



McKEE & ASSOCIATES
ARCHITECTS, INC.

Project Manual



**Renovation of Arts Center
to
Goshen High School
for the
Pike County Schools
Troy, Alabama
Project No: 20-119
October 10, 2025**

Alabama Division of Construction Management No. 2025714

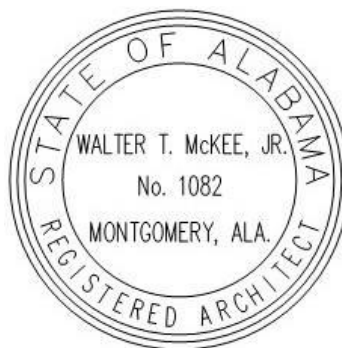


TABLE OF CONTENTS

Renovation of the Arts Center to Goshen High School for the Pike County Schools Troy, Alabama

MCKEE PROJECT NO. 20.119

BIDDING REQUIREMENTS

- Advertisement For Bids
- Instructions to Bidders (DCM Form C-2)
- Request For Information (McKee Form)
- Prior Approval/Substitution Request Form (McKee Form)
- Instructions to Bidders (DCM Form C-2)
- Proposal Form (DCM Form C-3)
- Form Of Bid Bond (DCM Form C-4)
- Special Instructions to Bidders (McKee Form)

CONTRACT FORMS

- Preparation and Approval of Construction Contracts and Bonds (DCM Form B-7)
- Construction Contract (DCM Form C-5)
- Performance Bond (DCM Form C-6)
- Payment Bond (DCM Form C-7)
- General Conditions of the Contract (DCM Form C-8)
- Instructions for Contractor's Insurance Company (Article 37 of DCM Form C-8)
- Supplement to General Conditions of the Contract (McKee Form)
- State of Alabama Disclosure Statement Form, Required by Article 3B of Title 41, Code of Alabama 1975 with Information and Instructions regarding Relationships Between Contractor/Grantees and Public Officials/Employees.
- State of Alabama E-Verify Memorandum of Understanding Instructions with ABC Bulletin and Revised Alabama Immigration Law Guidance for School Boards
- E-Verify Memorandum of Understanding Supplemental (McKee Form)
- Alabama Department of Revenue – Sales and Use Tax Division – Application for Sales and Use Tax Certificate of Exemption (ST:EX-01)

- Alabama Department of Finance Real Property Management Division of Construction Management Permit Fee and Re-Inspection Fee Calculation Worksheet

GENERAL CONDITIONS

- Pre-Construction Conference Checklist (DCM Form B-8)
- Detail Of Project Sign (DCM Form C-15)
- Application and Certificate for Payment (DCM Form C-10)
- Schedule Of Values, (DCM Form C-10SOV) Attachment to DCM Form C-10
- Inventory Of Stored Materials, (DCM Form C-10SM) Attachment to DCM Form C-10
- Progress Schedule and Report (DCM Form C-11)
- Change Order Checklist, (DCM Form B-12) For Use with DCM Form C-12
- Contract Change Order (DCM Form C-12 (fully locally funded K-12 Schools)
- Change Order Justification (DCM Form B-11) Attachment to DCM Form C-12
- Change Order Proposal Recap Sheet (Lathan Mckee Form LM 0825)
- Certificate of Substantial Completion (DCM Form C-13 & 13A)
- Form of Advertisement for Completion (DCM Form C-14)
- Final Payment Checklist (DCM Form B-13)
- Contractor's Affidavit of Payment of Debts and Claims (DCM Form C-18)
- Contractor's Affidavit of Release of Liens (DCM Form C-19)
- Consent of Surety to Final Payment (DCM Form C-20)
- Form of Advertisement for Completion (DCM Form C-14)
- Certificate of Asbestos Free Building Materials (McKee Form)

DIVISION 01 GENERAL REQUIREMENTS

01000	Alternates
01010	Scope of Work
01011	Contingency Allowances
01250	Contract Modification Procedures
01290	Payment Procedures
01320	Construction Progress Documentation
01322	Photographic Documentation
01330	Submittal Requirements
01500	Temporary Facilities and Controls
01600	Product Requirements
01700	Execution Requirements
01770	Closeout Procedures

Renovation to Arts Center For
Goshen High School For The
Pike County Schools BOE
Troy, Alabama

TABLE OF CONTENTS

01781	Project Record Documents
01782	Operation and Maintenance Data
01820	Demonstration and Training

DIVISION 02 SITE WORK

02070	Selective Demolition
02100	Site Preparation
02513	Asphaltic Concrete Paving
02660	Water Distribution System
02830	Temporary Chain Link Fencing and Gates

DIVISION 03 CONCRETE

03310	Cast-In Place Concrete
03950	Concrete Sealer

DIVISION 04 MASONRY

04200	Unit Masonry
-------	--------------

DIVISION 05 METAL

05310	Steel Decking
05450	Pre-Engineered Light Gauge Steel Trusses
05500	Miscellaneous Steel and Metal Fabrications (Handrails)
05510	Metal Stairs
05540	Metal Studs

DIVISION 06 CARPENTRY

06121	Structural Panel Concrete Subfloor
06241	Solid Surface Fabrications (Window Sills)
06410	Custom Laminated Millwork (Wall Panels)

