufacturer.

C. Testing Agency Qualifications: Independent firm specializing in performing testing and inspections of the type specified in this section.

**1.07 DELIVERY, STORAGE, AND HANDLING**

A. See Section 01 6000 - Product Requirements for additional requirements.

B. Identify, store, and handle geosynthetic rolls and samples according to ASTM D4873/D4873M.

C. Protect materials from sunlight and other ultraviolet light sources during storage.

D. Handle geosynthetics with care and prevent dragging, dropping, or imbalanced lifting.

**1.08 FIELD CONDITIONS**

A. Temperature Requirements: Do not place geosynthetic when ambient air or base surface temperature is less than 40 degrees F (4 degrees C) or above 140 degrees F (60 degrees C).

B. Surface Requirements: Do not place geosynthetic when the receiving surface is saturated or has ponded water.

C. Follow recommendations of geosynthetic manufacturer.

**PART 2 PRODUCTS**

**2.01 MANUFACTURERS**

A. SKAPS Industries; _____: www.skaps.com/#sle.

B. Solmax; _____: www.solmax.com/#sle.

C. US Fabrics Inc; _____: www.usfabricsinc.com/#sle.

**2.02 GEOSYNTHETIC**

A. Provide geosynthetic in largest size sheets as possible to minimize field joining.

B. Uniform thickness according to ASTM D5199.

C. Resistant to mildew, chemicals in soil, stable under freeze-thaw cycles, will not shrink or expand under wet conditions, and will not unravel or become clogged during use.

D. Ultraviolet Stability: 65 percent, minimum, when tested in accordance with ASTM D4355/D4355M.

E. Abrasion Resistance: 80 percent loss for 250 cycles, when tested in accordance with ASTM D4886.

**2.03 GEOTEXTILE**

A. General:

1. Material: Polyethylene consisting of 5 percent maximum regrind and free of contaminants.
2. AASHTO M 288.

B. Geotextile for Protection: Capable of absorbing and dissipating stress.
1. Type: Woven.
2. Seams: Mechanically sewn.
   a. Overlap: 3 inches (7.6 cm).
   b. Stitch: Flat; continuous; tied off at ends.
   c. Strength: 85 percent of grab, minimum, according to ASTM D4632/D4632M.
   d. Limit seams perpendicular to the direction of incline.
3. Grab Strength: 500 lb (2.2 kN), minimum, when tested in accordance with ASTM D4632/D4632M.
4. Puncture Strength: 650 lb (2.9 kN), minimum, when tested in accordance with ASTM D6241.
5. Sewn Seam Strength: 300 lb (1.3 kN), minimum, when tested in accordance with ASTM D4632/D4632M.
6. Trapezoid Tear Strength: 150 lb (0.7 kN), minimum, when tested in accordance with ASTM D4533/D4533M.

C. Geotextile Accessories:
1. Seaming Thread: High-strength; as recommended by manufacturer; contrasting color.
2. Anchoring Pins: Steel; 18-inch (45-cm) length, 3/16-inch (4.8-mm) diameter.
3. Anchoring Pins: As recommended by manufacturer.

**2.04 GEOGRID**

A. General:
1. Material: Polyethylene consisting of 5 percent maximum regrind and free of contaminants.
2. Tensile Strength at 2 percent Strain: 400 lb/ft (5.8 kN/m), minimum, when tested in accordance with ASTM D6637/D6637M.
3. Tensile Strength at 5 percent Strain: 800 lb/ft (11.7 kN/m), minimum, when tested in accordance with ASTM D6637/D6637M.
4. Minimum Opening Size: 1/2 inch (12.7 mm).
5. Maximum Opening Size: 3 inches (76.2 mm).

B. Geogrid for Reinforcement: Capable of increasing tensile strength of soils.
1. Seams: Spliced.
   a. Overlap: 4 inches (10 cm).
   b. Splice: Fusion wedge welding.
   c. Strength: 85 percent of grab, minimum, according to ASTM D4632/D4632M.
   d. Do not splice adjacent reinforcing strips and limit one splice per reinforcing strip.
   e. Limit seams perpendicular to the direction of reinforcement.
2. Ultimate Tensile Strength: 4,000 lb/ft (58.4 kN/m), minimum, when tested in accordance with ASTM D6637/D6637M.
3. Junction Strength: 50 lb (0.22 kN), minimum, when tested in accordance with ASTM D7737/D7737M.
4. Coefficient of Interaction for Pullout: 0.85, minimum, when tested in accordance with ASTM D6706.
5. Nominal Long-Term Strength: 2,000 lb/ft (29.2 kN/m), minimum, when tested in accordance with ASTM D6637/D6637M.

C. Geogrid Accessories:
1. Seaming Splices: Bodkin connection.

2. Anchoring Staples: Steel; 8-inch (20-cm) length, 1-inch (2.54-cm) width.
3. Anchoring Staples: As recommended by manufacturer.

**2.05 GEOCOMPOSITE**

A. Geocomposite for Drainage: Capable of collecting and transmitting liquids.
1. Material: Polyethylene consisting of 5 percent maximum regrind and free of contaminants.
2. Fabrication: Prefabricated.
3. Component Bond Strength: 0.5 lb/in (0.09 N/mm), minimum, when tested in accordance with ASTM D7005/D7005M.
4. Transmissivity: 5.0 gpm/ft (0.001 m3/s/m), minimum, when tested in accordance with ASTM D4716/D4716M.
5. Compressive Strength: 100 psi (690 kPa), minimum, when tested in accordance with ASTM D1621.
6. Fungi Resistance: No visible growth, when tested in accordance with ASTM G21.
7. Geonet Component: Faced on one side with geotextile.
   a. Thickness: 0.2 inch (5 mm) when tested in accordance with ASTM D5199.
   b. Breaking Force: 250 lb (1.05 kN), minimum, when tested in accordance with ASTM D7179.
   c. Side Seams: Cable tied.
      1) Overlap: 4 inches (10 cm).
      2) Side Ties: Taut, spaced 5 ft (1.5 m), maximum.
      3) Trench Ties: Taut, spaced 1 ft (0.3 m), maximum.
      4) Limit seams perpendicular to the direction of incline.
   d. End Seams: Cable tied.
      1) Overlap: 12 inches (300 mm).
      2) End Ties: Taut, spaced 1 ft (0.3 m), maximum.
      3) Limit seams perpendicular to the direction of incline.
8. Geotextile Component: Attached to geonet.
   a. Type: Nonwoven.
   b. Seams: Mechanically sewn.
      1) Overlap: 12 inches (300 mm).
      2) Stitch: Flat; continuous; tied off at ends.
      3) Fused: According to manufacturer's recommendations.
      4) Strength: 85 percent of grab, minimum, according to ASTM D4632/D4632M.
      5) Limit seams perpendicular to the direction of incline.
      6) Vertically offset seams of multiple layers.
   c. Grab Strength: 200 lb (0.8 kN), minimum, when tested in accordance with ASTM D4632/D4632M.
   d. Elongation: 50 percent minimum, when tested in accordance with ASTM D4632/D4632M.
   e. Apparent Opening Size: No.70 (0.212 mm), maximum, when tested in accordance with ASTM D4751.
   f. Trapezoid Tear Strength: 55 lb (0.24 kN), minimum, when tested in accordance with ASTM D4533/D4533M.
   g. Puncture Strength: 55 lb (0.24 kN), minimum, when tested in accordance with ASTM D4833/D4833M.
   h. Permittivity: 0.2 per second minimum, ASTM D4491/D4491M.
9. Products:
   a. Tensar, a division of CMC; FilterGrid: www.tensarcorp.com/#sle.

b. _____.
c. Substitutions: See Section 01 6000 - Product Requirements.

B. Geocomposite Accessories:
1. Seaming Splices: Plastic fasteners, contrasting color.
2. Seaming Thread: High-strength; polyester thread; contrasting color.
3. Anchoring Pins: Steel; 18-inch (45-cm) length, 3/16-inch (4.8-mm) diameter.
4. Anchoring Pins: As recommended by manufacturer.

## 2.06 GEOMEMBRANE

A. Geomembrane for Barrier: Capable of preventing fluid passage.
1. PVC Liner: Scrim-reinforced plastic sheet.
a. Thickness: 60 mils, 0.06 inch (1.5 mm).
b. Scrim: Polyester, 6 by 6, 100 denier (0.011 g per m).
c. Overall Thickness: 60 mils, 0.06 inch (1.5 mm).
2. HDPE Liner: Plastic sheet, comply with GRI GM13.
a. Thickness: 60 mils, 0.06 inch (1.5 mm).
b. Sided: Single.
c. Finish: Smooth.
3. LDPE Liner: Plastic sheet, comply with GRI GM17.
a. Thickness: 60 mils, 0.06 inch (1.5 mm).
b. Sided: Single.
c. Finish: Smooth.
4. Seams: Thermal fusion.
a. Overlap: 6 inches (150 mm), minimum.
b. Bonded Seams: Uniformly applied to inner sides of overlap without runoff, pressed together and wrinkle free.
c. Thermally Fused Seams:
1) Single hot wedge, according to GRI GM32.
2) According to manufacturer's recommendations.
d. Reinforced Sheets: Seam edges to protect reinforcement.
e. Limit seams perpendicular to the direction of incline.
f. Evaluation: Nondestructive field integrity testing according to GRI GM29.

B. Geomembrane Accessories:
1. Seaming Adhesive: As recommended by manufacturer and compatible with material being seamed.
2. Prefabricated Liner Penetrations: Provide manufacturer's standard factory fabricated penetration assemblies, of same base material as liner and at least 60 mils, 0.06-inch (1.5 mm) thick.

# PART 3 EXECUTION

## 3.01 INSTALLERS

A. Installer List: _____.

B. Substitutions: See Section 01 2500 - Substitution Procedures.

## 3.02 EXAMINATION

A. Verify the receiving surface is smooth, without ruts or protrusions, and grades are according to design drawings.

B. Verify the receiving surface is unsaturated and free of ponded water.

C. Verify the geosynthetic is free of defects or flaws that may degrade physical performance.

D. Verify that each geosynthetic member is uniquely marked identifying proper placement.

**3.03 PREPARATION**

A. Remove vegetation, boulders, and rocks larger than 3/4 inch (20 mm) in size and other sharp objects in accordance with Section 31 1000.

B. Remove unsuitable materials in accordance with Section 31 2316.

C. Fill in holes, including stake holes, backfill, and fill in accordance with Section 31 2323.

D. Grade as indicated on drawings in accordance with Section 31 2200.

E. Compact smooth as indicated on drawings in accordance with Section 31 2323.

**3.04 INSTALLATION**

A. General:
   1. Notify Architect a minimum of 24 hours prior to installation.
   2. Prevent surface drainage from eroding under geosynthetic. Repair undermined areas prior to backfill.
   3. Position geosynthetic smooth and wrinkle free on prepared surface; unroll or unfold carefully, avoiding stretching.
   4. Secure geosynthetic to prevent movement or damage during installation.
   5. Perform seaming in adequate lighting. Seam each geosynthetic member immediately after final placement. Clean sheets of dust, dirt, and other foreign matter prior to seaming.
   6. Follow manufacturer's recommended installation procedures.

B. Protection:
   1. Install geotextile according to manufacturer's recommendations.
   2. Lay sheets in the direction of incline.
   3. Place adjacent geotextile and loosely fasten until seamed.
   4. Anchor Trench:
      a. Excavate with rounded corners, remove vegetation, boulders, and rocks larger than 3/4 inch (20 mm) in size, and other sharp objects in accordance with Section 31 2316.13.
      b. Location: Crest of slopes.
      c. Edge Distance: 3 ft (1 m).
      d. Size: 2 ft (0.6 m) wide by 3 ft (0.9 m) deep.
      e. Remove ponded water in trench while open.
      f. Backfill in accordance with Section 31 2323.
   5. Place terminal ends within anchor trench and secure with backfill.
   6. Repairs: Remove damaged portion of geotextile and seam an additional layer to cover the affected area in all directions.

C. Reinforcement:
   1. Install geogrid according to manufacturer's recommendations.
   2. Lay sheets in the direction of reinforcement.
   3. Allow geogrid to lie in a relaxed state for a minimum of 1/2 hour prior to attachments.
   4. Place adjacent geogrid and loosely fasten until seamed.
   5. Penetrations:
      a. Only cut transverse members for penetration sizes smaller than longitudinal members.
      b. Reinforce cut geogrid longitudinal members by splicing to adjacent members.

6. Anchor Trench:
    a. Excavate in accordance with Section 31 2316.13.
    b. Location: Crest of slopes.
    c. Edge Distance: 3 ft (1 m).
    d. Size: 2 ft (0.6 m) wide by 3 ft (0.9 m) deep.
    e. Remove ponded water in trench while open.
    f. Backfill in accordance with Section 31 2323.
7. Place terminal ends within anchor trench and secure with backfill.
8. Repairs: Remove damaged portion of geogrid and seam an additional layer to cover the affected area in all directions.
9. Tensioning:
    a. Pull geogrid taut in the direction of reinforcement to remove slack.
    b. Ensure positive load transfer of perpendicular seams and re-seam loose connections.
    c. Do not over-tension geogrid causing deformation or damage to seams. Repair damages before backfilling.
    d. Maintain tension across full length of geogrid until backfill is compacted.

D. Drainage:
1. Install geocomposite according to manufacturer's recommendations.
2. Lay sheets in the direction of incline.
3. Allow geocomposite to lie in a relaxed state for a minimum of 1/2 hour prior to attachments.
4. Place adjacent geocomposite and loosely fasten until seamed.
5. Penetrations:
    a. Seam geotextile apron to conveyances.
    b. Apron: 2 ft (61 cm) in the direction of flow.
6. Anchor Trench:
    a. Excavate in accordance with Section 31 2316.13.
    b. Location: Crest of slopes.
    c. Edge Distance: 3 ft (1 m).
    d. Size: 2 ft (0.6 m) wide by 3 ft (0.9 m) deep.
    e. Remove ponded water in trench while open.
    f. Backfill in accordance with Section 31 2323.
7. Place terminal ends within anchor trench and secure with backfill.
8. Repairs:
    a. Remove damaged portion of geonet and end seam an additional layer to cover the affected area in all directions.
    b. Remove damaged portion of geotextile and seam an additional layer to cover the affected area in all directions.

E. Barrier:
1. Install geomembrane according to manufacturer's recommendations.
2. Lay sheets in the direction of incline.
3. Allow geomembrane to lie in a relaxed state for a minimum of 1/2 hour prior to attachments.
4. Place adjacent geomembrane and loosely fasten until seamed.
5. Penetrations:
    a. Seam geomembrane apron to conveyances.
    b. Apron: 12 inches (300 mm) in the direction of flow.

6. Anchor Trench:
   a. Excavate in accordance with Section 31 2316.13.
   b. Location: Crest of slopes.
   c. Edge Distance: 3 ft (1 m).
   d. Size: 2 ft (0.6 m) wide by 3 ft (0.9 m) deep.
   e. Remove ponded water in trench while open.
   f. Backfill in accordance with Section 31 2323.
7. Place terminal ends within anchor trench and secure with backfill.
8. Repairs: Remove damaged portion of geomembrane and seam an additional layer to cover the affected area in all directions.

**3.05 BACKFILL**

A. Obtain approval for geosynthetic sheet installation from Architect before placing fill.

B. Backfill in a manner to prevent damage to geosynthetic. Repair geosynthetic damaged during backfill operations.

C. Cover geosynthetic in the installed direction in accordance with Section 31 2323.
   1. Cover geosynthetic within time limits specified by manufacturer.
   2. Drive only on earth cover and use only rubber-tired or rubber-tracked vehicles.
   3. Lift Thickness: 12 inches (300 mm).

**3.06 FIELD QUALITY CONTROL**

A. See Section 01 4000 - Quality Requirements for additional requirements.

B. Provide manufacturer's field representative at all times during geosynthetic installation.

C. Inspect completed liner for pinholes, punctures, and tears; inspect seams and joints for unbonded areas. Repair any defects or damages found.

D. Perform one interface friction test for each geosynthetic and backfill combination in accordance with ASTM D5321/D5321M. Provide results to the Architect.

E. Leakage Testing: Test barrier for leakage according to ASTM D7877.

F. Product Conformance Testing: Confirm geosynthetic supplied meets design requirements according to ASTM D4595.

**3.07 PROTECTION**

A. Do not exceed geosynthetic manufacturer's recommended exposure to UV radiation.

B. Prevent surface water runoff from contaminating geosynthetic.

C. Do not use pins or staples where risk of damaging underlying geosynthetic layer is present.

D. Erect barricades to prevent traffic over geosynthetic before it is filled.

**END OF SECTION**

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# SECTION 31 1001
# SITE CLEARING

## PART 1 GENERAL

### 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

### 1.02 SUMMARY

A. This Section includes the following:
   1. Protecting existing trees and vegetation to remain to include all site trees unless shown removed.
   2. Removing trees and other vegetation.
   3. Clearing and grubbing.
   4. Topsoil stripping.
   5. Removing above-grade site improvements.
   6. Disconnecting, capping or sealing, and abandoning site utilities in place.
   7. Disconnecting, capping or sealing, and removing site utilities.