DIVISION 07 INSULATION

07132	Rolled Self, Adhering Waterproofing Membrane
07200	Insulation
07410	Galvalume Standing Seam Metal Roofing
07421	Metal Wall Panels
07600	Flashing and Sheetmetal

07900 Joint Sealers

DIVISION 08 DOORS, WINDOWS, & GLASS

08100 Steel Doors and Steel Frames

08211 Wood Doors

08410 Aluminum Storefront

08700 Finish Hardware

DIVISION 09 FINISHES

09250 Gypsum Drywall

09301 Porcelain Tile

09510 Acoustical Ceilings

09550 Wood Flooring

09650 Rubber Base, Stair Tread, and Riser

09651 Luxury Vinyl Tile (LVT)

09843 Fixed Sound-Absorptive Panels

09846 Fixed Sound Reflective Panels (Diffusers/Barrell)

09900 Painting

DIVISION 10 SPECIALTIES

10160 Toilet Partitions

10410 Identifying Devices

10800 Toilet Accessories

DIVISION 11 EQUIPMENT

11520 Projectors

11521 Projection Screens

11614 Stage Curtain and Accessories

DIVISION 12 FURNISHINGS

12304 Laminate Clad Casework

12355 Music Education Storage Casework

DIVISION 13 SPECIAL CONSTRUCTION

Not Applicable

DIVISION 14 CONVEYING SYSTEM

14425 Vertical Wheelchair Lifts

DIVISION 15 MECHANICAL

15010 General Mechanical Provisions

15400 Plumbing

15500 Sprinkler System

15700 Heating, Ventilating and Air Conditioning

DIVISION 16 ELECTRICAL

16100 Electrical

16571 Theatrical Dimming System

16800 Audio Visual System

END OF TABLE OF CONTENTS

ADVERTISEMENT FOR BIDS

RENOVATION OF THE ARTS CENTER TO GOSHEN HIGH SCHOOL FOR PIKE COUNTY SCHOOLS TROY, ALABAMA

MCKEE PROJECT NO. 20-119

Requirements for Bidding: The Pike County Board of Education shall accept proposals only from Contractors who have successfully completed at least 3 similar projects on time for satisfied State, County or City Governmental Agencies. The lowest bidding Contractor shall submit to the Architect within 24 hours after submitting their bid proposal a listing of projects, construction cost, Owner's address, and telephone numbers.

Sealed proposals as described above shall be received by Dr. Mark Bazzell, Superintendent, at the Pike County Board of Education, 101 West Love Street, Troy, AL 36081, **until 2:00 PM, Thursday, November 20, 2025**, then opened and read aloud.

All General Contractors bidding on this project shall be required to visit the site and examine all existing conditions prior to submitting their proposal and shall be arranged by the contractor with the school.

All Bidders shall have general liability and workman's compensation insurance. The project shall be bid excluding taxes. Bids must be submitted on proposal forms furnished by the Architect or copies thereof. No bid may be withdrawn after the scheduled closing for receipt of bids for a period of ninety (90) days. The Owner reserves the right to reject any or all proposals and to waive technical errors if, in the Owners judgment, the best interests of the Owner will thereby be promoted.

A certified check or Bid Bond payable to **Pike County Schools** in an amount not less than five percent (5%) of the amount of the bid, but in no event more than \$10,000.00 must accompany the bidder's sealed proposal. Performance and statutory labor and material payment bonds will be required at the signing of the Contract.

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. All bidders shall show such evidence by clearly displaying current license number on the outside of sealed envelope in which the proposal is delivered.

PDFs of the project can be reviewed by going to the McKee website at www.mckeeassoc.com and selecting "Project Bid List". Also, if you are not receiving NOTIFICATIONS from us, please register on our website, "Project Bid List" by selecting manage your bid list profile. The documents may be viewed on-line and printed by General Contractors, Sub-Contractors and Suppliers. Documents published through this procedure are the only documents endorsed by the Architect. The Architect is unable to monitor, confirm and maintain other websites that provide documents. Addendums will be provided to entities that have *CONFIRMED* bidding for this particular project. The

Architect retains ownership and copyrights of the documents. If bidders require printed sets, please submit request to the Architect at mckeeplans@gmail.com. Include your first & last name, company name, address, phone number and the project name and number. Print sets are to be returned, in reusable condition, within ten days after the bid opening.

Completion Time: See scope of work in Project Manual.

Supervision: Contractor to ensure proper supervision for all work.

Owner: Dr. Mark Bazzell, Superintendent, at the Pike County Board of Education, 101 West Love Street, Troy, AL 36081, Phone: 334-566-1850

Architect: Lathan McKee Architects, 631 South Hull Street, Montgomery, Alabama 36104, Phone: 334-834-9933

INSTRUCTIONS TO BIDDERS

CONTENTS

- | | |
|---|---|
| 1. <u>Bid Documents</u> | 9. <u>Withdrawal or Revision of Bids</u> |
| 2. <u>General Contractor's</u>
<u>State Licensing Requirements</u> | 10. <u>Opening of Bids</u> |
| 3. <u>Qualifications of Bidders</u>
<u>and Prequalification Procedures</u> | 11. <u>Incomplete and Irregular Bids</u> |
| 4. <u>Preference to Resident Contractors</u> | 12. <u>Bid Errors</u> |
| 5. <u>Examination of Bid Documents and</u>
<u>the Site of the Work</u> | 13. <u>Disqualification of Bidders</u> |
| 6. <u>Explanations and Interpretations</u> | 14. <u>Consideration of Bids</u> |
| 7. <u>Substitutions</u> | 15. <u>Determination of Low Bidder by</u>
<u>Use of Alternates</u> |
| 8. <u>Preparation and Delivery of Bids</u> | 16. <u>Unit Prices</u> |
| | 17. <u>Award of Contract</u> |

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 is \$100,000 or more, 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. DCM Form C-3: 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 DCM Form C-3A: 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. DCM Form C-3A: Accounting of Sales Tax

A completed DCM Form C-3A: Accounting of Sales Tax must be submitted with DCM Form C-3: Proposal Form. Submission of DCM Form C-3A 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 should 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 and date 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. DETERMINATION of LOW BIDDER by USE of ALTERNATES:

a. The Awarding Authority may request alternate bid prices (alternates) to facilitate either reducing the base bid to an amount within the funds available for the project or adding items to the base bid within the funds available for the project. Alternates, if any, are listed in the

Proposal Form in the order in which they shall cumulatively deduct from or add to the base bid for determining the lowest bidder.

b. If alternates are included in the Proposal Form, the Awarding Authority shall determine the dollar amount of funds available and immediately prior to the opening of bids shall announce publicly the funds available for the project. The dollar amount of such funds shall be used to determine the lowest bidder as provided herein below, notwithstanding that the actual funds available for the project may subsequently be determined to be more or less than the expected funds available as determined immediately prior to the time of the opening of bids.

c. If the base bid of the lowest bidder exceeds the funds available and alternate bid prices will reduce the base bids to an amount that is within the funds available, the lowest bidder will be determined by considering, in order, the fewest number of the alternates that produces a price within the funds available. If the base bid of the lowest bidder is within the funds available and alternate bid prices will permit adding items to the base bid, the lowest bidder will be determined by considering, in order, the greatest number of the alternates that produces a price within the funds available.

d. After the lowest bidder has been determined as set forth above, the Awarding Authority may award that bidder any combination of alternates, provided said bidder is also the low bidder when only the Base Bid and such combination of alternates are considered.

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.

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.

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.

c. 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.

d. 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.

REQUEST FOR INFORMATION

(RFI)

Email this form in its entirety to Project Manager listed below.

The Architect reserves the right not to answer any Request For Information received after 2:00 p.m., Two (2) days prior to the bid date.

To: Mckee & Associates, Architects
Glenn Chapman, Project Manager
chapmang@lathanmckee.com
Email

From: _____
Name

Company

Email

Project: _____

Project Number: _____

Request For Information Number: _____

Issue Date: _____

☐ BID PHASE

☐ CONSTRUCTION PHASE

Procedures for "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 or can be accessed by going to the McKee web site - mckeeassoc.com and clicking on the tab "Files" to retrieve the Addendums. Neither the Architect nor the Owner 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.

REQUEST FOR INFORMATION DESCRIPTION: (Fully describe the question or type of information requested.)

REFERENCES/ATTACHEMENTS: (List specific documents researched when seeking the information requested.)

Specification Title: _____ Description: _____
Section: _____ Page: _____ Article/Paragraph: _____

Drawing Sheet Number: _____ Title: _____
Plan: _____ Elevation: _____ Section: _____ Detail: _____

Renovations to the Arts Center At
Goshen High School For The
Pike County BOE
Troy, Alabama

REQUEST FOR INFORMATION (RFI)
0000- 1

Other:

RECEIVERS REPLY:

Signed by: _____ Date: _____ Copies to: _____

REQUEST FOR APPROVAL (RFA)

PRIOR APPROVAL/SUBSTITUTION REQUEST

Email this form in its entirety to Project Manager listed below.

All products, materials, systems, equipment and services requested for prior approval must be submitted to the architect for approval **no later than 2:00 p.m., Ten (10) days prior to the bid date.**

To: Lathan Mckee, Architects Substitution Request Number: _____
Glenn Chapman From: _____
chapmang@lathanmckee.com Date: _____
Email

Project: _____ A/E Project Number: _____

Re: _____ Contract For: _____

Specification Title: _____ Description: _____
Section: _____ Page: _____ Article/Paragraph: _____

Procedures for “Substitutions” and “Pre-Bid Approval”:

- 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.

The undersigned requests consideration of the following product substitution:

Proposed Substitution: _____

Manufacturer: _____ Address: _____ Phone: _____

Trade Name: _____ Model No.: _____

Supporting Data Attached: ☐ Product Description ☐ Drawings ☐ Photographs ☐ Performance & Test Data ☐ Specifications

Attached data includes product description, specifications, drawings, photographs, and performance and test data adequate for evaluation of the request; applicable portions of the data are clearly identified.

Attached data also includes a description of changes to the Contract Documents that the proposed substitution will require for its proper installation.

The Undersigned states and certifies the following: (Mark Boxes as Applicable)

☐ Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.

or

☐ Proposed substitution differs from what is specified in the Bid Documents. Submitted Data clearly identifies all differences from what is specified in the Bid Documents.

☐ No changes will be required to the Contract Documents for the proper installation of the proposed product substitution.

or

☐ Changes will be required to the Contract Documents for the proper installation of the proposed product substitution. Submitted Data clearly identifies description of changes.

and

☐ Warranty will be furnished for proposed substitution ☐ Equal to or ☐ Superior to specified product.