### 1.03 DEFINITIONS

A. Topsoil: Natural or cultivated surface-soil layer containing organic matter and sand, silt, and clay particles; friable, pervious, and black or a darker shade of brown, gray, or red than underlying subsoil; reasonably free of subsoil, clay lumps, gravel, and other objects more than 2 inches in diameter; and free of weeds, roots, and other deleterious materials.

### 1.04 MATERIALS OWNERSHIP

A. Except for materials indicated to be stockpiled or to remain Owner's property, cleared materials shall become Contractor's property and shall be removed from the site.

### 1.05 SUBMITTALS

A. Record drawings according to Division 1 Section "Contract Closeout."
   1. Identify and accurately locate capped utilities and other subsurface structural, electrical, and mechanical conditions.

### 1.06 PROJECT CONDITIONS

A. Traffic: Minimize interference with adjoining roads, streets, walks, and other adjacent occupied or used facilities during site-clearing operations.
   1. Do not close or obstruct streets, walks, or other adjacent occupied or used facilities without permission from Owner and authorities having jurisdiction.

B. Notify utility locator service for area where Project is located before site clearing.

## PART 2 PRODUCTS (NOT APPLICABLE)

## PART 3 EXECUTION

### 3.01 PREPARATION

A. Protect and maintain benchmarks and survey control points from disturbance during construction.

B. Provide erosion-control measures to prevent soil erosion and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

C. Locate and clearly flag trees and vegetation to remain or to be relocated.

D. Protect existing site improvements to remain.
   1. Restore damaged improvements to their original condition, as acceptable to Owner.

**3.02 TREE PROTECTION**

A. Erect and maintain a temporary fence around drip line of individual trees or around perimeter drip line of groups of trees to remain. Remove fence when construction is complete.
   1. Do not store construction materials, debris, or excavated material within drip line of remaining trees.
   2. Do not permit vehicles, equipment, or foot traffic within drip line of remaining trees.

B. Do not excavate within drip line of trees, unless otherwise indicated.

C. Where excavation for new construction is required within drip line of trees, hand clear and excavate to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.
   1. Cover exposed roots with burlap and water regularly.
   2. Temporarily support and protect roots from damage until they are permanently relocated and covered with soil.
   3. Coat cut faces of roots more than 1-1/2 inches in diameter with an emulsified asphalt or other approved coating formulated for use on damaged plant tissues.
   4. Cover exposed roots with wet burlap to prevent roots from drying out. Backfill with soil as soon as possible.

**3.03 UTILITIES**

A. Locate, identify, disconnect, and seal or cap off utilities indicated to be removed.
   1. Arrange to shut off indicated utilities with utility companies.

B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
   1. Notify Architect not less than two days in advance of proposed utility interruptions.
   2. Do not proceed with utility interruptions without Architect's written permission.

C. Excavate for and remove underground utilities indicated to be removed.

**3.04 CLEARING AND GRUBBING**

A. Remove obstructions, trees, shrubs, grass, and other vegetation to permit installation of new construction. Removal includes digging out stumps and obstructions and grubbing roots.
   1. Do not remove trees, shrubs, and other vegetation indicated to remain or to be relocated.
   2. Cut minor roots and branches of trees indicated to remain in a clean and careful manner where such roots and branches obstruct installation of new construction.
   3. Completely remove stumps, roots, obstructions, and debris extending to a depth of 18 inches below exposed subgrade.
   4. Use only hand methods for grubbing within drip line of remaining trees.

B. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated.
   1. Place fill material in horizontal layers not exceeding 8-inch loose depth, and compact each layer to a density equal to adjacent original ground.

**3.05 TOPSOIL STRIPPING**

A. Remove sod and grass before stripping topsoil.

B. Strip topsoil to whatever depths are encountered in a manner to prevent intermingling with underlying subsoil or other waste materials.
   1. Strip surface soil of unsuitable topsoil, including trash, debris, weeds, roots, and other waste materials.

C. Stockpile topsoil materials away from edge of excavations without intermixing with subsoil. Grade and shape stockpiles to drain surface water. Cover to prevent windblown dust.
   1. Limit height of topsoil stockpiles to 72 inches.
   2. Do not stockpile topsoil within drip line of remaining trees.
   3. Stockpile surplus topsoil and allow for respreading deeper topsoil.

**3.06 SITE IMPROVEMENTS**

A. Remove existing above- and below-grade improvements as indicated and as necessary to facilitate new construction.

B. Remove slabs, paving, curbs, gutters, and aggregate base as indicated.
   1. Unless existing full-depth joints coincide with line of demolition, neatly saw-cut length of existing pavement to remain before removing existing pavement. Saw-cut faces vertically.

**3.07 DISPOSAL**

A. Disposal: Remove surplus soil material, unsuitable topsoil, obstructions, demolished materials, and waste materials, including trash and debris, and legally dispose of them off Owner's property.

**END OF SECTION 02230**

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# SECTION 31 2210
# EARTHWORK

## PART 1 GENERAL

### 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

### 1.02 SUMMARY

A. This Section includes the following:
   1. Preparing subgrades for slabs-on-grade, walks, pavements, lawns, and plantings.
   2. Excavating and backfilling for buildings and structures.
   3. Drainage course for slabs-on-grade.
   4. Fine grading, topsoiling and preparing lawn areas.
   5. Excavating and backfilling trenches within building lines.
   6. Excavating and backfilling trenches for buried mechanical and electrical utilities and pits for buried utility structures.
   7. Geotechnical Reports applicable to this project.
   8. Preparing crushed aggregate base for pavement areas.

B. Related Sections include the following:
   1. Division , Section "Site Clearing" for site stripping, grubbing, removing topsoil, and protecting trees to remain.
   2. Division 2, Section “Sodding” for placing of sod for lawn areas.

### 1.03 DEFINITIONS

A. Backfill: Soil materials used to fill an excavation.
   1. Initial Backfill: Backfill placed beside and over pipe in a trench, including haunches to support sides of pipe.
   2. Final Backfill: Backfill placed over initial backfill to fill a trench.

B. Bedding Course: Layer placed over the excavated subgrade in a trench before laying pipe.

C. Borrow: Satisfactory soil imported from off-site for use as fill or backfill.

D. Drainage Course: Layer supporting slab-on-grade used to minimize capillary flow of pore water.

E. Excavation: Removal of material encountered above subgrade elevations.
   1. Additional Excavation: Excavation below subgrade elevations as directed by Architect. Additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.
   2. Bulk Excavation: Excavations more than 10 feet in width and pits more than 30 feet in either length or width.
   3. Unauthorized Excavation: Excavation below subgrade elevations or beyond indicated dimensions without direction by Architect. Unauthorized excavation, as well as remedial work directed by Architect, shall be without additional compensation.

F. Fill: Soil materials used to raise existing grades.

G. Structures: Buildings, footings, foundations, retaining walls, slabs, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.

H. Subgrade: Surface or elevation remaining after completing excavation, or top surface of a fill or backfill immediately below subbase, drainage fill, or topsoil materials.

I. Utilities include on-site underground pipes, conduits, ducts, and cables, as well as underground services within buildings.

**1.04 SUBMITTALS**

A. Material Test Reports: Submit following reports directly to Architect/Engineer from the testing services, with copy to the Contractor.
   1. Classification according to ASTM D 2487 of each on-site or borrow soil material proposed for fill and backfill.
   2. Laboratory compaction curve according to ASTM D 698 for each on-site or borrow soil material proposed for fill and backfill.
   3. One optimum moisture density curve for each type of soil encountered.
   4. Verification of each footing subgrade.

**1.05 QUALITY ASSURANCE**

A. Geotechnical Testing Agency: Soil testing and inspection service for quality control testing during earthwork operations shall be furnished by the contractor. Retesting of failed test to be provided and paid for by the General Contractor.

B. Prior to the installation or placement of concrete into in situ soil (load bearing earth), the Contractor shall receive acknowledgement from the Testing Company that the soil where the concrete is to be placed meets all compaction and other testing requirements specified and/or required by the Owners' on-site testing agent. This approval with all drawings showing pertinent information indicating that day's work attached shall be signed and dated by the on-site Testing Agent and the Contractor's Superintendent and presented to the Architect on-site.
   1. "The contractor's testing agency shall report to the contractor the results of all required tests, which shall be reviewed and acknowledges by the General Contractor and then submitted to the Architect. The General Contractor shall not submit any failed soil density concrete or other test result(s) to the Architect without including the applicable recheck test result(s) that indicate compliance with the Specifications. The recheck test result(s) shall be identified with the same number as the failed test with the notation "-R"."

**1.06 PROJECT CONDITIONS**

A. Site Information: The report of subsurface investigation is bound herein. Data on indicated subsurface conditions are not intended as representations or warranties of accuracy or continuity between soil borings. It is expressly understood that owner will not be responsible for interpretations or conclusions drawn therefrom by Contractor.
   1. Additional test borings and other exploratory operations may be made by Contractor at no cost to the owner.

B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted in writing by Architect and then only after arranging to provide temporary utility services according to requirements indicated:
   1. Notify Architect not less than two days in advance of proposed utility interruptions.
   2. Do not proceed with utility interruptions without Architect's written permission.
   3. Contact utility-locator service for area where Project is located before excavating.

C. Demolish and completely remove from site existing underground utilities indicated to be removed. Coordinate with utility companies to shut off services if lines are active.

D. Recommendations made in the reports of subsurface investigation bound herewith after this section shall be a requirement of these specifications. Where conflicts occur between the report and this specification, the more stringent requirement shall govern.

## PART 2 PRODUCTS

### 2.01 SOIL MATERIALS

A. General: Provide borrow soil materials when sufficient satisfactory soil materials are not available from excavations.

B. Satisfactory Soils: ASTM D 2487 soil classification groups CL; free of rock or gravel larger than 3 inches in any dimension, debris, waste, frozen materials, vegetation, and other deleterious matter. See Geotechnical Engineering Report.

C. Unsatisfactory Soils: Excavated on-site soil is not suitable for reuse as stru
   1. Unsatisfactory soils also include satisfactory soils not maintained within 2 percent of optimum moisture content at time of compaction.

D. Backfill and Fill: Satisfactory soil materials.

E. Base: Crushed aggregate base in accordance with requirements of Section 825 of the State of Alabama Department of Transportation Standard Specifications for Highway Construction, Latest Edition, unless noted otherwise.

F. Structural Fill: Structural Fill required to grade the site can include clean, non-organic, non-saturated, native clayey sand and silty sand soil available from on-site cuts or excavations. The native silt soil shall not be used for structural fill.

G. See Geotechnical Engineering Report for select fill earth originating from an off-site source. shall con

H. Engineered Fill: All fill earth, including structural fill earth, placed in the “Controlled Areas” shall be designated as “Engineered Fill.”

I. Bedding: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand; ASTM D 2940; except with 100 percent passing a 1-inch sieve and not more than 8 percent passing a No. 200 sieve.

J. Drainage Fill: Washed, narrowly graded mixture of crushed stone, or crushed or uncrushed gravel; ALDOT Section 800; coarse-aggregate grading Size 57 or 67.

K. Topsoil: Topsoil shall be a natural, workable, friable, loamy soil, without admixture of subsoil, refuse, or foreign materials, suitable for growing grasses or other vegetative ground cover. Topsoil shall be furnished by the Contractor from an off-site source approved by the Architect if required to supplement previously stockpiled on-site topsoil.

### 2.02 ACCESSORIES

A. Detectable Warning Tape: Acid- and alkali-resistant polyethylene film warning tape manufactured for marking and identifying underground utilities, 6 inches wide and 4 mils thick minimum, continuously inscribed with a description of the utility, with metallic core encased in a protective jacket for corrosion protection, detectable by metal detector when tape is buried up to 2’-6” deep.
   1. Tape Colors: Provide tape colors to utilities as follows:
      Red: Electric
      Yellow: Gas, oil, steam, and dangerous materials.
      Orange: Telephone and other communications.
      Blue: Water systems.
      Green: Sewer systems.

## PART 3 EXECUTION

### 3.01 PREPARATION

A. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

B. Protect subgrades and foundation soils against freezing temperatures or frost. Provide protective insulating materials as necessary.

C. Provide erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

### 3.02 DEWATERING

A. Prevent surface water and ground water from entering excavations, from ponding on prepared subgrades, and from flooding Project site and surrounding area.

B. Protect subgrades from softening, undermining, washout, and damage by rain or water accumulation.

1. Reroute surface water runoff away from excavated areas. Do not allow water to accumulate in excavations. Do not use excavated trenches as temporary drainage ditches.
2. Install a dewatering system to keep subgrades dry and convey ground water away from excavations. Maintain until dewatering is no longer required.

### 3.03 EXPLOSIVES

A. Explosives: Do not use explosives.

### 3.04 EXCAVATION, GENERAL

A. Unclassified Excavation: Excavation to subgrade elevations regardless of the character of surface and subsurface conditions encountered, including rock, soil materials, and obstructions.

1. If excavated materials intended for fill and backfill include unsatisfactory soil materials and rock, replace with satisfactory soil materials.

### 3.05 EXCAVATION FOR STRUCTURES

A. The building “control area” shall be prepared as recommended by the Geotechnical Engineering Report, dated October 28, 2024 prepared by Terracon, for this project.

B. Excavate to indicated elevations and dimensions within a tolerance of plus or minus 1 inch. Extend excavations a sufficient distance from structures for placing and removing concrete formwork, for installing services and other construction, and for inspections.

1. Excavations for Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
2. Excavation for Underground Mechanical or Electrical Utility Structures: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 1 inch. Do not disturb bottom of excavations intended for bearing surface.

### 3.06 EXCAVATION FOR WALKS AND PAVEMENTS

A. Excavate surfaces under walks and pavements to indicated cross sections, elevations, and grades.

### 3.07 EXCAVATION FOR UTILITY TRENCHES

A. Excavate trenches to indicated gradients, lines, depths, and elevations.

1. Beyond building perimeter, excavate trenches to allow installation of top of pipe below frost line.

B. Excavate trenches to uniform widths to provide a working clearance on each side of pipe or conduit. Excavate trench walls vertically from trench bottom to 12 inches higher than top of pipe or conduit, unless otherwise indicated.
   1. Clearance: 12 inches on each side of pipe or conduit.

C. Trench Bottoms: Excavate and shape trench bottoms to provide uniform bearing and support of pipes and conduit. Shape subgrade to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits. Remove projecting stones and sharp objects along trench subgrade.
   1. For pipes and conduit less than 6 inches in nominal diameter and flat-bottomed, multiple-duct conduit units, hand-excavate trench bottoms and support pipe and conduit on an undisturbed subgrade.
   2. For pipes and conduit 6 inches or larger in nominal diameter, shape bottom of trench to support bottom 90 degrees of pipe circumference. Fill depressions with tamped sand backfill.
   3. Excavate trenches 6 inches deeper than elevation required in unyielding bearing material to allow for bedding course.

## 3.08 APPROVAL OF SUBGRADE

A. Notify Architect when excavations have reached required subgrade.

B. If Architect determines that unsatisfactory soil is present, continue excavation and replace with compacted backfill or fill material as directed.
   1. Additional excavation and replacement material will be paid for according to Contract provisions for changes in the Work.

C. Proof roll subgrade under building and pavement areas with heavy pneumatic-tired equipment to identify soft pockets and areas of excess yielding proof rolling shall include a minimum of 2 passes in perpendicular directions over the controlled area. Do not proof roll wet or saturated subgrades.

D. Reconstruct subgrades damaged by freezing temperatures, frost, rain, accumulated water, or construction activities, as directed by Architect.

## 3.09 UNAUTHORIZED EXCAVATION

A. Fill unauthorized excavation under foundations or wall footings by extending bottom elevation of concrete foundation or footing to excavation bottom, without altering top elevation. Lean concrete fill may be used when approved by Architect.
   1. Fill unauthorized excavations under other construction or utility pipe as directed by Architect.

## 3.10 STORAGE OF SOIL MATERIALS

A. Stockpile borrow materials and satisfactory excavated soil materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
   1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.

## 3.11 BACKFILL

A. Place and compact backfill in excavations promptly, but not before completing the following:

1. Construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation.
2. Surveying locations of underground utilities for record documents.
3. Inspecting and testing underground utilities.
4. Removing concrete formwork.
5. Removing trash and debris.
6. Removing temporary shoring and bracing, and sheeting.
7. Installing permanent or temporary horizontal bracing on horizontally supported walls.

### 3.12 UTILITY TRENCH BACKFILL

A. Place and compact bedding course on trench bottoms and where indicated. Shape bedding course to provide continuous support for bells, joints, and barrels of pipes and for joints, fittings, and bodies of conduits.

B. Backfill trenches excavated under footings and within 18 inches of bottom of footings; fill with concrete to elevation of bottom of footings.

C. Place and compact initial backfill material, free of particles larger than 1 inch to a height of 12 inches over the utility pipe or conduit.
   1. Carefully compact material under pipe haunches and bring backfill evenly up on both sides and along the full length of utility piping or conduit to avoid damage or displacement of utility system.

D. Coordinate backfilling with utilities testing.

E. Fill voids with approved backfill materials while shoring and bracing, and as sheeting is removed.

F. Place and compact final backfill of satisfactory soil material to final subgrade.

### 3.13 FILL

A. Preparation: Remove vegetation, topsoil, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface before placing fills.