☐ Proposed substitution does not affect dimensions shown on the drawings and functional clearances.

☐ No changes will be required to the building design, engineering design or detailing by the proposed substitution.

☐ Proposed substitution will have no adverse effect on other trades and will not affect or delay construction progress schedule.

☐ No maintenance is required by the proposed substitution other than that required for originally specified product.

☐ Other Information:

The undersigned further states that they have read the corresponding specification sections in the project manual and confirms that the function, appearance and quality of the proposed substitution are equivalent to or superior to the originally specified product.

Submitted by: (Print)

Signature:

Date:

Firm:

Address:

Email:

Telephone:

A/E REVIEW AND ACTION

☐ Substitution Approved

☐ Substitution Approved as noted

☐ Substitution Rejected

☐ Substitution Request Received to Late

Comments:

Signed by:

Date:

PROPOSAL FORM

To: _____ Date: _____
(Awarding Authority)

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

(Legal Name of Bidder)

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

in accordance with Drawings and Specifications, dated _____, prepared by
_____, 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 (.....) ☐ (add) ☐ (deduct) \$ _____
(Insert key word for Alternate)

For Alternate No. 2 (.....) ☐ (add) ☐ (deduct) \$ _____

For Alternate No. 3 (.....) ☐ (add) ☐ (deduct) \$ _____

For Alternate No. 4 (.....) ☐ (add) ☐ (deduct) \$ _____

For Alternate No. 5 (.....) ☐ (add) ☐ (deduct) \$ _____

For Alternate No. 6 (.....) ☐ (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 of _____,
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)** _____ (Seal)

Telephone Number _____

Email Address _____

* 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.

Note: A completed DCM Form C-3A: Accounting of Sales Tax must be submitted with DCM Form C-3: Proposal Form. Submission of DCM Form C-3A is required, it is not optional. A proposal shall be rendered non-responsive if an Accounting of Sales Tax is not provided.

UNIT PRICE ITEM LEGEND

Renovations to the Arts Center

at

Goshen High School

for the

Pike County Board of Education

Troy, Alabama

MCKEE PROJECT NO. 20.119

Legal Name of Bidder _____

Mailing Address _____

The General Contractor shall include the Unit Prices below in their Base Bid Proposal. **The quantities assigned below are above and beyond the amounts required to complete the work required by the bid documents.** This Unit Price Item Legend shall be submitted with the sealed Proposal.

SCHEDULE OF UNIT PRICES:

UNIT PRICES: The Unit Prices below establishes Unit Prices so that the Owner can delete/add quantities from the Contract(s) required.

UNIT PRICE #1: The Contractor shall include in his Base Bid proposal the cost for **[an Additional] 100** Cubic Yards Measured In Place (CYMIP) of removal and off-site disposal of unsuitable soil and furnishing, placing and compacting of acceptable fill material from below the finished subgrade and tested to meet requirements specified for the affected area, in accordance with Section 02513 Asphaltic Concrete Paving

100 CYMIP @ _____/CYMIP = \$_____ Included in Base Bid

UNIT PRICE #2: The Contractor shall include in his Base Bid proposal **50** Cubic Yards Measured In Place (CYMIP) for excavation of unsuitable soils, disposal off site of excavated material and furnishing and installation of lean concrete mud footing "mud sill" in accordance with **[the Geotechnical Report and]** Section 03310 "Cast-In Place Concrete"

50 CYMIP @ _____ per CYMIP = \$_____ Included in Base Bid

Note: This unit price is not applicable to cost of mud footings that are required due to over-excavation, or due to not pouring footings the same date they are excavated, or other reasons indicated in Section 02200 - "Earthwork," or Section 03310 - "Concrete."

ACCOUNTING OF SALES TAX

Attachment to DCM Form C-3: Proposal Form

To: _____ Date: _____
(Awarding Authority)

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: \$ _____

Alternate No. 1 (.....) ☐ (add) ☐ (deduct) \$ _____
(Insert key word for Alternate)

Alternate No. 2 (.....) ☐ (add) ☐ (deduct) \$ _____

Alternate No. 3 (.....) ☐ (add) ☐ (deduct) \$ _____

Alternate No. 4 (.....) ☐ (add) ☐ (deduct) \$ _____

Alternate No. 5 (.....) ☐ (add) ☐ (deduct) \$ _____

Alternate No. 6 (.....) ☐ (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 (type or print) _____

(Seal)

*Title _____

Telephone Number _____

Email Address _____

Note: A completed DCM Form C-3A: Accounting of Sales Tax must be submitted with DCM Form C-3: Proposal Form. Submission of DCM Form C-3A with DCM Form C-3 is required, it is not optional. A proposal shall be rendered non-responsive if an Accounting of Sales Tax is not provided.

BID BOND

The **PRINCIPAL** (*Bidder's company name and address*)

Name:

Address:

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

Name:

Address:

The **OWNER** (*Entity name and address*)

Name:

Address:

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 of _____, _____.

ATTEST:

PRINCIPAL:

By _____

Name and Title

SURETY:

ATTEST:

By _____

Name and Title

SPECIAL INSTRUCTIONS TO BIDDERS

1.1 INTENT OF INSTRUCTIONS

- A. The Special Instructions to Bidders are intended to amplify the abbreviated Advertisement and to give other details which shall allow interested parties to prepare bids which accurately reflect the scope of the Work. The Special Instructions to Bidders are meant to be viewed as a complement to the general Instructions to Bidders found in the Project Manual. Should any discrepancy or ambiguity be noted, the Special Instructions to Bidders shall defer to the general Instructions to Bidders.

1.2 EXPLANATION AND INTERPRETATION

- A. Should any Bidder or subcontractor find any ambiguity, discrepancy, omission, or error in the Drawings and Project Manual, or insufficient information to provide a complete job, or be in doubt as to the intent and meaning thereof, he should at once report such in writing to Architect and request clarification prior to bidding
- B. Clarification shall be made only by written Addenda during the bid period and sent to all perspective Bidders. The Architect and Consultants shall not be responsible for verbal answers regarding intent or meaning of the Contract Documents, or for any verbal instructions, by whomsoever made, prior to the award of the Contract.
- C. Additionally, all designed systems and/or assemblies are to be proposed and bid as complete assemblies or operational systems. Drawings are indicating intent and not attempting to fully obtain or detail required work.

1.3 BIDDER REQUIREMENTS

- A. **All Bidders must honor their bid proposals for a period of 90 calendar days from date of bid opening.**
- B. **The Contractor MUST Field Verify all existing conditions prior to submitting bid proposal.**
- C. **The Apparent Low Bidder AND Apparent Second Lowest Bidder** must submit to the **Architect a direct Contact Name, Phone Number and Email Address for the Bonding Company and a list of the principal Subcontractors, suppliers, and fabricators he plans to use for each category of work.** The list of Subcontractors, Suppliers and Fabricators must be received by the Architect within **24 hours following the Bid Opening** (email to: krawlinson@lathanmckee.com). Once the successful bidder has obtained approval from the Owner, no changes in Subcontractors, Suppliers or Fabricators shall be made without the express, written consent of the Owner. Contractor shall request consent in writing from the Owner and Architect and provide specific and reasonable explanation as to the necessity of said change. Should said change be approved by the Owner, the Contractor must submit the desired replacement Subcontractor to the Architect and obtain written approval of the Subcontractor.

1.4 OPENING OF PROPOSALS

- A. The Owner shall, according to applicable laws and regulations pertaining to bid openings, receive and review all Proposals submitted, according to the method selected below:
 - 1. Proposals shall be opened and read publicly at the time and place indicated in the Advertisement.
 - 2. Proposals may be rejected if they contain any omissions, alterations of forms, additions not called for, conditional bids, alternate bids unless called for, incomplete bids, erasures, or irregularities of any kind. Proposals in which the unit or lump sum prices bid are obviously unbalanced may be rejected. Additions to or deductions from the Bid amount may be written on the outside of the sealed bid, or by letter enclosed in the sealed bid envelope.

1.5 DETERMINATION of LOW BIDDER by USE of ALTERNATES

- A. The Awarding Authority may request alternate bid prices (alternates) to facilitate either reducing the base bid to an amount within the funds available for the project or adding items to the base

bid within the funds available for the project. Alternates, if any, are listed in the Proposal Form in the order in which they shall cumulatively deduct from or add to the base bid for determining the lowest bidder.

- B. If alternates are included in the Proposal Form, the Awarding Authority shall determine the dollar amount of funds available and immediately prior to the opening of bids shall announce publicly the funds available for the project. The dollar amount of such funds shall be **used to determine the lowest bidder** as provided herein below, notwithstanding that the actual funds available for the project may subsequently be determined to be more or less than the expected funds available as determined immediately prior to the time of the opening of bids.
- C. **If additional funds become available after the bid opening, the Owner may at his option elect to award to the lowest base bid bidder a contract based on the Contractors base bid amount and additional Alternates.**
- D. If the base bid of the lowest bidder **exceeds** the funds available and alternate bid prices will reduce the base bids to an amount that is **within** the funds available, the lowest bidder will be determined by considering, in order, the fewest number of the alternates that produces a price within the funds available.
- E. If the base bid of the lowest bidder is within the funds available and alternate bid prices will permit adding items to the base bid, the lowest bidder will be determined by considering, in order, the greatest number of the alternates that produces a price within the funds available.
- F. After the lowest bidder has been determined as set forth above, the Awarding Authority may award that bidder any combination of alternates, provided said bidder is also the low bidder when only the Base Bid and such combination of alternates are considered.

1.6 AWARD OF CONTRACT

- A. The Bidder to whom the award is made shall be notified by letter to the address shown on his Proposal at the earliest possible date. At such time, at the option of the Owner, additional information such as a complete financial statement may be required from the successful Bidder.

1.7 EXECUTION OF CONTRACT

- A. The Contract shall be signed by the successful Bidder, in the number of counterparts provided in the Contract Agreement and returned to the Owner with satisfactory Contract Bonds within ten (10) days after the date of Notice of Award.