B. Plow, scarify, bench, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing material.

C. Place and compact fill material in layers to required elevations as follows:
   1. Under grass and planted areas, use satisfactory soil material.
   2. Under walks and pavements, use satisfactory soil material.
   3. Under steps and ramps, use satisfactory or structural fill.
   4. Under building slabs, use satisfactory or structural fill.
   5. Under footings and foundations, use satisfactory or structural fill.

### 3.14 MOISTURE CONTROL

A. Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 3 percent of optimum moisture content.
   1. Do not place backfill or fill material on surfaces that are muddy, frozen, or contain frost or ice.
   2. Remove and replace, or scarify and air-dry, otherwise satisfactory soil material that exceeds optimum moisture content by 2 percent and is too wet to compact to specified dry unit weight.

### 3.15 COMPACTION OF BACKFILLS AND FILLS

A. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers.

B. Place backfill and fill materials evenly on all sides of structures to required elevations, and uniformly along the full length of each structure.

C. Compact soil to not less than the following percentages of maximum dry unit weight according to ASTM D 698:
   1. Under structures, building slabs and steps, scarify and recompact top 12 inches of existing subgrade and each layer of backfill or fill material at 98 percent and top 6" under pavement of existing subgrade and each layer of backfill or fill material at 100 percent.
   2. Under walkways, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill material at 95 percent.
   3. Under lawn or unpaved areas, scarify and recompact top 6 inches below subgrade and compact each layer of backfill or fill material at 90 percent.

### 3.16 GRADING

A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
   1. Provide a smooth transition between adjacent existing grades and new grades.
   2. Cut out soft spots, fill low spots, and trim high spots to comply with required surface tolerances.

B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
   1. Lawn or Unpaved Areas: Plus or minus 1 inch.
   2. Walks: Plus or minus 1 inch.
   3. Pavements: plus or minus ½ inch.

C. Grading inside Building Lines: Finish subgrade to a tolerance of 1/2 inch when tested with a 10-foot straightedge.

D. Topsoil: All areas disturbed by grading or other construction operations or as shown on the Site Plan, not occupied by the building or pavement, shall receive 4 inch minimum thickness topsoil from on-site stockpile or from approved off-site sources.

### 3.17 BASE COURSES

A. Under pavements, place base course material on prepared subgrades.
   1. Compact base courses at optimum moisture content to required grades, lines, cross sections and thickness to not less than 100 percent of ASTM D698 relative density.
   2. Shape base to required crown elevations and cross-slope grades.
   3. When thickness of compacted base course is 6 inches or less, place materials in a single layer.
   4. When thickness of compacted base course exceeds 6 inches, place materials in equal layers, with no layer more than 6 inches thick or less than 3 inches thick when compacted.

### 3.18 PLANTING SOIL PREPARATION

A. Limit subgrade to areas that will be planted in the immediate future.

B. Loosen subgrade to a minimum depth of 4 inches. Remove stones larger than 1-1/2 inches in any dimension and sticks, roots, rubbish, and other extraneous matter.

C. Spread topsoil mixture to depth required to meet thickness, grades, and elevations shown, after light rolling and natural settlement. Do not spread if planting soil or subgrade is frozen.
   1. Place approximately ½ the thickness of topsoil mixture required. Work into top of loosened subgrade to create a transition layer and then place remainder of planting soil mixture.
   2. Allow for sod thickness in areas to be sodded.

D. Preparation of Unchanged Grades: Where lawns are to be planted in areas unaltered or undisturbed by excavating, grading, or surface soil stripping operations, prepare soil as follows:
   1. Remove and dispose of existing grass, vegetation, and turf. Do not turn over into soil being prepared for lawns.
   2. Till surface soil to a depth of at least 6 inches. Apply required soil amendments and initial fertilizers and mix thoroughly into top 4 inches of soil. Trim high areas and fill in depressions. Till soil to a homogenous mixture of fine texture.
   3. Clean surface soil of roots, plants, sod, stones, clay lumps, and other extraneous materials harmful to plant growth.
   4. Remove waste material, including grass, vegetation, and turf, and legally dispose of it off the Owner's property.

E. Grade lawn and grass areas to a smooth, even surface with loose, uniformly fine texture. Roll and rake, remove ridges, and fill depressions to meet finish grades. Limit fine grading to areas that can be planted in the immediate future. Remove trash, debris, stones larger than 1-1/2 inches in any dimension, and other objects that may interfere with planting or maintenance operations.

F. Moisten prepared lawn areas before planting when soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

G. Restore prepared areas if eroded or otherwise disturbed after fine grading and before planting.

### 3.19 DRAINAGE COURSE

A. Under slabs-on-grade, place drainage course on prepared subgrade and as follows:
   1. Compact drainage course to required cross sections and thickness to not less than 95 percent of maximum dry unit weight according to ASTM D 698.
   2. When compacted thickness of drainage course is 6 inches or less, place materials in a single layer.

### 3.20 FIELD QUALITY CONTROL

A. Testing Agency: Contractor will engage a qualified independent geotechnical engineering testing agency to perform field quality-control testing.

B. Allow testing agency to inspect and test subgrades and each fill or backfill layer. Proceed with subsequent earthwork only after test results for previously completed work comply with requirements.

C. Footing Subgrade: At footing subgrades, at least one test of each soil stratum will be performed to verify design bearing capacities. Subsequent verification and approval of other footing subgrades may be based on a visual comparison of subgrade with tested subgrade when approved by Architect.

D. Testing agency will test compaction of soils in place according to ASTM D 1556. Tests will be performed at the following locations and frequencies:

1. Building Slab and Pavement Areas: At subgrade and at each compacted fill and backfill layer, at least one test for every 2,000 sq. ft. of fill area per each foot of vertical thickness placed on the building area and one per 4,000 sq.ft. in the pavement areas, but in no case fewer than three tests.
2. Trench Backfill: At least one test for each 50 feet per each 2' or vertical thickness or less of trench length, but no fewer than two tests.

E. When testing agency reports that subgrades, fills, or backfills have not achieved degree of compaction specified, scarify and moisten or aerate, or remove and replace soil to depth required; recompact and retest until specified compaction is obtained.

### 3.21 PROTECTION

A. Protecting Graded Areas: Protect newly graded areas from traffic, freezing, and erosion. Keep free of trash and debris.

B. Repair and reestablish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or where they lose compaction due to subsequent construction operations or weather conditions.
1. Scarify or remove and replace soil material to depth as directed by Architect; reshape and recompact.

C. Where settling occurs before Project correction period elapses, remove finished surfacing, backfill with additional soil material, compact, and reconstruct surfacing.
1. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.

### 3.22 DISPOSAL OF SURPLUS AND WASTE MATERIALS

A. Disposal: Remove surplus satisfactory soil and waste material, including unsatisfactory soil, trash, and debris, and legally dispose of it off Owner's property, unless instructed otherwise by Owner.

**END OF SECTION**

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# SECTION 31 3116
# TERMITE CONTROL

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Chemical soil treatment.

### 1.02 RELATED REQUIREMENTS

A. Section 03 3000 - Cast-in-Place Concrete: Vapor barrier placement under concrete slab-on-grade.

### 1.03 REFERENCE STANDARDS

A. Title 7, United States Code, 136 through 136y - Federal Insecticide, Fungicide and Rodenticide Act; 1947 (Revised 2001).

### 1.04 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Indicate toxicants to be used, composition by percentage, dilution schedule, intended application rate.

C. Test Reports: Indicate regulatory agency approval reports when required.

D. Manufacturer's Application Instructions: Indicate caution requirement.

E. Manufacturer's Certificate: Certify that toxicants meet or exceed specified requirements.

F. Record and document moisture content of soil before application.

G. Maintenance Data: Indicate re-treatment schedule .

H. Warranty: Submit warranty and ensure that forms have been completed in Owner's name.

### 1.05 QUALITY ASSURANCE

A. Installer Qualifications: Company specializing in performing this type of work and:
   1. Having minimum of three (3) years documented experience.
   2. Approved by manufacturer of treatment materials.
   3. Licensed in the State in which the Project is located.

### 1.06 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide five year installer's warranty against damage to building caused by termites.
   1. Include coverage for repairs to building and to contents damaged due to building damage. Repair damage and, if required, re-treat.

## PART 2 PRODUCTS

### 2.01 CHEMICAL SOIL TREATMENT

A. Toxicant Chemical: EPA Title 7, United States Code, 136 through 136y approved; synthetically color dyed to permit visual identification of treated soil.

B. Manufacturers:
   1. Syngenta Professional Products; ____: www.syngentaprofessionalproducts.com/#sle.
   2. _____; ____.
   3. Substitutions: See Section 01 6000 - Product Requirements.

C. Toxicant Chemical: EPA approved; synthetically color dyed to permit visual identification of treated soil.

D. Diluent: Recommended by toxicant manufacturer.

**2.02 MIXES**

A. Mix toxicant to manufacturer's instructions.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

A. Verify that soil surfaces are unfrozen, sufficiently dry to absorb toxicant, and ready to receive treatment.

B. Verify final grading is complete.

**3.02 PREPARATION**

A. General: Comply with the most stringent requirements of authorities having jurisdiction and with manufacturer's written instructions for preparing substrate. Remove all extraneous sources of wood cellulose and other edible materials such as wood debris, tree stumps and roots, stakes, formwork, and construction waste wood from soil and around foundations.

B. Soil Treatment Preparation: Remove foreign matter and impermeable soil materials that could decrease treatment effectiveness on areas to be treated. Loosen, rake, and level soil to be treated, except previously compacted areas under slabs and footings. Termiticides may be applied before placing compacted fill under slabs if recommended by termiticide manufacturer.

C. Fit filling hose connected to water source at the site with a backflow preventer, complying with requirements of authorities having jurisdiction.

D. Applicator shall mix all treatment from a sealed package on site with the project construction superintendent in his company during the course of the mixing.

**3.03 APPLICATION - CHEMICAL TREATMENT**

A. Comply with requirements of U.S. EPA and applicable state and local codes.

B. Spray apply toxicant in accordance with manufacturer's instructions.

C. Apply extra treatment to structure penetration surfaces such as pipe or ducts, and soil penetrations such as grounding rods or posts.

D. Re-treat disturbed treated soil with same toxicant as original treatment.

E. If inspection or testing identifies the presence of termites, re-treat soil and re-test.

**3.04 PROTECTION**

A. Do not permit soil grading over treated work.

B. Protect sheet materials from damage after completed installation. Repair damage with manufacturer's recommended products and according to the manufacturer's written instructions.

**END OF SECTION**

# SECTION 32 0116
# COLD MILLING (PLANING) OF EXISTING BITUMINOUS PAVEMENTS

## PART 1 GENERAL

### 1.01 DESCRIPTION

A. This Section shall cover the work of removing, by planing (milling), existing asphalt pavement. The work specified in this Section includes the transporting, stockpiling, or otherwise disposing of the removed pavement material. The removed material shall become the property of the Contractor unless otherwise noted on the plans. Work shall be performed in accordance with requirements of this Section and with Section 408 of the State of Alabama Department of Transportation standard specifications for Highway Construction latest edition.

B. Maintain in a satisfactory working condition equipment, tools, and machines used in the performance of the work.

C. Cold-Milling Machine
   1. Provide a cold-milling machine which is self-propelled, capable of milling the pavement to a specified depth and smoothness and of establishing grade control; with means of controlling transverse slope and dust produced during the pavement milling operation. The machine shall have the ability to remove the millings or cuttings from the pavement and load them into a truck. The milling machine shall not cause damage to any part of the pavement structure that is not to be removed.

D. Cleaning Equipment
   1. Provide cleaning equipment suitable for removing and cleaning loose material from the pavement surface.

E. Straightedge
   1. Furnish and maintain at the site, in good condition, one 12 foot straightedge or other suitable device for each milling machine, for testing the finished surface. Make straightedge available for Government use. Straightedges shall be constructed of aluminum or other lightweight metal, with blades of box or box-girder cross section with flat bottom reinforced to insure rigidity and accuracy. Straightedges shall have handles to facilitate movement on the pavement.

### 1.02 QUALITY ASSURANCE

A. Codes and Standards: Unless otherwise noted, specifications referred to herein shall be the State of Alabama Department of Transportation Standard Specifications for Highway Construction, Latest Edition.

B. Grade
   1. Conform the finished milled surfaces to the lines, grades, and cross sections indicated. The finished milled-pavement surfaces shall vary not more than 1/4 inch from the established plan grade line and elevation. Finished surfaces at a juncture with other pavements shall coincide with the finished surfaces of the abutting pavements. The deviations from the plan grade line and elevation will not be permitted in areas of pavements where closer conformance with planned grade and elevation is required for the proper functioning of appurtenant structures involved.

C. Surface Smoothness
   1. Finished surfaces shall not deviate from the testing edge of a straightedge more than 1/4 inch in the transverse or longitudinal direction.

D. Traffic Control
   1. Provide all necessary traffic controls during milling operations.

**1.03 ENVIRONMENTAL REQUIREMENTS**

A. Milling shall not be performed when there is accumulation of snow or ice on the pavement surface.

**PART 2 PRODUCTS (NOT APPLICABLE)**

**PART 3 EXECUTION**

**3.01 MILLING OPERATION**

A. A minimum of seven days notice is required, prior to start work to coordinate the milling operation with other activities at the site. Make sufficient passes so that the designated area is milled to the grades and cross sections indicated. The milling shall proceed with care and in depth increments that will not damage the pavement below the designated finished grade. Repair or replace, as directed, items damaged during milling such as manholes, valve boxes, utility lines, pavement that is torn, cracked, gouged, broken, or undercut. The milled material shall be removed from the pavement and loaded into trucks.

**3.02 CONSTRUCTION REQUIREMENTS**

A. Construction Requirements shall conform to ALDOT Specifications Section 408.

**3.03 REMOVAL OF MILLED MATERIAL**

A. Material that is removed shall become the property of the Contractor and removed from the site.

**END OF SECTION**

# SECTION 32 1217
# ASPHALT CONCRETE PAVING

## PART 1 GENERAL

### 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification sections, apply to work of this section.

### 1.02 DESCRIPTION OF WORK:

A. Work described in this section includes construction of new asphalt paving for parking areas at locations shown on the plans. Construction work items include a bituminous concrete binder layer, prime coat, tack coat, and bituminous concrete wearing surface. Pavement marking for parking areas is also included in this section.

### 1.03 SUBMITTALS

A. Material Certificates: Provide copies of materials certificates signed by material producer and Contractor, certifying that each material item complies with, or exceeds, specified requirements.

### 1.04 QUALITY ASSURANCE

A. Codes and Standards: Unless otherwise noted, specifications referred to herein shall be the State of Alabama Department of Transportation Standard Specifications for Highway Construction, 2008 Edition.

B. Soil Testing: Laboratory and field density tests and other soils tests specified herein shall be performed by an independent soils testing laboratory selected and paid by the Contractor.

### 1.05 SITE CONDITIONS

A. Weather Limitations: Construct asphalt concrete binder and surface courses when atmospheric temperature is above 40 degrees F (4 degrees C) and rising, and when subgrade is dry. Spreading operations shall be stopped when the air temperature is below 45 degrees F (7 degrees C) and falling.

B. Grade Control: Establish and maintain required lines and elevations.

## PART 2 PRODUCTS

### 2.01 MATERIALS

A. Fine and course aggregates for bituminous concrete binder and wearing surface layer course shall be as specified in Alabama D.O.T. Specifications, Section 424.

B. Job Mix: Mix shall be as specified in Section 424 for a 424*-B Superpave Bituminous Concrete Binder Layer, ¾" maximum size aggregate ESAL Range A.

C. Prime Coat: Bituminous material for prime coat shall be as specified in Section 401.

D. Tack Coat: Bituminous material for tack coat shall be as specified in Section 405.

E. Job Mix: Mix shall be as specified in Section 424 for a 424-A Superpave Bituminous Concrete Wearing Surface Layer, ½" maximum size aggregate. ESAL Range A.

F. Paint for pavement marking shall conform to the requirements of Federal Specification TT-P-115, Class B, color white for regular parking and blue for handicap parking and shall be non-reflective or reflective as indicated on the drawings. It shall be well-ground and shall show easy brushing qualities. Paint shall be delivered to the job in original, unbroken containers, with label and tags intact. The paint shall not be thinned in excess of printed directions of the manufacturer.

## PART 3 EXECUTION

### 3.01 PRIME COAT

A. Description: The work covers the furnishing and placing of a bituminous prime coat on a compacted crushed aggregate soil base course which is to be covered by a bituminous binder layer.

B. Construction Methods: Requirements are specified in section 401 of the Alabama D.O.T. Standard Specifications for Highway Construction.

### 3.02 PLANT MIX BITUMINOUS CONCRETE BINDER LAYER

A. Description: The work consists of constructing a layer, composed of an aggregate and bituminous material hot mixed in a central plant and hot laid on the compacted subgrade in accordance with these specifications and at locations shown on the drawings.

B. Construction Methods: Details and requirements for construction are specified in Section 424, which refers also to Articles 410.03 through 410.07 of the Alabama D.O.T. Specifications.

C. Compaction shall be as specified in Subarticle 410.03 (g) of the Alabama D.O.T. Specifications. At least three compaction tests will be required for each day of paving operations to determine that density requirements have been attained.

### 3.03 TACK COAT

A. Description: The work covers the furnishing and placing of a bituminous tack coat on a new bituminous concrete binder layer which is to be covered by a bituminous concrete wearing surface or on an existing asphalt surface to receive a new bituminous concrete overlay.

B. Construction Methods: Requirements are specified in Section 405 of the Alabama D.O.T. Standard Specifications for Highway Construction

### 3.04 BITUMINOUS CONCRETE WEARING SURFACE

A. Description: The work consists of constructing a hot bituminous concrete wearing surface on the previously constructed plant mix bituminous concrete binder layer in accordance with these specifications at locations shown on the drawings. See details.

B. Construction Methods: Requirements shall be the same as specified in Section 424 which also refers to Article 410.03 through 410.07 of the Alabama D.O.T. Specifications.

C. Compaction shall be as specified in Subarticle 410.03(g) of the Alabama D.O.T. Specifications. At least three compaction tests will be required for each day of paving operations to determine that density requirements have been attained.

### 3.05 EXISTING PAVEMENTS

A. Broken Pavement: Repair existing pavement where damaged by construction activity. Carefully note and record condition of pavement prior to beginning work. Remove pavement for patching by cutting pavement in straight lines with power saw.

B. Restore base course with crushed aggregate base course. Backfill in trenches is specified under other Sections; allow initial backfill to settle under traffic for 2 weeks before cutting out for new base course. Install new wearing surface as herein before specified.

C. All patches shall be placed in straight lines, level with existing pavement, without bumps or sinks.

### 3.06 PAVEMENT MARKINGS

A. Application: All surfaces to be painted shall be swept clean of dirt and dust, washed with water if so directed by the Architect, and shall be dry and free from "bleeding asphalt". Paint may be applied by brush or mechanical marking equipment. Marking shall conform to the layout and dimensions shown on the drawings. Stripe shall be painted with one coat of paint with a rate of application of not more than 100 square feet per gallon.

### 3.07 FIELD QUALITY CONTROL

A. General: Test in-place asphalt concrete courses for compliance with requirements for thickness and surface smoothness. Repair or remove and replace unacceptable paving as directed by Architect.

B. Thickness: In-place compacted thickness will not be acceptable if exceeding following allowable variation from required thickness:
   1. Binder Course: ½", plus or minus.
   2. Surface Course: ¼", plus or minus.

C. Surface Smoothness: Test finished surface of each asphalt concrete course for smoothness, using 10' straightedge applied parallel with, and at right angles to centerline of paved area. Surfaces will not be acceptable if exceeding the following tolerances for smoothness.
   1. Binder Course Surface: ¼"
   2. Wearing Course Surface: 3/16"
   3. Check surface areas at intervals as directed by Architect.

**END OF SECTION**

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# SECTION 32 1314
# CEMENT CONCRETE PAVING

## PART 1 GENERAL

### 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

### 1.02 SUMMARY

A. This Section includes exterior cement concrete pavement for the following:
   1. Curbs and gutters.
   2. Walkways.
   3. Equipment Pads.
   4. Vehicular pavement.

B. Related Sections include the following:
   1. Division 2 Section “Earthwork” for subgrade preparation and grading.
   2. Division 2 Section “Pavement Joint Sealants” for joint sealants within concrete pavement and at isolation joints of concrete pavement with adjacent construction.
   3. Division 3 Section “Cast-in-Place Concrete” for general building applications of concrete.

### 1.03 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of blended hydraulic cement, expansive hydraulic cement, fly ash and other pozzolans, ground granulated blast-furnace slag, and silica fume.

### 1.04 SUBMITTALS

A. Product Data: For each type of manufactured material and product indicated.

B. Design Mixes: For each concrete pavement mix. Include alternate mix designs when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.

C. Material Test Reports: From a qualified testing agency indicating and interpreting test results for compliance of the following with requirements indicated, based on comprehensive testing of current materials:

D. Material Certificates: Signed by manufacturers certifying that each of the following materials complies with requirements:
   1. Cementitious materials and aggregates.
   2. Steel reinforcement and reinforcement accessories.
   3. Fiber reinforcement.
   4. Admixtures.
   5. Curing compounds.
   6. Applied finish materials.
   7. Bonding agent or adhesive.
   8. Joint fillers.

### 1.05 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has completed work similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

B. Manufacturer Qualifications: Manufacturer of ready-mixed concrete products complying with ASTM C 94 requirements for production facilities and equipment.
   1. Manufacturer must be certified according to the National Ready Mix Concrete Association's Plant Certification Program.

C. Testing Agency Qualifications: An independent testing agency, acceptable to authorities having jurisdiction, qualified according to ASTM C 1077 and ASTM E 329 to conduct the testing indicated, as documented according to ASTM E 548.

D. Source Limitations: Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant and each aggregate from one source.

E. ACI Publications: Comply with ACI 301, "Specification for Structural Concrete," unless modified by the requirements of the Contract Documents.

F. Concrete Testing Service: Engage a qualified independent testing agency to perform material evaluation tests and to design concrete mixes.

### 1.06 PROJECT CONDITIONS

A. Traffic Control: Maintain access for vehicular and pedestrian traffic as required for other construction activities.

## PART 2 PRODUCTS

### 2.01 FORMS

A. Form Materials: Plywood, metal, metal-framed plywood, or other approved panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces.
   1. Use flexible or curved forms for curves of a radius 100 feet or less.

B. Form-Release Agent: Commercially formulated form-release agent that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces.

### 2.02 STEEL REINFORCEMENT

A. Plain-Steel Welded Wire Fabric: ASTM A 185, fabricated from as-drawn steel wire into flat sheets.

B. Reinforcement Bars: ASTM A615, Grade 60.

### 2.03 CONCRETE MATERIALS

A. General: Use the same brand and type of cementitious material from the same manufacturer throughout the Project.

B. Portland Cement: ASTM C 150, Type I or II.
   1. Fly Ash: ASTM C 618, Class F or C.
   2. Ground Granulated Blast-Furnace Slag: ASTM C 989, Grade 100 or 120.

C. Aggregate: ASTM C 33, uniformly graded, from a single source, with coarse aggregate as follows:
   1. Maximum Aggregate Size: ¾ inch nominal.
   2. Do not use fine or coarse aggregates containing substances that cause spalling.
   3. Match existing aggregate to the extent possible.

D. Water: ASTM C 94.

### 2.04 ADMIXTURES

A. General: Admixtures certified by manufacturer to contain not more than 0.1 percent water-soluble chloride ions by mass of cement and to be compatible with other admixtures.

B. Air-Entraining Admixture: ASTM C 260.

**2.05 FIBER REINFORCEMENT**

A. Synthetic Fiber: Fibrillated polypropylene fibers engineered and designed for use in concrete pavement, complying with ASTM C 1116, Type III, ½ to 1-1/2 inches long.

**2.06 CURING MATERIALS**

A. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq.yd. dry.

B. Moisture-Retaining Cover: ASTM C 171, polyethylene film or white burlap-polyethylene sheet.

C. Water: Potable.

D. Clear Solvent-Borne Liquid-Membrane-Forming Curing Compound: ASTM C 309, Type 1, Class B.

**2.07 RELATED MATERIALS**

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D 1751, asphalt-saturated cellulosic fiber, or ASTM D 1752, cork or self-expanding cork.

B. Bonding Agent: ASTM C 1059, Type II, non-redispersible, acrylic emulsion or styrene butadiene.

C. Epoxy Bonding Adhesive: ASTM C 881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class and grade to suit requirements, and as follows:
   1. Types I and II, non-load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

**2.08 CONCRETE MIXES - STANDARD CONCRETE**

A. Prepare design mixes, proportioned according to ACI 211.1 and ACI 301, for each type and strength of normal-weight concrete determined by either laboratory trial mixes or field experience.

B. Use a qualified independent testing agency for preparing and reporting proposed mix designs for the trial batch method.
   1. Do not use Owner’s field quality-control testing agency as the independent testing agency.

C. Proportion mixes to provide concrete with the following properties:
   1. Compressive Strength (28 Days): 4000 psi for vehicular pavement , 3000 psi for all others.
   2. Maximum Water-Cementitious Materials Ratio: 0.45. and .50 accordingly.
   3. Slump Limit: 4 inches.

D. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
   1. Fly Ash: 25 percent.
   2. Combined Fly Ash and Pozzolan: 25 percent.
   3. Ground Granulated Blast-Furnace Slag: 50 percent.
   4. Combined Fly Ash or Pozzolan, and Ground Granulated Blast-Furnace Slage: 50 percent portland cement minimum, with fly ash or pozzolan not exceeding 25 percent.

E. Add air-entraining admixture at manufacturer’s prescribed rate to result in concrete at point of placement having an air content of 2.5 to 4.5 percent.
   1. Air Content: 6.0 percent for ¾ inch maximum aggregate.

F. Synthetic Fiber: Uniformly disperse in concrete mix at manufacturer’s recommended rate, but not less than 1.0 lb/cu. yd.

### 2.09 CONCRETE MIXES - EXPOSED AGGREGATE CONCRETE

A. Prepare design mixes, proportioned according to ACI 211.1 and ACI 301, for each type and strength of normal-weight concrete determined by either laboratory trial mixes or field experience.

B. Use a qualified independent testing agency for preparing and reporting proposed mix designs for the trial batch method.
   1. Do not use Owner's field quality-control testing agency as the independent testing agency.

C. Proportion mixes to provide concrete with the following properties:
   1. Compressive Strength (28 Days): 4000 psi.
   2. Maximum Water-Cementitious Materials Ratio: 0.45.
   3. Slump Limit: 4 inches.
   4. Design Unit weight: 143.55 lbs/cubic foot
   5. Design Volumn: 27 cubic feet

D. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
   1. Blended material: CEM,BLD,TYPE___IL,GRAY,BULK
   2. Course aggergate: AGG,3/4 INCH, ASTM__#7, GRANITE
   3. Fine Aggergate: AGG, SAND, 3/8 INCH, ASTM __C33
   4. Add Mixture: ADMIX, ASTM __C260, AEA__504
   5. Add Mixture: ADMIX, ASTM __ C494, TYPE__A&D.WR/RETARD___ 144
   6. Water: WATER, CITY

E. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having an air content of 2.5 to 4.5 percent.
   1. Air Content: 4.0 percent for ¾ inch maximum granite aggregate

F. Exposed aggregate finished where indicated for slabs (or toppings) shall consist of a concrete mix using an aggregate as specified of 3/8" maximum size. The aggregate shall be selectd and mixed for a uniform consistancy. The mix proportions shall be determined to yield a 4,000 psi compressive strength at 28 days, using a minum of mixing water. After placing and screeding the conrete shall be tamped and floated in a manner that will assure a uniform distribution of the coarse aggregate near the surface. Before the cement matrix at the surface hardens a commercially prepared retarding agent shall be uniformly applied as recommeded by the manufacturer. After the concrete has sufficiently hardened the cement matrix at the surface shall be removed by washing to expose the aggregate. Cure the concrete as herein specified.

### 2.10 CONCRETE MIXING

A. Ready-Mixed Concrete: Comply with requirements and with ASTM C 94 and ASTM C 1116.
   1. When air temperature is between 85 deg F and 90 deg F reduce mixing and delivery time from 1-1/2 hours to 75 minutes; when air temperature is above 90 deg F reduce mixing and delivery time to 60 minutes.

## PART 3 EXECUTION

### 3.01 PREPARATION

A. Proof-roll prepared subgrade surface to check for unstable areas and verify need for additional compaction. Proceed with pavement only after nonconforming conditions have been corrected and subgrade is ready to receive pavement.

B. Remove loose material from compacted subgrade surface immediately before placing concrete.

### 3.02 EDGE FORMS AND SCREED CONSTRUCTION

A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for pavement to required lines, grades, and elevations. Install forms to allow continuous progress of work and so forms can remain in place at least 24 hours after concrete placement.

B. Clean forms after each use and coat with form release agent to ensure separation from concrete without damage.

### 3.03 STEEL REINFORCEMENT

A. General: Comply with CRSI's "Manual of Standard Practice" for fabricating reinforcement and with recommendations in CRSI's "Placing Reinforcing Bars" for placing and supporting reinforcement.
   1. Apply epoxy repair coating to uncoated or damaged surfaces of epoxy-coated reinforcement.

B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.

C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Maintain minimum cover to reinforcement.

D. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh, and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.

### 3.04 JOINTS

A. General: Construct construction, isolation, and contraction joints and tool edgings true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to centerline, unless otherwise indicated.
   1. When joining existing pavement, place transverse joints to align with previously placed joints, unless otherwise indicated.

B. Construction Joints: Set construction joints at side and end terminations of pavement and at locations where pavement operations are stopped for more than one-half hour, unless pavement terminates at isolation joints.
   1. Provide preformed galvanized steel or plastic keyway-section forms or bulkhead forms with keys, unless otherwise indicated. Embed keys at least 1-1/2 inches into concrete.
   2. Continue reinforcement across construction joints, unless otherwise indicated. Do not continue reinforcement through sides of pavement strips, unless otherwise indicated.
   3. Use epoxy bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Isolation Joints: Form isolation joints of preformed joint-filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.
   1. Locate expansion joints at intervals of 50 feet, unless otherwise indicated.
   2. Extend joint fillers full width and depth of joint.
   3. Terminate joint filler less than ½ inch or more than 1 inch below finished surface if joint sealant is indicated.
   4. Place top of joint filler flush with finished concrete surface if joint sealant is not indicated.
   5. Furnish joint fillers in one-piece lengths. Where more than one length is required, lace or clip joint-filler sections together.
   6. Protect top edge of joint filler during concrete placement with metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides of joint.

D. Contraction Joints: Form weakened-plane contraction joints, sectioning concrete into areas as indicated. Construct contraction joints for a depth equal to at least one-fourth of the concrete thickness, as follows:
   1. Grooved Joints: Form contraction joints after initial floating by grooving and finishing each edge of joint with groover tool to the following radius. Repeat grooving of contraction joints after applying surface finishes. Eliminate groover marks on concrete surfaces.
      a. Radius: ¼ inch.
   2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch wide joints into concrete when cutting action will not tear, abrade, or otherwise damage surface and before developing random contraction cracks.

E. Edging: Tool edges of pavement, gutters, curbs, and joints in concrete after initial floating with an edging tool to the following radius. Repeat tooling of edges after applying surface finishes. Eliminate tool marks on concrete surfaces.
   1. Radius: ¼ inch.

**3.05 CONCRETE PLACEMENT**

A. Inspection: Before placing concrete, inspect and complete formwork installation, reinforcement steel, and items to be embedded or cast in. Notify other trades to permit installation of their work.

B. Remove snow, ice, or frost from subgrade surface and reinforcement before placing concrete. Do not place concrete on frozen surfaces.

C. Moisten subgrade to provide a uniform dampened condition at the time concrete is placed. Do not place concrete around manholes or other structures until they are at the required finish elevation and alignment.

D. Comply with requirements and with recommendations in ACI 304R for measuring, mixing, transporting, and placing concrete.

E. Do not add water to concrete during delivery, at Project site, or during placement.

F. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place.

G. Consolidate concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures to consolidate concrete according to recommendations in ACI 309R.
   1. Consolidate concrete along face of forms and adjacent to transverse joints with an internal vibrator. Keep vibrator away from joint assemblies, reinforcement, or side forms. Use only square-faced shovels for hand-spreading and consolidation. Consolidate with care to prevent dislocating reinforcement, dowels, and joint devices.

H. Place concrete in two operations; strike off initial pour for entire width of placement and to the required depth below finish surface. Lay welded wire fabric or fabricated bar mats immediately in final position. Place top layer of concrete, strike off, and screed.
   1. Remove and replace portions of bottom layer of concrete that have been placed more than 15 minutes without being covered by top layer, or use bonding agent if approved by Architect.

I. Screed pavement surfaces with a straightedge and strike off. Commence initial floating using bull floats or darbies to form an open textured and uniform surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces before beginning finishing operations.

J. Cold-Weather Placement: Comply with ACI 306.1 and as follows. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
   1. When air temperature has fallen to or is expected to fall below 40 deg F, uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 deg F and not more than 80 deg F point of placement.
   2. Do not use frozen materials or materials containing ice or snow.
   3. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators, unless otherwise specified and approved in mix designs.

K. Hot-Weather Placement: Place concrete according to recommendations in ACI 305R and as follows when hot-weather conditions exist:
   1. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 deg F. Chilled mixing water or chopped ice may be used to control temperature, provided water equivalent of ice is calculated to total amount of mixing water. Using liquid nitrogen to cool concrete is Contractor's option.
   2. Fog-spray forms, reinforcement steel, and subgrade just before placing concrete. Keep subgrade moisture uniform without standing water, soft spots, or dry areas.

## 3.06 CONCRETE FINISHING

A. General: Wetting of concrete surfaces during screeding, initial floating, or finishing operations is prohibited.

B. Float Finish: Begin the second floating operation when bleed-water sheen has disappeared and the concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats, or by hand floating if area is small or inaccessible to power units. Finish surfaces to true planes. Cut down high spots, and fill low spots. Refloat surface immediately to uniform granular texture.
   1. Medium-to-Fine- Textured Broom Finish: Draw a soft bristle broom across float-finished concrete surface perpendicular to line of traffic to provide a uniform, fine-line texture.