1.8 PERFORMANCE BOND AND PAYMENT BOND

- A. The intent of the Performance Bond is to ensure the faithful performance of each and every condition, stipulation, and requirements of the Contract and to indemnify and save harmless the Owner, Architect, and Consultants from any and all damages, either directly or indirectly (arising out of any failure to perform same). The successful Bidder to whom the Contract is awarded shall furnish at his expense an acceptable Performance Bond in an amount equal to one hundred percent (100%) of the Contract Price of the Contract as awarded. Said Bond shall be made on the approved Bond form, shall be furnished by a surety company duly authorized and qualified to make such bonds in the State of Alabama, shall be countersigned by an authorized agent resident in the State who is qualified for the execution of such instruments, and shall have attached thereto power of attorney of the signing official. In case of default on the part of the Contractor, all expenses incident to ascertaining and collecting losses suffered by the Owner under the Bond, the direct costs of administration, architectural, engineering, and legal services, shall lie against the Contract Bond for Performance of the Work.
- B. In addition thereto, the successful Bidder to whom the Contract is awarded shall furnish at his expense a Payment Bond with good and sufficient surety payable to the Owner in an amount not less than one hundred percent (100%) of the Contract Price, with the obligation that the Contractor shall promptly make payment to all persons furnishing him or them with labor, material, feedstuffs, or supplies for or in prosecution of the Work provided for in the Contract and for the payment or reasonable attorneys' fees, incurred by successful claimants or plaintiffs in suits on said Bond.

- C. **The Apparent Low Bidder AND Apparent Second Lowest Bidder** must submit to the Architect a direct Contact Name, Phone Number and Email Address for the Bonding Company within 24 hours of the bid opening.

1.9 APPROVAL OF CONTRACT

- A. No Contract is binding upon the Owner until it has been executed by the Owner and the successful Bidder and copies delivered.

1.10 LIST OF SUBCONTRACTORS

- A. **The Apparent Low Bidder AND Apparent Second Lowest Bidder** must submit to the Architect a direct Contact Name, Phone Number and Email Address for the Bonding Company and a list of the principal Subcontractors, suppliers, and fabricators he plans to use for each category of work must be received by the Architect within twenty-four hours following the Bid Opening. Email to krawlinson@lathanmckee.com. Once the successful bidder has obtained approval from the Owner, no changes in Subcontractors, suppliers and fabricators shall be made without the express, written consent of the Owner

1.11 LIST OF SUBCONTRACTORS SUBMITTAL FORM

Email this form in its entirety to contact listed below.

The **Apparent Low Bidder AND Apparent Second Lowest Bidder** must submit to the Architect a **direct Contact Name, Phone Number and Email Address for the Bonding Company** and the principal Subcontractors, suppliers, and fabricators he plans to use for each category of work. The list of Subcontractors must be received by the Architect within twenty-four hours following the Bid Opening.

To: McKee & Associates, Architects

Kayla Rawlinson

krawlinson@lathanmckee.com

Email

From: _____

Company

Name

Email

Project Name: _____

Phone Number

Project Number: _____

Issue Date: _____

Bid Date: _____

Category of Work	Name of Sub to Perform Work	Name of Supplier
SURETY		

END OF SECTION

Renovation to Arts Center For
Goshen High School For The
Pike County Schools BOE
Troy, Alabama

SPECIAL INSTRUCTIONS TO BIDDERS (DCM)
PAGE-4

**PREPARATION AND APPROVAL OF
CONSTRUCTION
CONTRACTS and BONDS
SUBMITTED ELECTRONICALLY**

CHECKLIST

Use with DCM Forms C-5, C-6, & C-7
and DCM Forms 9-A, 9-B, & 9-C

CONSTRUCTION CONTRACT - DCM Form C-5 or DCM Form 9-A (PSCA Projects)	
The numbers in the left column below correspond to numbers in the left margin of the Contract form.	
(1)	PROJECT NUMBER(S): DCM will insert the DCM Project Number in the field provided. On DCM Form 9-A, insert the PSCA Project Number in the field provided.
(2)	DATE: Do not select a date beyond today's date.
(3)	OWNER: Insert the full, legal name, address, email, and telephone number of the Owner (Awarding Authority). On DCM Form 9-A, insert the name, address, email, and telephone number of the Local Owner (city or county school board, college, university, etc.) after "Alabama Public School and College Authority"
(4)	CONTRACTOR: Insert the Contractor's company name, correct mailing address, email, and telephone number. For State Agency projects, the Contractor Company name and address must match the name and address registered in the State of Alabama Accounting and Resource System (STAARS) or AL Buys (if registered), used by most State Agencies to pay Vendors. The Contractor Company name and address must be consistent across all documents in the same contract package, in order to avoid Comptroller's Office rejection. On DCM Form 9-A: The Contractor Company name and address must match the name and address registered in STAARS or AL Buys used by the State to pay Vendors. The Contractor Company name and address must be consistent across all documents in the same contract package, in order to avoid Comptroller's rejection.
(5)	The WORK: Insert the complete name of the Project; same as in the Bid Documents.
(6)	CONTRACT DOCUMENTS: Insert the date of the Bid Documents
(7)	ADDENDA: Identify, by number and date, all pre-bid Addenda that were issued to the Bid Documents. If none were issued, insert "None". All Addenda shall be submitted to DCM for review prior to contract issuance.
(8)	ARCHITECT: Insert the full, legal name, address, email, and telephone number of the Project Architectural or Engineering firm.
(9)	CONTRACT SUM: The Contract Sum is the total of the Contract's Base Bid and accepted Bid Alternate Prices, if any. Insert the Contract Sum in words and figures, verifying that this amount corresponds with the CERTIFIED TABULATION OF BIDS.
(10)	BID ALTERNATE PRICES: Identify which, if any, Bid Alternate Prices are accepted and included in the Contract Sum by inserting either (a) "No Alternate Prices Requested in Bid", (b) "No Alternate Prices Accepted", or (c) a listing of the accepted Alternates by number and dollar amount.
(11)	The CONTRACT TIME: State the Contract Time in words and in figures.
(12)	LIQUIDATED DAMAGES: If the Owner has computed a daily rate for liquidated damages, insert the amount in both words and figures in the spaces provided.
(13)	SPECIAL PROVISIONS: This space may be used to incorporate Special Provisions into the Contract, such as unit prices, compliance with enacted provisions, and value engineering. If the solicitation for bids required Unit Prices, insert a statement of which Unit Prices, if any, are accepted and incorporated into the Contract. If more space is needed, Special Provisions may be stated on an attachment that is cited in the Special Provisions section. DCM Form 9-A is published bearing Special Provision "A. Severable Payments", which is where the portions of the Contract Sum to be paid by the PSCA and the Local Owner are to be stated. Obtain these amounts from Local Owner and insert them in the spaces provided. Other Special Provisions, such as disposition of Unit Prices, may be inserted below this provision.
(14)	STATE GENERAL CONTRACTOR'S LICENSE: Insert the Contractor's current state general contracting license number, bid limit, and classification in the spaces provided.