C. Match existing finishing to extent possible.

## 3.07 CONCRETE PROTECTION AND CURING

A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with ACI 306.1 for cold-weather protection and follow recommendations in ACI 305R for hot-weather protection during curing.

B. Begin curing after finishing concrete, but not before free water has disappeared from concrete surface.

C. Curing Methods: Cure concrete by moisture curing, moisture-retaining-cover curing, curing compound, or a combination of these as follows:
   1. Moisture Curing: Keep surfaces continuously moist for not less than seven days with the following materials:
      a. Water.
      b. Continuous water-fog spray.
      c. Absorptive cover, water saturated, and kept continuously wet. Cover concrete surfaces and edges with 12-inch lap over adjacent absorptive covers.
   2. Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.

3. Curing Compound: Apply uniformly in continuous operation by power spray or roller according to manufacturer's written instructions. Recoat areas subjected to heavy rainfall within three hours after initial application. Maintain continuity of coating and repair damage during curing period.

### 3.08 PAVEMENT TOLERANCES

A. Comply with tolerances of ACI 117 and as follows:
   1. Elevation: ¼ inch.
   2. Thickness: Plus 3/8 inch, minus ¼ inch.
   3. Surface: Gap below 10-foot- long, unleveled straightedge not to exceed ¼ inch.
   4. Joint Spacing: 3 inches.
   5. Contraction Joint Depth: Plus ¼ inch, no minus.
   6. Joint Width: Plus 1/8 inch, no minus.

### 3.09 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing and inspection agency to sample materials, perform tests, and submit test reports during concrete placement. Sampling and testing for quality control may include those specified in this Article.

B. Testing Services: Testing shall be performed according to the following requirements:
   1. Sampling Fresh Concrete: Representative samples of fresh concrete shall be obtained according to ASTM C 172, except modified for slump to comply with ASTM C 94.
   2. Slump: ASTM C 143; one test at point of placement for each compressive-strength test, but not less than one test for each day's pour of each type of concrete. Additional tests will be required when concrete consistency changes.
   3. Air Content: ASTM C 231, pressure method; one test for each compressive-strength test, but not less than one test for each day's pour of each type of air-entrained concrete.
   4. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F and below and when 80 deg F and above, and one test for each set of compressive-strength specimens.
   5. Compression Test Specimens: ASTM C 31/C 31M; one set of four standard cylinders for each compressive-strength test, unless otherwise indicated. Cylinders shall be molded and stored for laboratory-cured test specimens unless field-cured test specimens are required.
   6. Compressive-Strength Tests: ASTM C 39; one set for each day's pour of each concrete class exceeding 5 cu. yd., but not less than 25 cu. yd., plus one set for each additional 50 cu. yd. One specimen shall be tested at 7 days and two specimens at 28 days; one specimen shall be retained in reserve for later testing if required.
   7. When frequency of testing will provide fewer than five compressive-strength tests for a given class of concrete, testing shall be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
   8. When total quantity of a given class of concrete is less than 50 cu. yd., Architect may waive compressive-strength testing if adequate evidence of satisfactory strength is provided.
   9. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, current operations shall be evaluated and corrective procedures shall be provided for protecting and curing in-place concrete.
   10. Strength level of concrete will be considered satisfactory if averages of sets of three consecutive compressive-strength test results equal or exceed specified compressive strength by more than 500 psi.

C. Test results shall be reported in writing to Architect, concrete manufacturer, and Contractor within 24 hours of testing. Reports of compressive-strength tests shall contain Project identification name and number, date of concrete placement, name of concrete testing agency, concrete type and class, location of concrete batch in pavement, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7- and 28-day tests.

D. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as the sole basis for approval or rejection.

E. Additional Tests: Testing agency shall make additional tests of the concrete when test results indicated slump, air entrainment, concrete strengths, or other requirements have not been met, as directed by Architect. Testing agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.

## 3.10 REPAIRS AND PROTECTION

A. Remove and replace concrete pavement that is broken, damaged, or defective, or does not meet requirements in this Section.

B. Drill test cores where directed by Architect when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory pavement areas with portland cement concrete bonded to pavement with epoxy adhesive.

C. Protect concrete from damage. Exclude traffic from pavement for at least 14 days after placement. When construction traffic is permitted, maintain pavement as clean as possible by removing surface stains and spillage of materials as they occur.

D. Maintain concrete pavement free of stains, discoloration, dirt, and other foreign material. Sweep concrete pavement not more than two days before date scheduled for Substantial Completion inspections.

**END OF SECTION**

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# SECTION 32 1720
# PAVEMENT JOINT SEALANTS

## PART 1 GENERAL

### 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

### 1.02 SUMMARY

A. This Section includes the following:
   1. Expansion and contraction joints within portland cement concrete pavement.
   2. Joints between portland cement concrete and asphalt pavement.

B. Related Sections include the following:
   1. Division 2 Section "Cement Concrete Pavement" for constructing joints in concrete paving.
   2. Division 7 Section "Joint Sealants" for sealing nontraffic and traffic joints in locations not specified in this Section.

### 1.03 SUBMITTALS

A. Product Certificates: Signed by manufacturers of joint sealants certifying that products furnished comply with requirements and are suitable for the use indicated.

### 1.04 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who has specialized in installing joint sealants similar in material, design, and extent to those indicated for this Project and whose work has resulted in joint-sealant installations with a record of successful in-service performance.

B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

### 1.05 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in original unopened containers or bundles with labels indicating manufacturer, product name and designation, color, expiration date, pot life, curing time, and mixing instructions for multi-component materials.

B. Store and handle materials to comply with manufacturer's written instructions to prevent their deterioration or damage due to moisture, high or low temperatures, contaminants, or other causes.

### 1.06 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with installation of joint sealants under the following conditions:
   1. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer.
   2. When ambient and substrate temperature conditions are outside limits permitted by joint sealant manufacturer or are below 40 deg F (4.4 deg C).
   3. When joint substrates are wet.

B. Joint-Width Conditions: Do not proceed with installation of joint sealants where joint widths are less than that allowed by joint sealant manufacturer for application indicated.

C. Joint-Substrate Conditions: Do not proceed with installation of joint sealants until contaminants capable of interfering with their adhesion are removed from joint substrates.

## PART 2 PRODUCTS

### 2.01 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backing materials, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint sealant manufacturer based on testing and field experience.

B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range for this characteristic.

### 2.02 COLD OR HOT-APPLIED JOINT SEALANTS

A. Elastomeric Sealant for Concrete: Single-component formulation complying with ASTM D 3406.

B. Products: Subject to compliance with requirements, provide one of the following:
   1. Elastomeric Sealant for Concrete:
      a. 890-sl Silicone Joint Sealants; Dow Corning.
      b. Pourthane NS and SL; W.R. Meadows, Inc.

### 2.03 JOINT-SEALANT BACKER MATERIALS

A. General: Provide joint-sealant backer materials that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by joint sealant manufacturer based on field experience and laboratory testing.

B. Round Backer Rod for Cold- and Hot-Applied Sealants: ASTM D 5249, Type 1, of diameter and density required to control sealant depths and prevent bottom-side adhesion of sealant.

### 2.04 PRIMERS

A. Primers: Product recommended by joint sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint- sealant-substrate tests and field tests.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

### 3.02 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint sealant manufacturer's written instructions.

B. Joint Priming: Prime joint substrates where indicated or where recommended in writing by joint sealant manufacturer, based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

### 3.03 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint sealant manufacturer's written installation instructions applicable to products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations of ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install backer materials of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
   1. Do not leave gaps between ends of backer materials.
   2. Do not stretch, twist, puncture, or tear backer materials.
   3. Remove absorbent backer materials that have become wet before sealant application and replace them with dry materials.

D. Install sealants by proven techniques to comply with the following and at the same time backings are installed:
   1. Place sealants so they directly contact and fully wet joint substrates.
   2. Completely fill recesses provided for each joint configuration.
   3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

E. Provide joint configuration to comply with joint sealant manufacturer's written instructions, unless otherwise indicated.

**3.04 CLEANING**

A. Clean off excess sealants or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved by manufacturers of joint sealants and of products in which joints occur.

**3.05 PROTECTION**

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from the original work.

**END OF SECTION**

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# SECTION 32 3100
# ORNAMENTAL CANTILEVER GATE SYSTEM

## PART 1 - GENERAL

### 1.01 WORK INCLUDED

A. The contractor shall provide all labor, materials, and appurtenances necessary for installation of the industrial ornamental cantilever gate system defined herein at (specify project site).

### 1.02 RELATED WORK

A. A. Section 31 2210 Earthwork

B. B. Section 03 3000 Cast in Place Concrete

### 1.03 SYSTEM DESCRIPTION

A. The manufacturer shall supply a total industrial ornamental cantilever gate system, The system shall include all components (i.e., tracks, uprights, bracing, pickets, hardware and fasteners) required by manufacturer.

### 1.04 QUALITY ASSURANCE

A. The contractor shall provide laborers and supervisors who are thoroughly familiar with the type of construction involved and materials and techniques specified.

### 1.05 REFERENCES

A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron B. Alloy Coated (Galvannealed) by the Hot-Dip Process.

B. ASTM B117 - Practice for Operating Salt-Spray (Fog) Apparatus.

C. ASTM B221 – Aluminum and Aluminum Alloy Extruded Bars, Shapes and Tubes

D. ASTM D523 - Test Method for Specular Gloss.

E. ASTM D714 - Test Method for Evaluating Degree of Blistering in Paint.

F. ASTM D822 - Practice for Conducting Tests on Paint and Related Coatings and Materials using Filtered Open-Flame Carbon-Arc Light and Water Exposure Apparatus.

G. ASTM D1654 - Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments.

H. ASTM D2244 - Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.

I. ASTM D2794 - Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).

J. ASTM D3359 - Test Method for Measuring Adhesion by Tape Test.

### 1.06 SUBMITTAL

A. The manufacturer's submittal package shall be provided prior to installation.

### 1.07 PRODUCT HANDLING AND STORAGE

A. Upon receipt at the job site, all materials shall be checked to ensure that no damages occurred during shipping or handling. Materials shall be stored in such a manner to ensure proper ventilation and drainage, and to protect against damage, weather, vandalism and theft.

## PART 2 - MATERIALS

### 2.01 MANUFACTURER

A. All industrial ornamental cantilever gates shall conform to the Ameristar TransPort Traverse II gate system or approved equal, **classic spike top design**. The project drawings shall show required gate opening and gate height along with gate travel direction. **Provide ball top post cap welded to post, finish to match.**

### 2.02 MATERIAL

A. The materials used for cantilever gate framing (uprights & diagonal bracing) shall be manufactured from ASTM A653 Steel with yield strength of 34,800 PSI, a tensile strength of 37,700PSI and a standard mill finish. The TransPort™ aluminum extrusions for top and bottom enclosed tracks shall be alloy and temper designation 6005-T5 to meet ASTM B221.

B. Material for pickets shall be 1” square x 16 ga. steel pickets on gate systems less than 22’ openings, gate systems greater than 22’ openings shall have 1" square x 1/8” wall aluminum pickets. Picket on center spacing shall not exceed 5". Pickets shall be securely fastened to face of top and bottom enclosed track extrusions.

C. Material for gate uprights shall be 2 ½” X 16 ga. and diagonal bracing shall be 2” square x 16 ga. steel. The cross-sectional shape of the enclosed-track shall confirm to the manufacturers design with a single extrusion consisting of a 3.75” x 7” channeled support with integrated 3” x 3” enclosed-track raceway. Gates less than 18-foot openings shall be constructed as a single-track system, gates greater than 20-foot openings shall be constructed as a spliced track system.

D. Steel material for fence posts and pickets shall be galvanized prior to forming in accordance with the requirements of ASTM A653/A653M, with minimum yield strength of 45,000 psi (310264.20 kPa). The steel shall be hot-dip galvanized to meet the requirements of ASTM A653/A653M with a minimum zinc coating weight of 0.90 oz/ft2 (276 g/m2), Coating Designation G-90. Depending on application and gate size, material for gate support posts shall be 4” x 11 Ga., or 6” x 3/16”.

E. Support carriage trolly assemblies, for the gates enclosed bottom track, shall have two mounting options: concrete slab or post mount bracket configuration, and shall support the vertical load of the gate. The gates center of gravity shall be centered on the bottom support carriage trolly assemblies. Installation of the carriage trolly assemblies shall be per manufacturer’s installation instructions (written or video).

### 2.03 FABRICATION

A. Gate frame uprights and diagonal bracing shall be prefabricated and pre-punched to accept frame fasteners. Enclosed track shall be pre-punched to accept gate uprights. Pickets shall be precut to specified length and predrilled to accept picket to track fasteners. Posts shall be precut to specified lengths.

B. Top and bottom enclosed track extrusions shall be mechanically fastened to vertical gate uprights and intermediate supports, as required by assembly instructions. Diagonal bracing shall be mechanically fastened to vertical gate uprights and intermediate supports, as required by assembly instructions. Pickets shall be mechanically fastened to top and bottom enclosed track, as required by assembly instructions.

C. The manufactured gate components shall comply with all coating requirements per listed applicable ASTM standards. The color shall be black.

### 2.04 2.04 GATE OPERATOR

A. Provide commercial grade, chain drive slide gate operator.

B. Basis of Design: All-O-Matic, Inc. SL 150DC or approved equal.

C. Ensure that gate operator is sized adequately for applicable gate weight.

D. Provide all required safety devices for operable slide gates in compliance with UL 325, Class II.

## PART 3 - EXECUTION

### 3.01 PREPARATION

A. All new installation shall be laid out by the contractor in accordance with the construction plans.

### 3.02 GATE INSTALLATION

A. Cantilever support posts shall be set in concrete footers having a minimum depth of 48” (Note: In most cases, local soil, code restrictions and inclement weather conditions may require a greater depth). Posts shall be spaced according to gate specific submittal drawings. Optional Safety Kit must be included if the gate is automated. The “Earthwork” and “Concrete” sections of this specification shall govern material requirements for the concrete footer.

B. Gate to be installed per manufacturers gate installation instructions (written or video). For Gates that will be automated, the contractor shall be responsible to ensure the gate, and installation, meet ASTM F2200 and UL325 Standards.

### 3.03 GATE INSTALLATION MAINTENANCE

A. When cutting/drilling rails or posts adhere to the following steps to seal the exposed steel surfaces; 1) Remove all metal shavings from cut area. 2) Apply zinc-rich primer to thoroughly cover cut edge and/or drilled hole; let dry. 3) Apply 2 coats of custom finish paint matching fence color as required by manufacturer.

### 3.04 GATE INSTALLATION

A. Gate posts shall be spaced according to the manufacturers’ drawings, dependent on clear opening. The manufacturers’ gate drawings shall identify the necessary gate hardware required for the application. Gate hardware shall be provided by the manufacture of the gate and shall be installed per manufacturer’s recommendations.

### 3.05 CLEANING

A. The contractor shall clean the jobsite of excess materials; post-hole excavations shall be scattered uniformly away from posts.

**END OF SECTION**

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# SECTION 32 3119
# ORNAMENTAL FENCE SYSTEM

## PART 1 – GENERAL

### 1.01 WORK INCLUDED

A. The contractor shall provide all labor, materials and appurtenances necessary for installation of the welded ornamental steel fence system defined herein at (specify project site).

### 1.02 RELATED WORK

A. Section 31 2210 - Earthwork

B. Section 03 3000 - Cast-in-Place Concrete

### 1.03 SYSTEM DESCRIPTION

A. The manufacturer shall supply a total fence system including all components (i.e., panels, posts, gates and hardware) required by manufacturer.

### 1.04 QUALITY ASSURANCE

A. The contractor shall provide laborers and supervisors who are thoroughly familiar with the type of construction involved and materials and techniques specified.

### 1.05 REFERENCES

A. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.

B. ASTM B117 - Practice for Operating Salt-Spray (Fog) Apparatus.

C. ASTM D523 - Test Method for Specular Gloss.

D. ASTM D714 - Test Method for Evaluating Degree of Blistering in Paint.

E. ASTM D822 - Practice for Conducting Tests on Paint and Related Coatings and Materials using Filtered Open-Flame F. Carbon-Arc Light and Water Exposure Apparatus.

F. ASTM D1654 - Test Method for Evaluation of Painted or Coated Specimens Subjected to Corrosive Environments.

G. ASTM D2244 - Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.

H. ASTM D2794 - Test Method for Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).

I. ASTM D3359 - Test Method for Measuring Adhesion by Tape Test.

J. ASTM F2408 – Ornamental Fences Employing Galvanized Steel Tubular Pickets.

### 1.06 SUBMITTAL

A. The manufacturer’s literature shall be submitted prior to installation.

### 1.07 PRODUCT HANDLING AND STORAGE

A. Upon receipt at the job site, all materials shall be checked to ensure that no damage occurred during shipping or handling. Materials shall be stored in such a manner to ensure proper ventilation and drainage, and to protect against damage, weather, vandalism and theft.

### 1.08 PRODUCT WARRANTY

A. All structural fence components (i.e. rails, pickets, and posts) shall be warranted within specified limitations, by the manufacturer for a period of 20 years from date of original purchase. Warranty shall cover any defects in material finish, including cracking, peeling, chipping, blistering or corroding.

B. Reimbursement for labor necessary to restore or replace components that have been found to be defective under the terms of manufactures warranty shall be guaranteed for five (5) years from date of original purchase.

## PART 2 – MATERIALS

### 2.01 MANUFACTURER

A. The fence system shall conform to basis of design Ameristar Montage II or approved equal, **classic spike top design**, extended picket bottom rail treatment, **3 rail style.** Provide ball top post cap welded to post, finish to match. Height shall be 6'.

### 2.02 MATERIAL

A. A. Steel material for fence panels and posts shall conform to the requirements of ASTM A653/A653M, with a minimum yield strength of 45,000 psi (310264.20 kPa) and a minimum zinc (hot-dip galvanized) coating weight of 0.90 oz/ft2 (276 g/m2), Coating Designation G-90.

B. Material for pickets shall be 1” square x 14 Ga. tubing. The rails shall be steel channel, 1.75” x 1. 75” x .105”. Picket holes in the rail shall be spaced 4.715” o.c. Fence posts and gate posts shall meet the minimum size requirements of Table 1.

### 2.03 FABRICATION

A. Pickets, rails and posts shall be pre-cut to specified lengths. Rails shall be pre-punched to accept pickets.

B. Pickets shall be inserted into the pre-punched holes in the rails and shall be aligned to standard spacing using a specially calibrated alignment fixture. The aligned pickets and rails shall be joined at each picket-to-rail intersection by Ameristar’s proprietary fusion welding process, thus completing the rigid panel assembly (Note: The process produces a virtually seamless, spatter-free good-neighbor appearance, equally attractive from either side of the panel).

C. The manufactured panels shall comply with all coating requirements per listed applicable ASTM standards The color shall be Black.

D. The manufactured fence system shall be capable of meeting the vertical load, horizontal load, and infill performance requirements for Industrial weight fences under ASTM F2408.

E. Swing gates shall be fabricated using 1.75” x 14ga Forerunner double channel rail, 2” sq. x 12ga. gate ends, and 1” sq. x 14ga. pickets. Gates that exceed 6’ in width will have a 1.75” sq. x 14ga. intermediate upright. All rail and upright intersections shall be joined by welding. All picket and rail intersections shall also be joined by welding. Gusset plates will be welded at each upright to rail intersection. Cable kits will be provided for additional trussing for all gates leaves over 6’.

F. Pedestrian swing gates shall be self-closing, having a gate leaf no larger than 48" width. Integrated hinge-closer set (2 qty) shall be ADA compliant that shall include a variable speed and final snap adjustment with compact design (no greater than 5" x 6" footprint). Hinge-closer set (2 qty) shall be tested to a minimum of 500,000 cycles and capable of self-closing gates up to a maximum gate weight of 260 lbs. and maximum weight load capacity of 1,500 lbs. Hinge-closer device shall be externally mounted with tamper-resistant security fasteners, with full range of adjustability, horizontal (.5" - 1.375") and vertical (0 - .5"). Maintenance free hinge-closer set shall be tested to operate in temperatures of negative 20 F to 200 F degrees, and swings to negative 2 degrees to ensure reliable final lock engagement.

## PART 3 – EXECUTION

### 3.01 PREPARATION

A. All new installation shall be laid out by the contractor in accordance with the construction plans.

### 3.02 FENCE INSTALLATION

A. Fence post shall be spaced according to Table 3, plus or minus ½". For installations that must be raked to follow sloping grades, the post spacing dimension must be measured along the grade. Fence panels shall be attached to posts with brackets supplied by the manufacturer. Posts shall be set in concrete footers having a minimum depth of 36" (Note: In some cases, local restrictions of freezing weather conditions may require a greater depth). The "Earthwork" and "Concrete" sections of this specification shall govern material requirements for the concrete footer. Posts setting by other methods such as plated posts or grouted core-drilled footers are permissible only if shown by engineering analysis to be sufficient in strength for the intended application.

### 3.03 FENCE INSTALLATION MAINTENANCE

A. When cutting/drilling rails or posts adhere to the following steps to seal the exposed steel surfaces; 1) Remove all metal shavings from cut area. 2) Apply zinc-rich primer to thoroughly cover cut edge and/or drilled hole; let dry. 3) Apply 2 coats of custom finish paint matching fence color as required by manufacturer.

### 3.04 GATE INSTALLATION

A. Gate posts shall be spaced according to the manufacturers' gate drawings, dependent on standard out-to-out gate leaf dimensions and gate hardware selected. Type and quantity of gate hinges shall be based on the application; weight, height, and number of gate cycles. The manufacturers' gate drawings shall identify the necessary gate hardware required for the application. Gate hardware shall be provided by the manufacturer of the gate and shall be installed per manufacturer's recommendations.

### 3.05 CLEANING

A. The contractor shall clean the jobsite of excess materials; post-hole excavations shall be scattered uniformly away from posts.

**TABLE 1 – MINIMUM SIZES FOR POSTS**

| FENCE POSTS | PANEL HEIGHT |
|---|---|
| 3" X 12 GA. | OVER 6' UP TO & INCLUDING 8' HEIGHT |
| | |
| GATE LEAF | GATE HEIGHT<br>OVER 6' UP TO & INCLUDING 8' |
| UP TO 4' | 3" X 12 GA. |
| 4'1" TO 6' | 4" X 11 GA. |

| | |
|---|---|
| 6’1” TO 8’ | 6” X 3/16” |
| 8’1” TO 10’ | 6” X 3/16” |
| 10’1” TO 12’ | 6” X 3/16” |
| 12’1” TO 14’ | 6” X 3/16” |
| 14’1” TO 16’ | 6” X 3/16” |

**END OF SECTION**

# SECTION 32 8423
# UNDERGROUND SPRINKLERS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Provide the design and specifications for the undergound sprinkler system to include shop drawings for architect's approval.

B. Providing the designed irrigation system for a complete installation. Company must provide a performance Bond covering Trenholm State Community College for amount of total cost of Sprinkler work.
   1. Pipe and fittings, valves, sprinkler heads, emitters, bubblers, and accessories.
   2. Control system.
   3. Sprinkler and Landscape Contractors ( provide proof of five years of experience) Aproval by addendum only.
   4. The following are pre-approved Landscape and Sprinkler sub contractors
      a. Froggy Bottom - Chris Lashlee - 334--651-2161. Pike Road AL
      b. Pate Landscaping - Jason Walker- 334-300-0701. Montgomery, AL
      c. Southeastern Envoronmental Contractors, LLC - Levi Duke - 334-403-2436. Troy ,AL

C. This work will be under the General Contractor's scope of work as required by the Contract Documents. Refer to Section 01 2100 Allowances.

### 1.02 RELATED REQUIREMENTS

A. Section 01 2100 - Allowances
   1. Refer to Underground Sprinkler System Contingecy Allowance.

B. Section 31 2316 - Excavation: Excavating for irrigation piping.

C. Section 31 2323 - Fill: Backfilling for irrigation piping.

D. Section 31 2316.13 - Trenching: Excavating and backfilling for irrigation piping.

E. Section 26 0519 - Low-Voltage Electrical Power Conductors and Cables (600 V and Less).

F. Section 26 0534 - Conduit.

G. Section 01 2100 - Allowances.

### 1.03 REFERENCE STANDARDS

A. ASTM D2241 - Standard Specification for Poly (Vinyl Chloride) (PVC) Pressure-Rated Pipe (SDR Series); 2020.

B. ASTM D2564 - Standard Specification for Solvent Cements for Poly(Vinyl Chloride) (PVC) Plastic Piping Systems; 2020 (Reapproved 2024).

C. NEMA EN 10250 - Enclosures for Electrical Equipment (1000 Volts Maximum); 2024.

### 1.04 ADMINISTRATIVE REQUIREMENTS

A. Coordination: Coordinate the work with site backfilling, landscape grading and delivery of plant life.

B. Preinstallation Meeting: Convene one week prior to commencing work of this Section.

### 1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Indicate to scale piping layout to water source, location of sleeves under pavement, location and coverage of sprinkler heads, components, plant and landscaping features, site structures, schedule of fittings to be used.

C. Product Data: Provide component and control system and wiring diagrams.

D. Record Documents: Record actual locations of all concealed components piping system and conduit.

E. Operation and Maintenance Data:
   1. Provide instructions for operation and maintenance of system and controls, seasonal activation and shutdown, and manufacturer's parts catalog.
   2. Provide schedule indicating length of time each valve is required to be open to provide a determined amount of water.

F. Maintenance Materials: Provide the following for Owner's use in maintenance of project.
   1. See Section 01 6000 - Product Requirements, for additional provisions.
   2. Extra Sprinkler Heads: Two of each type and size.
   3. Extra Valve Keys for Manual Valves: One.
   4. Extra Valve Box Keys: One.
   5. Extra Valve Marker Keys: One.
   6. Wrenches: One for each type head core and for removing and installing each type head.

## 1.06 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.

B. Installer Qualifications: Company specializing in performing the work of this section with minimum 5 years of experience.

C. Warranty: All irrigation lawn sprinker system (parts, labor and material) shall be warranteed for 365 days from substantial completion. During this period the maintenance and service for the system for normal use will be at no cost to the owner.

## 1.07 REGULATORY REQUIREMENTS

A. Conform to applicable code for piping and component requirements.

B. City of Montgomery Departments

C. Montgomery Waterworks Board

D. Alabama Community College System and it's representatives.

# PART 2 PRODUCTS

## 2.01 IRRIGATION SYSTEM

A. Electric solenoid controlled underground irrigation system, with low point self drain.
   1. Low Voltage Controls: 24 volt, A.

B. Manufacturers:
   1. Rain Bird Sales, Inc; ____: www.rainbird.com/#sle.
   2. Toro Company; ____: www.toro.com/#sle.
   3. Weathermatic; ____: www.weathermatic.com/#sle.
   4. Substitutions: See Section 01 6000 - Product Requirements.

## 2.02 PIPE MATERIALS

A. PVC Pipe: ASTM D2241; 200 psi (1.38 MPa) pressure rated upstream from controls, 160 psi (1.10 MPa) downstream; solvent welded sockets.

B. Fittings: Type and style of connection to match pipe.

C. Solvent Cement: ASTM D 2564 for PVC pipe and fittings.

D. Sleeve Material: PVC.

**2.03 OUTLETS**

A. Rotary Type Sprinkler Head: Pop-up type with screens; fully adjustable for flow and pressure; size as indicated; with letter or symbol designating degree of arc and arrow indicating center of spray pattern.

B. Spray Type Sprinkler Head: Pop-Up head with full circle pattern.

**2.04 VALVES**

A. Gate Valves: Bronze construction non-rising stem.

B. Backflow Preventers: Iron body construction, double check valve type.

C. Valve Box and Cover: _____.

D. Drain Valve: _____.

**2.05 CONTROLS**

A. Controller: Automatic controller, microprocessor solid state control with visible readout display, temporary override feature to bypass cycle for inclement weather, timer for a 4 station system, programmable for 7 days in quarter hour increments, with automatic start and shutdown.

B. Controller Housing: NEMA EN 10250 Type 3; weatherproof, watertight, with lockable access door.

C. Valves: Hydraulic; normally open; hydraulic tubing, including required fittings and accessories.

D. Wire Conductors: Color coded.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

A. Verify location of existing utilities prior to bid.

B. Verify that required utilities are available, in proper location, and ready for use.

C. Refer to Civil Drawings for information on back-flow preventer by civil contractor and plugged pipe for Sprinkler contractor to tie into.

D. Reference is made to irrigation drawings from Phase 3. These drawings are not part of the contract documents but only for the convenience of the contractor. Verify all conditions prior to bid. The architect will make these drawings available to bidders upon request.

**3.02 PREPARATION**

A. Piping layout indicated is diagrammatic only. Route piping to avoid plants, ground cover, and structures.

B. Layout and stake locations of system components.

C. Review layout requirements with other affected work. Coordinate locations of sleeves under paving to accommodate system.

**3.03 TRENCHING**

A. Trench and backfill in accordance with Section 31 2316 and Section 31 2323.

B. Trench to accommodate grade changes and slope to drains.

C. Maintain trenches free of debris, material, or obstructions that may damage pipe.

### 3.04 INSTALLATION

A. Install pipe, valves, controls, and outlets in accordance with manufacturer's instructions.

B. Connect to utilities.

C. Set outlets and box covers at finish grade elevations.

D. Provide for thermal movement of components in system.

E. Use threaded nipples for risers to each outlet.

F. Mark valves with neoprene valve markers containing locking device. Set valve markers in pipe risers extending from top of valve to finish grade.

G. After piping is installed, but before outlets are installed and backfilling commences, open valves and flush system with full head of water.

### 3.05 FIELD QUALITY CONTROL

A. Prior to backfilling, test system for leakage at main piping to maintain 100 psi (690 kPa) pressure for one hour.

B. System is acceptable if no leakage or loss of pressure occurs and system self drains during test period.

### 3.06 BACKFILLING

A. Provide 3 inch (75 mm) sand cover over piping.

B. Backfill trench and compact to specified subgrade elevation. Protect piping from displacement.

### 3.07 SYSTEM STARTUP

A. Prepare and start system in accordance with manufacturer's instructions.

B. Adjust control system to achieve time cycles required.

C. Adjust head types for full water coverage as directed.

### 3.08 CLOSEOUT ACTIVITIES

A. Instruct Owner's personnel in operation and maintenance of system, including adjusting of sprinkler heads. Use operation and maintenance data as basis for demonstration.

B. Provide owner with maintenance parts and manuals of operation.

### 3.09 MAINTENANCE

A. See Section 01 7000 - Execution and Closeout Requirements, for additional requirements relating to maintenance service.

B. Provide one complete spring start-up and a fall shutdown by installer, at no extra cost to Owner.

**END OF SECTION**

# SECTION 32 9223
# SODDING

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Preparation of subsoil.

B. Placing topsoil.

C. Fertilizing.

D. Sod installation.

E. Maintenance.

### 1.02 RELATED REQUIREMENTS

A. Earthwork Section 31 2210

B. Section 31 2200 - Grading: Preparation of subsoil and placement of topsoil in preparation for the work of this section.

C. Section 32 9300 - Plants

### 1.03 DEFINITIONS

A. Weeds: Includes Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

### 1.04 REFERENCE STANDARDS

A. TPI (SPEC) - Guideline Specifications to Turfgrass Sodding; 2006.

### 1.05 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Certification: Submit certification of grass species and location of sod source.

C. Certificate: Certify fertilizer and herbicide mixture approval by authority having jurisdiction.

D. Maintenance Data: Include maintenance instructions, cutting method and maximum grass height; types, application frequency, and recommended coverage of fertilizer .

### 1.06 QUALITY ASSURANCE

A. Sod Producer: Company specializing in sod production and harvesting with minimum five years experience, and certified by the State of Alabama.

B. Installer Qualifications: Company approved by the sod producer.

### 1.07 REGULATORY REQUIREMENTS

A. Comply with regulatory agencies for fertilizer and herbicide composition.

### 1.08 DELIVERY, STORAGE, AND HANDLING

A. Deliver sod on pallets. Protect exposed roots from dehydration.

B. Do not deliver more sod than can be laid within 24 hours.

### 1.09 WARRANTY

A. Guarantee all plant material and planting workmanship for a period of one full year beyond the date of Substantial Completion. The end of the guarantee period shall coincide with the end of the one year maintenance; however, any replacements made during the maintenance period shall be warranted for an additional growing season, defined as March 15 through October 15. No maintenance shall be done during the guarantee period of the replacement plants beyond the original one year period.

B. During the period of guarantee, replace, with no additional compensation, and as soon as weather permits, all dead plant materials, and all plant materials not in a thriving condition with materials originally specified and/or installed. Make good any other damage, loss, destruction, or failure to flourish sufficiently as the result of inferior or defective materials or workmanship.

C. Repair grades and other work necessitated due to planting replacements.

## PART 2 PRODUCTS

### 2.01 REGULATORY REQUIREMENTS

A. Comply with regulatory agencies for fertilizer and herbicide composition.

B. Provide certificate of compliance from authority having jurisdiction indicating approval of fertilizer and herbicide mixture.

### 2.02 MATERIALS

A. Sod: TPI (SPEC), Certified Turfgrass Sod quality; cultivated grass sod; type indicated in plant schedule on Drawings (If not shown on drawings as indicated by Architect and Owner); with strong fibrous root system, free of stones, burned or bare spots; containing no more than 5 weeds per 1000 sq ft (100 sq m). Minimum age of 18 months, with root development that will support its own weight without tearing, when suspended vertically by holding the upper two corners.
   1. Superior Bermuda Grass Type: 100 percent.
   2. Thickness: "Thick" sod, minimum 1 inch (25 mm) and maximum 1-3/8 inch (35 mm) topsoil base.
   3. Machine cut sod and load on pallets in accordance with TPI (SPEC) Guidelines.

B. Fertilizer: Commercial 15-15-15 or approved equal; recommended for grass, with fifty percent of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies of topsoil, as indicated by analysis.