(15)	SIGNATURES - APPROVING and CONTRACTING PARTIES The documents will forward to the signers in sequential order.
PERFORMANCE BOND, DCM Form C-6 or DCM Form 9-B (PSCA Projects), and PAYMENT BOND, DCM Form C-7 or DCM Form 9-C (PSCA Projects) Required for contracts of \$100,000.0 or more, with surety's power-of-attorney - required per Section 39-2-8 of the Code of Alabama.	
(1)	SURETY'S BOND NUMBER should be inserted in the field provided.
(2)	PRINCIPAL: Contractor's name and address is to be the same as appears in the Construction Contract.
(3)	SURETY: The full, legal name and address of the bonding company.
(4)	OWNER: The Owner's name and address is to be the same as appears in the Construction Contract.
(5)	PENAL SUM: The Penal Sum of each Bond is to be the Contract Sum of the Construction Contract and is to be inserted in both words and figures.
(6)	The Date of the Construction Contract: The date that appears on the Construction Contract.
(7)	The PROJECT: The same name or description as appears in the Construction Contract.
(8)	DATE: After "SIGNED AND SEALED" is to appear the date upon which Surety signs the Bond. THIS DATE CANNOT PRECEDE THE DATE OF THE CONSTRUCTION CONTRACT.
(9)	CONTRACTOR'S SIGNATURE: The Contractor's name must appear beneath "CONTRACTOR", under which the signature of a member or officer of the firm must appear with the name and title of the signing party appearing beneath the signature.
(10)	SURETY'S SIGNATURE: The full, legal name of the bonding company must appear under "SURETY", under which the signature of an individual having power of attorney for the bonding company must appear with the individual's name and title appearing beneath the signature.
(11)	ATTACHED POWER OF ATTORNEY: Attached to each of the Bonds must be a Power of Attorney, signed by an officer of the bonding company, for the individual e-signing the bond on behalf of the bonding company. The date of the Power of Attorney <u>must</u> not precede the date of the bond.
ATTACHMENTS The following documents must be attached to the Construction Contract: - Insurance Certificate (attach copy): It is the responsibility of the design professional to ensure all insurance requirements are discussed with bidders prior to a bid and that Contractor has provided the requirements to their insurance provider. Contractor must obtain <u>all</u> insurance coverage specified in Article 37 of the General Conditions of the Contract - required per Section 39-2-8 of the Code of Alabama. - Surety's power-of-attorney: Required for Performance Bond, which is required for contracts of \$100,000.00 or more per Section 39-2-8 of the Code of Alabama. - Surety's power-of-attorney: Required for Payment Bond, which is required for contracts of \$100,000.00 or more per Section 39-2-8 of the Code of Alabama. - Certified Tabulation of Bids (attach copy): Required for all projects including those with informal bids -required per Section 39-2-6 of the Code of Alabama. - DCM Form C-3: Proposal Form (attach copy): If bid proposal was adjusted by notation on outside of envelope, also attach copy of outside of envelope including notation. - DCM Form C-3A: Accounting of Sales Tax (attach copy): Attachment must be of the executed C-3A from the bid -required per Section 40-9-14.1 of the Code of Alabama. - E-Verify Memorandum of Understanding (attach copy): Entire document required - required per Section 31-13-25(b) of the Code of Alabama. - Alabama Vendor Disclosure Statement - required per Section 41-16-82 of the Code of Alabama. Contractor must mail one original completed wet-signed notarized and dated hardcopy to DCM along with DCM Form: Transmittal of Alabama Vendor Disclosure Statement. DCM will perform a review, and if the document is correct, will attach a scan of the Disclosure Statement to the Contract.	

DCM USER FEES:

- **PSCA-Funded Projects & Fully Locally-Funded State Agency Projects:** The Contract Document Administration Fee-CC and the Permit Fee must be paid by the time a Construction Contract for a PSCA-funded project or state agency/authority project is submitted to DCM for review, or when a fully locally-funded project Construction Contract is converted to PSCA. Contract reviews can begin once the fees have been paid.
- **Fully Locally-Funded K-12 Projects:** The Permit Fee must be paid by the time a copy of a fully locally-funded K-12 school project's executed Construction Contract is received at DCM's office from the State Department of Education (SDE). * See Permit Fee exception below.