C. Water: Clean, fresh and free of substances or matter that could inhibit vigorous growth of grass.

### 2.03 ACCESSORIES

A. Wood Pegs: Softwood, sufficient size and length to ensure anchorage of sod on slope.

B. Wire Mesh: Interwoven hexagonal metal wire mesh of 2 inch (50 mm) size.

## PART 3 EXECUTION

### 3.01 EXAMINATION

A. Verify that prepared soil base is ready to receive the work of this section.

### 3.02 PREPARATION

A. Prepare subgrade in accordance with Section 31 2200.

B. Place topsoil in accordance with Section 31 2200.

### 3.03 FERTILIZING

A. Apply fertilizer in accordance with manufacturer's instructions.

B. Apply after smooth raking of topsoil and prior to installation of sod.

C. Apply fertilizer no more than 48 hours before laying sod.

D. Mix thoroughly into upper 2 inches (50 mm) of topsoil.

E. Lightly water to aid the dissipation of fertilizer.

### 3.04 LAYING SOD

A. Moisten prepared surface immediately prior to laying sod.

B. Lay sod immediately after delivery to site to prevent deterioration.

C. Lay sod smooth and tight with no open joints visible, and no overlapping; stagger end joints 12 inches (300 mm) minimum. Do not stretch or overlap sod pieces.

D. Where new sod adjoins existing grass areas, align top surfaces.

E. Where sod is placed adjacent to hard surfaces, such as curbs, pavements, etc., place top elevation of sod 1/2 inch (13 mm) below top of hard surface.

F. On slopes 6 inches per foot (500 mm per m) and steeper, lay sod perpendicular to slope and secure every row with wooden pegs at maximum 2 feet (600 mm) on center. Drive pegs flush with soil portion of sod.

G. Prior to placing sod, on slopes exceeding 8 inches per foot (666 mm per m) or where indicated, place wire mesh over topsoil. Securely anchor in place with wood pegs sunk firmly into the ground.

H. Water sodded areas immediately after installation. Saturate sod to 4 inches (100 mm) of soil.

I. After sod and soil have dried, roll sodded areas to ensure good bond between sod and soil and to remove minor depressions and irregularities.

### 3.05 MAINTENANCE

A. Provide maintenance at no extra cost to Owner; Owner will pay for water.

B. Until the site is considered substantially complete, mow grass at regular intervals to maintain at a maximum height of 2-1/2 inches (65 mm). Do not cut more than 1/3 of grass blade at any one mowing.

C. Neatly trim edges and hand clip where necessary.

D. Immediately remove clippings after mowing and trimming.

E. Water to prevent grass and soil from drying out.

F. Roll surface to remove irregularities.

G. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions. Remedy damage resulting from improper use of herbicides.

H. Immediately replace sod to areas that show deterioration or bare spots.

I. Protect sodded areas with warning signs during maintenance period.

**END OF SECTION**

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# SECTION 32 9300
# PLANTS

## PART 1 GENERAL

### 1.01 SECTION INCLUDES

A. Preparation of subsoil.

B. Topsoil bedding.

C. New trees, plants, and ground cover.

D. Mulch and Fertilizer.

E. Maintenance.

F. Tree Pruning.

### 1.02 RELATED REQUIREMENTS

A. Section 31 2200 - Grading: Topsoil material.

B. Section 31 2323 - Fill: Topsoil material.

C. Section 32 0190 - Operation and Maintenance of Planting: Post-occupancy maintenance.

### 1.03 PRICE AND PAYMENT PROCEDURES

### 1.04 DEFINITIONS

A. Weeds: Include Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

B. Plants: Living trees, plants, and ground cover specified in this Section , and described in ANSI Z60.1.

### 1.05 REFERENCE STANDARDS

A. ANSI A300 Part 1 - American National Standard for Tree Care Operations - Tree, Shrub, and Other Woody Plant Management - Standard Practices (Pruning); 2017.

B. ANSI/AHIA Z60.2 - American Standard for Nursery Stock; 2025.

### 1.06 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Certificate: Certify fertilizer and herbicide mixture approval by authority having jurisdiction.

C. Certificate: Submit certificate for plants free of disease or hazardous insects; certified by federal department of agriculture; free of disease or hazardous insects.

D. Maintenance Data: Include cutting and trimming method ; types, application frequency, and recommended coverage of fertilizer ; and _____.

E. Submit list of plant life sources.

### 1.07 QUALITY ASSURANCE

A. Nursery Qualifications: Company specializing in growing and cultivating the plants with three years documented experience.

B. Installer Qualifications: Company specializing in installing and planting the plants with 5 years documented experience.

C. Maintenance Services: Performed by installer.

D. Non-native, Invasive Plant Species: Do not introduce, grow, or cultivate plant species that are non-native to the ecosystem of the project site, and whose introduction causes or is likely to cause economic or environmental harm or harm to human health.
   1. Comply with laws regulating non-native and invasive plant species in the State in which the Project is located.

**1.08 REGULATORY REQUIREMENTS**

A. City of Montgomery, Alabama Departments

**1.09 DELIVERY, STORAGE, AND HANDLING**

A. Deliver fertilizer in waterproof bags showing weight, chemical analysis, and name of manufacturer.

B. Protect and maintain plant life until planted.

C. Deliver plant life materials immediately prior to placement. Keep plants moist.

**1.10 FIELD CONDITIONS**

A. Do not install plant life when ambient temperatures may drop below 35 degrees F (2 degrees C) or rise above 90 degrees F (32 degrees C).

B. Do not install plant life when wind velocity exceeds 30 mph (48 k/hr).

**1.11 WARRANTY**

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Provide one year warranty from the date of substantial completion.

C. Warranty: Include coverage for one continuous growing season; replace dead or unhealthy plants.

D. Replacements: Plants of same size and species as specified, planted in the next growing season, with a new warranty commencing on date of substantial completion.

**1.12 MAINTENANCE (SEE END OF SECTION)**

A. See Section 01 7000 - Execution and Closeout Requirements, for additional requirements relating to maintenance service.

**PART 1 PRODUCTS**

**2.01 REGULATORY REQUIREMENTS**

A. Comply with regulatory agencies for fertilizer and herbicide composition.

B. Provide certificate of compliance from authority having jurisdiction indicating approval of plants, fertilizer and herbicide mixture.

C. Plant Materials: Certified by federal department of agriculture; free of disease or hazardous insects.

**2.02 RELATED SECTIONS**

A. Section 32 9223 Sodding.

**2.03 PLANTS**

A. Plants will be as specified by the contract documents.

B. The following are **preapproved** Landsaping and Sprinkler sub contractors.
   1. Froggy Bottom - Chris Lashlee - 334- 651- 2161, Pike Road ,AL

2. Pate Landscaping - Jason Walker- 334-300-0701, Mintgomery, AL
3. Southeastern Environmental Contractors, LLC - Levi Duke, 334-403-2436, Troy, AL

**2.04 SOIL MATERIALS**

A. Topsoil: Fertile, agricultural soil, typical for locality, capable of sustaining vigorous plant growth, taken from drained site; free of subsoil, clay or impurities, plants, weeds and roots; minimum pH value of 5.4 and maximum 7.0.

**2.05 SOIL AMENDMENT MATERIALS**

A. Fertilizer: Containing fifty percent of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies of topsoil, as indicated in analysis..

B. Water: Clean, fresh, and free of substances or matter that could inhibit vigorous growth of plants.

**2.06 MULCH MATERIALS**

A. Mulching Material: fresh pine straw

**2.07 ACCESSORIES**

A. Stakes: Softwood lumber, pointed end.

**PART 3 EXECUTION**

**3.01 EXAMINATION**

A. Verify that prepared subsoil and planters are ready to receive work.

B. Saturate soil with water to test drainage.

**3.02 PREPARATION OF SUBSOIL**

A. Prepare subsoil to eliminate uneven areas. Maintain profiles and contours. Make changes in grade gradual. Blend slopes into level areas.

B. Remove foreign materials, weeds and undesirable plants and their roots. Remove contaminated subsoil.

C. Scarify subsoil to a depth of ____ inches (____ mm) where plants are to be placed. Repeat cultivation in areas where equipment, used for hauling and spreading topsoil, has compacted subsoil.

D. Dig pits and beds 6 inches (150 mm) larger than plant root system.

**3.03 PLACING TOPSOIL**

A. Spread topsoil to a minimum depth of 4 inches (100 mm) over area to be planted. Rake smooth.

B. Place topsoil during dry weather and on dry unfrozen subgrade.

C. Remove vegetable matter and foreign non-organic material from topsoil while spreading.

D. Grade topsoil to eliminate rough, low or soft areas, and to ensure positive drainage.

E. Install topsoil into pits and beds intended for plant root balls, to a minimum thickness of 6 inches (150 mm).

**3.04 FERTILIZING**

A. Apply fertilizer in accordance with manufacturer's instructions.

B. Apply after initial raking of topsoil.

C. Mix thoroughly into upper 2 inches (50 mm) of topsoil.

D. Lightly water to aid the dissipation of fertilizer.

**3.05 PLANTING**

A. Place plants for best appearance for review and final orientation by Architect.

B. Set plants vertical.

C. Remove non-biodegradable root containers.

D. Set plants in pits or beds, partly filled with prepared plant mix, at a minimum depth of 6 inches (of 150 mm) under each plant. Remove burlap, ropes, and wires, from the root ball.

E. Place bare root plant materials so roots lie in a natural position. Backfill soil mixture in 6 inch (150 mm) layers. Maintain plant life in vertical position.

F. Saturate soil with water when the pit or bed is half full of topsoil and again when full.

**3.06 INSTALLATION OF ACCESSORIES**

A. Place metal edging, where indicated on drawings.

**3.07 TREE PRUNING**

A. Prune trees as recommended in ANSI A300 Part 1.

B. Prune newly planted trees as required to remove dead, broken, and split branches.

**3.08 FIELD QUALITY CONTROL**

A. Plants will be rejected if a ball of earth surrounding roots has been disturbed or damaged prior to or during planting.

**3.09 MAINTENANCE**

A. Provide maintenance at no extra cost to Owner; Owner will pay for water.

B. Maintain plant life for 12 months after Date of Substantial Completion.

C. Irrigate sufficiently to saturate root system and prevent soil from drying out.

D. Remove dead or broken branches and treat pruned areas or other wounds.

E. Neatly trim plants where necessary.

F. Immediately remove clippings after trimming.

G. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions.

H. Control insect damage and disease. Apply pesticides in accordance with manufacturers instructions.

I. Remedy damage from use of herbicides and pesticides.

J. Replace mulch when deteriorated.

K. Maintain wrappings, guys, turnbuckles, and stakes. Adjust turnbuckles to keep guy wires tight. Repair or replace accessories when required.

**END OF SECTION**

# SECTION 33 1117
# OUTSIDE WATER SYSTEM

## GENERAL

### 1.01 RELATED DOCUMENTS:

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division-1 Specification sections, apply to work of this section.

### 1.02 DESCRIPTION OF WORK:

A. Extent of water systems work is indicated on drawings and schedules, and by requirements of this section.

B. Refer to Division-31 section "Earthwork" for excavation and backfill required for water systems; not work of this section.

C. Refer to Division-22 section "Plumbing" for interior building systems including interior piping, fixtures, and equipment; not work of this section.

### 1.03 QUALITY ASSURANCE:

A. Manufacturer's Qualifications: Firms regularly engaged in manufacturing of water systems materials and products, of types and sizes required, whose products have been in satisfactory use in similar service for not less than 5 years.

B. Installer's Qualifications: Firm with at least 3 years of successful installation experience on projects with water piping work similar to that required for project.

### 1.04 CODES AND STANDARDS:

A. Plumbing Code Compliance: Comply with applicable portions of National Standard Plumbing Code pertaining to selection and installation of water system materials and products.

B. Water Purveyor Compliance: Comply with requirements of the Montgomery Water Works and Sanitary Sewer Board. Obtain required permits and inspections.

### 1.05 SUBMITTALS:

A. Product Data: Submit manufacturer's technical product data and installation instructions for water system materials and products.

B. Record Drawings: At project closeout, submit record drawings of installed water system piping and products, in accordance with requirements of Division 1.

### 1.06 PROJECT CONDITIONS:

A. Site Information: Perform site survey, research public utility records, and verify existing utility locations.

B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated.

C. Notify Architect not less than two days in advance of proposed utility interruptions.

D. Do not proceed with utility interruptions without Architect’s written permission.

## PART 2 - PRODUCTS

### 2.01 PIPES AND PIPE FITTINGS:

A. General: Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings, temperature ratings, and capacities as indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide sizes and types matching piping and equipment connections

B. 2.1.2 Piping: Provide pipe of the following material, of weight/class indicated. Provide pipe fittings and accessories of same material and weight/class as pipes, with joining method as indicated.

C. Pipe and Fittings:
   1. Ductile-Iron, Mechanical-Joint Pipe: AWWA C151, with cement-mortar lining and seal coat according to AWWA C104. Include gland, rubber gasket, and bolts and nuts and according to AWWA C1111. Fittings shall be in accordance with AWWA C110 or AWWA C153.
   2. Ductile-Iron, Push-on-Joint Pipe: AWWA C151, with cement-mortar lining and seal coat according to AWWA C104. Include rubber compression gasket according to AWWA C1111.
   3. Ductile-Iron, Flanged Fittings: AWWA C110, with cement-mortar lining and seal coat according to AWWA C104 or epoxy coating according to AWWA C550. Include gaskets and bolts and nuts. Flanged Fittings only shall be allowed inside vaults.
   4. Copper Tubing: ASTM B88, seamless water tube, Annealed temper, Type K with soldered joints.
   5. PVC Plastic Pipe: ASTM D1785, with marking "NSF-pw" according to NSF 14.
   6. Ductile-Iron Fittings for PVC Pipe: AWWA C110, ductile-iron or cast-iron; or AWWA C153, ductile-iron, compact type; push-on- or mechanical-joint type. Include dimensions matching PVC pipe, cement-mortar lining and seal coat according to AWWA C104, and rubber compression gaskets according to AWWA C111.

### 2.02 FIRE HYDRANTS:

A. Comply with AWWA Specification C-502 and shall meet local Fire Department standards and requirements. Hydrants shall have one pumper and two hose nozzles, a valve opening not less than 5 inches, and a 6-inch inlet connection. All fire hydrants shall be valved. All piping and fittings in fire hydrant installation shall be ductile iron. Paint fire hydrant in accordance with local Fire Department requirements.

### 2.03 GATE VALVES:

A. Iron body bronze mounted double-disc non-rising steam type meeting AWWA Specification C500, with water working pressure of 150 pounds. Furnish with hand-wheels and flanged joints for use in pits and cast iron valve boxes and covers where valves occur underground.

### 2.04 VALVE AND METER PITS:

A. Construct as detailed, with 4000 psi concrete meeting requirements of Division 3, and masonry meeting requirements of Division 4 or Precast Concrete. Cover shall be as specified on the drawings.

### 2.05 BACKFLOW PREVENTERS:

A. General: Manufactured backflow preventers, of size indicated for maximum flow rate and maximum pressure loss indicated.

B. Working Pressure: 150 psig minimum, unless otherwise indicated.

C. 2-1/2" NPS and Larger: Bronze, cast-iron, steel or stainless-steel body with flanged ends.

D. Interior Lining: AWWA C550, epoxy coating for backflow preventers with cast-iron or steel body.

E. Interior Components: Corrosion-resistant materials.

F. Double-Check Valve Assembly: AWWA C510, with OS&Y gate valves on inlet and outlet, and strainers on inlet.

G. Double-Check Detector Assembly Backflow Preventers: ASSE 1048, FM approved or UL listed, with OS&Y gate valves on inlet and outlet, and strainer on inlet. Include 2 positive-seating check valves and test cocks, and bypass with displacement-type water meter, valves, and double-check backflow preventer, for continuous-pressure application.

1. Pressure Loss: Psig maximum through middle third of flow range.

**2.06 ALARM DEVICES**

A. Description: UL 753, FM approved, of types and sizes to mate and match piping and equipment.

B. Supervisory switches: SPDT, designed to signal valve in other than full open position. Provide conduit and wiring back to fire control panel in building.

**2.07 VALVE BOXES:**

A. Cast-iron box with top section and cover with lettering "WATER," bottom section with base of size to fit over valve and barrel approximately 5 inches in diameter, and adjustable cast-iron extension of length required for depth of bury of valve.

**2.08 TAPPING SLEEVE AND TAPPING VALVE:**

A. Complete assembly, including tapping sleeve, tapping valve, and bolts and nuts. Use sleeve and valve compatible with tapping machine.

Tapping Sleeve: Cast- or ductile-iron, 2-piece bolted sleeve flanged outlet for new branch connection. Sleeve may have mechanical-joint ends with rubber gaskets or sealing rings in sleeve body. Include sleeve matching size and type of pipe material being tapped and of outlet flange required for branch connection.

**2.09 CHECK VALVES:**

A. AWWA C706 Turbing Type and AWWA C508, with 175-psig working-pressure rating. Include interior coating according to AWWA C550.

**2.10 WATER METER:**

A. AWWA C702, compound type, bronze main case. Register flow in gallons. Water meters shall meet requirements of the Montgomery Water Works and Sanitary Sewer Board.

**2.11 CONCRETE:**

A. All concrete including but not limited to thrust blocking, dead men, etc. shall have a 28 day compression strength of not less than 3000 pounds per square inch.

**2.12 GRAVEL:**

A. Gravel for drainage shall be washed 3/4 inch crushed rock or graded river gravel and shall be free of organic matter, sand, loam, clay and other particles that will tend to restrict water flow through the gravel.

**2.13 PIPE SLEEVES:**

A. Provide cast-iron or zinc coated sleeves built in place where water lines pass through walls. Properly secure in place, with approximately ¼-inch space between pipe and enclosing sleeve, before concrete is poured. Caulk annular opening between pipe and sleeves, and seal with asphaltic compound consisting of bituminous materials mixed with mineral matter. Install piping so that no joint occurs within a sleeve. Split sleeves may be installed where existing lines pass through new construction.

**2.14 EXTERIOR PROTECTION OF DUCTILE IRON PIPE**

A. Due to the corrosive nature of soils in and around the project area, all ductileiron pipe and fittings and threaded rods and eye bolts shall be polyethylene wrapped in accordance with ANSI/AWWA C105/A21.5. Wrapping shall be 8-mil low-density (LD) or 4-mil high density, cross-laminated (HDCL) polyethylene film.

**PART 3 - EXECUTION:**

**3.01 INSTALLATION OF PIPE AND PIPE FITTINGS:**

A. During installation of water lines the Contractor will be required to conduct his operations in a safety conscious manner. The Contractor shall comply with all applicable safety requirements in the location of the construction area. The Contractor alone shall be responsible for the safety, efficiency, and adequacy of his plant, appliances, and methods, and for any damage which may result from their failure or their improper construction, maintenance, or operation.

**3.02 SUPERVISION OF WORK:**

A. All work in progress shall receive the personal attention either of the Contractor or of a competent and reliable superintendent who shall have a full or final authority to act for him.

**3.03 AUTHORITY AND DUTIES OF INSPECTOR:**

A. The Governing Authority Inspector shall be authorized to inspect all work done and all material furnished, including preparation, fabrication and manufacture of the materials to be used. The Inspector shall not be authorized to alter or waive any requirements of the specifications without consent of the Architect. He shall call the attention of the Contractor to any failure of the work or materials to conform to the specifications. He may reject material or suspend the work until any questions at issue can be referred to and decided by the proper authority. The presence of the Inspector shall in no wise lessen the responsibility of the Contractor.

**3.04 TRENCHES:**

A. Water mains shall have at least 30 inches and not more than 48 inches of cover over the top of the pipe. Trenches shall be widened and deepened at all points where joints occur to such extent as to facilitate the proper making, tightening, and inspection of joints. The bottom of the trench shall be so shaped that except at "bell holes" the pipe, where laid, shall have a substantially uniform bearing throughout its length.

B. The maximum width of trench ditches shall be as follows:

| Main Size | Width |
|---|---|
| Laterals | As small width as possible |
| 6" | 24" |

C. If an unstable trench bottom is encountered, the trench shall be undercut 4 to 6 inches and a suitable select granular material used to stabilize the trench bottom.

D. The trenching and pipe laying shall be done in an orderly fashion and in a workman like manner. Excessive water shall be pumped from the trench before the pipe is laid. Back of curb, intersections, and locations where the gate valves will be set, shall be staked before the main is laid.

E. Pipe shall be handled in such a manner as to protect the lining and the pipe from being damaged. It should NOT be dropped while unloading or while being installed in the trench. The Inspector has the right to reject any damaged material.

F. The pipe shall be kept clean of dirt, clods, and debris, etc., while being installed. It shall be properly plugged off at the end of the working day or when work is suspended to prevent the entrances of foreign materials (i.e., storm water, dirt, animal, etc.).

G. Pipe shall be laid true to line and grade except that it may be deflected within the limits of the manufacturer's recommendations for making necessary changes in direction.

H. Water mains when laid shall have a minimum vertical clearance of 12 inches from other mains, laterals, pipes or other obstructions.

**3.05 VALVES:**

A. Valves shall be set level on compacted earth and mechanical joints made according to the manufacturer's recommendations.

B. Valve boxes shall be set to be flush with the finish grade of a street or road.

**3.06 CONCRETE THRUST BLOCK (DEAD MAN):**

A. A dead man shall be used for rodding on valves and fittings, etc., when other regular means of retention will not work or will be impractical.

**3.07 FIELD QUALITY CONTROL:**

A. Before being pressure tested, all lines shall be thoroughly flushed to remove all debris, etc., that may be in the new main.

B. Lines shall be flushed to achieve a velocity of 2 feet per second.

C. All valves not required to be closed for isolation of the new line to be tested shall be open during the testing.

D. After backfilling, all pipes shall be subjected to a hydrostatic test pressure of not less than 150 pounds per square inch by a pressure gauge.

E. All visible leaks, when pressure is applied, shall be repaired and any pipe valve or fittings which when under the pressure test are found defective shall be replaced.

F. The section of pipe tested shall be held at 150 psi for a minimum of 2 hours.

G. Leakage of water shall not be greater than 25 gallons per 24 hours per inch of diameter per mile of pipe.

H. The contractor shall provide all water, labor and material necessary for conducting the pressure test.

I. Upon successful passing of the pressure test, the lines shall be chlorinated as directed by the Montgomery Water Works and Sanitary Sewer Board (MWWSSB) requirements. In the absence of prevailing code follow AWWA C651. The contractor will be responsible for the cost of chlorination and water used during construction and testing.

**END OF SECTION**

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# SECTION 33 3112
# SANITARY SEWERAGE

## PART 1 GENERAL

### 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

### 1.02 SUMMARY

A. This Section includes sanitary sewerage outside the building.

### 1.03 PERFORMANCE REQUIREMENTS

A. Gravity-Flow, Non-pressure-Piping Pressure Ratings: At least equal to system test pressure.

### 1.04 DELIVERY, STORAGE, AND HANDLING

A. Protect pipe, pipe fittings, and seals from dirt and damage.

### 1.05 PROJECT CONDITIONS

A. Site Information: Verify existing utility locations.

B. Locate existing structures and piping to be closed and abandoned.

C. Comply with requirements of the Montgomery Water Works and Sanitary Sewer Board; obtain required permits and inspections. Pipe materials specified shall comply with the above agency. Should there be no material requirements from that agency, the general contractor may use any of the materials specified herein.

## PART 2 PRODUCTS

### 2.01 MANUFACTURERS

### 2.02 PIPES AND FITTINGS

A. ABS Sewer Pipe and Fittings: ASTM D 2751, for solvent-cemented or gasketed joints.
   1. Wall Thickness for NPS 8 to NPS 12 (DN200 to DN300): SDR 42.
   2. Gaskets: ASTM F 477, elastomeric seals.

B. PVC Sewer Pipe and Fittings: According to the following:
   1. PVC Sewer Pipe and Fittings, NPS 15 and Smaller: ASTM D 3034, SDR 35. for solvent-cemented or gasketed joints.
      a. Gaskets: ASTM F 477, elastomeric seals.

### 2.03 CONCRETE

A. General: Cast-in-place concrete according to ACI 318, ACI 350R, and the following:
   1. Cement: ASTM C 150, type II.
   2. Fine Aggregate: ASTM C 33, sand.
   3. Coarse Aggregate: ASTM C 33, crushed gravel.
   4. Water: Potable.

B. Portland Cement Design Mix: 3000-psi minimum, with 0.45 maximum water-cementitious materials ratio.

## PART 3 EXECUTION

### 3.01 EARTHWORK

A. Excavating, trenching, and backfilling are specified in Division 2 Section “Earthwork”.

### 3.02 IDENTIFICATION

A. Materials and their installation are specified in Division 2 Section “Earthwork.” Arrange for installing green warning tapes directly over piping.
   1. Use warning tape or detectable warning tape over ferrous piping.
   2. Use detectable warning tape over nonferrous piping.

### 3.03 PIPING APPLICATIONS

A. General: Include watertight joints.

### 3.04 INSTALLATION, GENERAL

A. General Locations and Arrangements: Drawings plans and details indicate general location and arrangement of underground sanitary sewerage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated, to extent practical.

B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer’s written instructions for using lubricants, cements, and other installation requirements. Maintain swab or drag in line, and pull past each joint as it is completed.

### 3.05 PIPE JOINT CONSTRUCTION AND INSTALLATION

A. General: Join and install pipe fittings according to installations indicated.

B. ABS Pipe and Fittings: As follows:
   1. Join pipe and gasketed fittings with gaskets according to ASTM D 2321.
   2. Install according to ASTM D 2321.

C. PVC Sewer Pipe and Fittings: As follows:
   1. Join pipe and gasketed fittings with gaskets according to ASTM D 2321.
   2. Install according to ASTM D 2321.

D. System Piping Joints: Make joints using system manufacturer’s couplings, unless otherwise indicated.

E. Join piping made of different materials or dimensions with couplings made for this application. Use couplings that are compatible with and that fit both systems’ materials and dimensions.

F. Install with top surfaces of components, except piping, flush with finished surface.

### 3.06 CONCRETE PLACEMENT

A. Place cast-in-place concrete according to ACI 318 and ACI 350R.

### 3.07 TAP CONNECTIONS

A. Make connections to existing lateral so finished Work complies as nearly as practical with requirements specified for new Work.

B. Protect existing piping and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

### 3.08 FIELD QUALITY CONTROL

A. Clear interior of piping and structures of dirt and superfluous material as work progresses. Maintain swab or drag in piping, and pull past each joint as it is completed.
   1. Place plug in end of incomplete piping at end of day when work stops.
   2. Flush piping between manholes and other structures to remove collected debris, if required by authorities having jurisdiction.

B. Test new piping systems, and parts of existing systems that have been altered, extended, or repaired, for leaks and defects.
   1. Do not enclose, cover, or put into service before inspection and approval.
   2. Test completed piping systems according to authorities having jurisdiction.
   3. Schedule tests and inspections by authorities having jurisdiction with at least 24 hours' advance notice.
   4. Submit separate reports for each test.
   5. If authorities having jurisdiction do not have published procedures, perform tests as follows:
      a. Sanitary Sewerage: Perform hydrostatic test.
         1) Allowable leakage is maximum of 50 gal. Per inch of nominal pipe size per mile (4.6 L per millimeter of nominal pipe size per kilometer) of pipe, during 24-hour period.
         2) Close openings in system and fill with water.
         3) Purge air and refill with water.
         4) Disconnect water supply.
         5) Test and inspect joints for leaks.
         6) Option: Test ductile-iron piping according to AWWA C600, Section "Hydrostatic Testing." Use test pressure of at least 10 psig (69 kPa).
            (a) Sanitary Sewerage: Perform air test according to UNI-B-6.
         7) Leaks and loss in test pressure constitute defects that must be repaired.
         8) Replace leaking piping using new materials, and repeat testing until leakage is within allowances specified.

**END OF SECTION**

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# SECTION 33 4112
# STORM DRAINAGE

## PART 1 GENERAL

### 1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

### 1.02 SUMMARY

A. This Section includes storm drainage outside the building.

B. Related Sections include the following:
   1. Division 3 Section "Cast-in-Place Concrete" for concrete structures.

### 1.03 PERFORMANCE REQUIREMENTS

A. Gravity-Flow, Nonpressure-Piping Pressure Ratings: At least equal to system test pressure.

### 1.04 DELIVERY, STORAGE, AND HANDLING

A. Do not store plastic structures, pipe, and fittings in direct sunlight.

B. Protect pipe, pipe fittings, and seals from dirt and damage.

C. Handle precast concrete manholes and other structures according to manufacturer's written rigging instructions.

### 1.05 PROJECT CONDITIONS

A. Site Information: Verify existing utility locations.

B. Existing Utilities: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:
   1. Notify Architect not less than two days in advance of proposed utility interruptions.
   2. Do not proceed with utility interruptions without Architect's written permission.

## PART 2 PRODUCTS

### 2.01 PIPES AND FITTINGS

A. General: All pipe shall have class designation cast or imprinted on side.

B. Reinforced-Concrete Sewer Pipe and Fittings: ASTM C 76 Class III, Wall B, for gasketed joints.
   1. Gaskets: ASTM C 443 rubber.

C. PVC Sewer Pipe and Fittings: ASTM F949 or F794 (Contech A-2000) with an integral bell gasketed joint per manufacturers recommendation.

D. Polypropylene Pipe and Fittings
   1. Polypropylene Pipe meeting the requirements of ASTM F2736 for piping 12”-60” in diameter
   2. HDPE pipe meeting ASTM 2648 for piping less than 12” in diameter.

### 2.02 MANHOLES

A. Heavy-Traffic Precast Concrete Manholes: ASTM C 913; designed according to ASTM C 890 for A-16, heavy-traffic, structural loading; of depth, shape, and dimensions indicated, with provision for rubber gasketed joints.
   1. Gaskets: Rubber.

2. Grade Rings: Include two or three reinforced-concrete rings, of 6- to 9-inch total thickness, that match 24-inch- diameter frame and cover.
3. Pipe Connectors: ASTM C 923 (ASTM C 923M), resilient, of size required, for each pipe connecting to base section.

B. Manhole Frames and Covers: ASTM A 536, Grade 60-40-18, ductile-iron castings designed for heavy-duty service. Include 24-inch ID by 7- to 9-inch riser with 4-inch minimum width flange, and 26-inch- diameter cover. Include indented top design with lettering "STORM SEWER" cast into cover.

### 2.03 HEADWALLS

A. Cast-In-Place concrete sloped headwalls as detailed on drawings.

### 2.04 CONCRETE

A. General: Cast-in-place concrete according to ACI 318, ACI 350R, and the following:
1. Cement: ASTM C 150, Type II.
2. Fine Aggregate: ASTM C 33, sand.
3. Coarse Aggregate: ASTM C 33, crushed gravel.
4. Water: Potable.

B. Portland Cement Design Mix: 4000 psi minimum, with 0.45 maximum water-cementitious ratio.
1. Reinforcement Fabric: ASTM A 185, steel, welded wire fabric, plain.
2. Reinforcement Bars: ASTM A 615, Grade 60, deformed steel.

## PART 3 EXECUTION

### 3.01 EARTHWORK

A. Excavating, trenching, and backfilling are specified in Division 2, Section "Earthwork."

### 3.02 INSTALLATION, GENERAL

A. General Locations and Arrangements: Drawing plans and details indicate general location and arrangement of underground storm drainage piping. Location and arrangement of piping layout take design considerations into account. Install piping as indicated, to extent practical.

B. Install piping beginning at low point, true to grades and alignment indicated with unbroken continuity of invert. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions for use of lubricants, cements, and other installation requirements. Maintain swab or drag in line, and pull past each joint as it is completed.

C. Use manholes for changes in direction, unless fittings are indicated. Use fittings for branch connections, unless direct tap into existing sewer is indicated.

D. Use proper size increasers, reducers, and couplings where different sizes or materials of pipes and fittings are connected. Reducing size of piping in direction of flow is prohibited.

E. Install gravity-flow piping and connect to building's storm drains, of sizes and in locations indicated. Terminate piping as indicated.

### 3.03 PIPE JOINT CONSTRUCTION AND INSTALLATION

A. General: Join and install pipe and fittings according to installations indicated.

B. Hub-and-Spigot, Cast-Iron Soil Pipe and Fittings: With rubber gaskets according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook." Use gaskets that match class of pipe and fittings.

C. Install with top surfaces of components, except piping, flush with finished surface.

D. Concrete Pipe and Fittings: Install according to ACPA's "Concrete Pipe Installation Manual." Use the following seals:
   1. Round Pipe and Fittings: ASTM C 443 (ASTM C 443M), rubber gaskets.

E. System Piping Joints: Make joints using system manufacturer's couplings, unless otherwise indicated.

F. Join piping made of different materials or dimensions with couplings made for this application. Use couplings that are compatible with and that fit both systems' materials and dimensions.

**3.04 CONCRETE PLACEMENT**

A. Place cast-in-place concrete according to ACI 318 and ACI 350R.

**3.05 TAP CONNECTIONS**

A. Make connections to existing underground structures so finished Work complies as nearly as practical with requirements specified for new Work.

B. Protect existing piping and structures to prevent concrete or debris from entering while making tap connections. Remove debris or other extraneous material that may accumulate.

**3.06 FIELD QUALITY CONTROL**

A. Clear interior of piping and structures of dirt and superfluous material as work progresses. Maintain swab or drag in piping, and pull past each joint as it is completed.
   1. Place plug in end of incomplete piping at end of day and when work stops.
   2. Flush piping between manholes and other structures to remove collected debris.

B. Inspect interior of piping to determine whether line displacement or other damage has occurred. Inspect after approximately 24 inches of backfill is in place, and again at completion of Project.
   1. Defects requiring correction include the following:
      a. Alignment: Less than full diameter of inside of pipe is visible between structures.
      b. Deflection: Flexible piping with deflection that prevents passage of ball or cylinder of size not less than 92.5 percent of piping diameter.
      c. Crushed, broken, cracked, or otherwise damaged piping.
      d. Infiltration: Water leakage into piping.
      e. Exfiltration: Water leakage from or around piping.
   2. Replace defective piping using new materials, and repeat inspections until defects are within allowances specified.
   3. Reinspect and repeat procedure until results are satisfactory.

**END OF SECTION**

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