- **General Information:**

Basic Contract Document Administration (CDA) Fee: This fee covers review of the Agreement Between Owner and Architect (O/A Agreement) and Construction Contract for state agency projects, and partially or fully PSCA-funded projects of K-12 public schools and universities and the related amendments, change orders, service invoices and pay requests. This fee does not apply to fully locally-funded K-12 public school projects or fully locally-funded university projects. The Basic CDA Fee covers review of the original submitted document and one revision. The total basic CDA fee is 1/2 of 1% of the total construction cost, due in two parts: 1/4 of 1% (.25%) of the Project Budget for administration of the O/ A Agreement. 1/4 of 1% (.25%) of the Construction Contract Amount for administration of the Construction Contract. The CDA Fee for a PSCA-funded O/A Agreement or Construction Contract is limited by the Project Construction Cost funded by PSCA.

Additional Revised Contract Document Fee: When more than one revision of a Construction Contract is required, an additional fee of \$200.00 will be charged to the design professional for each additional submittal until the document is executed.

Basic Permit Fee: This fee covers required project inspections. The Permit Fee **must be paid before a construction contract is reviewed by DCM, or** becomes due when a self-performance letter **or fully locally-funded K-12 construction contract** is received by DCM, and must be paid before a Pre-Construction Conference is scheduled with DCM Inspectors*

Note: Although DCM does not review the construction contracts of fully locally-funded public K-12 projects, the Permit Fee must be paid before the required Pre-Construction Conference is scheduled with DCM Inspectors for such projects.*

* Exception: Permit Fees are not owed for fully locally-funded public K-12 projects with an estimated cost of \$750,000.00 or Less for capital improvement or alterations, additions, repair, or maintenance of heating, ventilation, and air conditioning systems or any alterations, additions, repair, or maintenance of a roof; all such projects are still subject to DCM pre-construction conferences and inspections.

∇ Determination of whether or not a project is in the \$750,000.00 or Less classification for Permit Fees is based on the cost of the entire project including all phases and bid packages. If total of bids received for all phases and bid packages exceeds \$750,000.00 for a fully locally-funded public K-12 project, then a Permit Fee is owed.

Fees May Be Paid online at www.dcm.alabama.gov or paid with a physical check. Make check payable to: "Finance - Construction Management", include the DCM (BC) Project #, if assigned, on the check and attach the CDA Fees Calculation Worksheet and/or the Permit Fees Calculation Worksheet (also available on www.dcm.alabama.gov). Mail payment to: Finance - Construction Management, P.O. Box 301150, Montgomery, AL 36130-1150. For payments using Public School and College Authority (PSCA) funds and for state agency inter-fund transfers: contact Jennie Jones at 334-242-4808 or jennie.jones@realproperty.alabama.gov.

This form is provided solely for the purpose of inclusion in the project manual. A Construction Contract for fully locally-funded K-12 projects must be initiated via the appropriate DocuSign link from DCM's Engage Portal at <https://engagealabama-rpm.facilityforce.cloud> by the Lead Design Professional Firm.

DCM Form C-5 (fully locally-funded K-12 school project)
revised October 2024

DCM (BC) Project No.

CONSTRUCTION CONTRACT

- (1) _____
- (2) This Construction Contract is entered into this _____ day of _____ in the year of _____
- (3) between the **OWNER**,
Entity Name: _____
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** _____
- (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 (DCM Form C-8), 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 Owner (or by the Lead Design Professional on the Owner's behalf), 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.

Numbers in margin correspond to "Checklist", DCM Form B-7

- (13) **SPECIAL PROVISIONS** *(Insert any Special Provisions 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.:

Classification(s):

Bid Limit:

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 Number 26.

(15)

APPROVAL

**ALABAMA STATE DEPARTMENT OF EDUCATION
(SDE)**
(Required for locally-funded, SDE projects.)

By _____ Date: _____
State Superintendent of Education

CONTRACTING PARTIES

Contractor Company

By _____
Signature

Name & Title _____

Owner Entity

By _____
Signature

Name(s) & Title(s) _____

Routing of the Construction Contract to reviewers and e-signers is automated through DocuSign. DocuSign links for fully locally-funded contract documents are available from DCM's Engage Portal at <https://engagealabama-rpm.facilityforce.cloud>

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) 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.

(3) 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.

(4) 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. 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

(5) 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:

<u>Coverage</u>	<u>Limit</u>
.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, Alabama Division of Construction Management, State Department of Education (if applicable), 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, Alabama Division of Construction Management, State Department of Education (if applicable), and their agents, consultants, and employees as additional insureds.

(4) COMMERCIAL UMBRELLA OR COMMERCIAL EXCESS LIABILITY INSURANCE

(a) Commercial Umbrella or Commercial Excess 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 Combined Primary Commercial General Liability and Commercial Umbrella or Commercial Excess Limits of:

.1 \$ 5,000,000 per Occurrence

.2 \$ 5,000,000 Aggregate

(c) Additional Requirements for Commercial Umbrella or Commercial Excess Liability Insurance:

.1 The policy shall name the Owner, Architect, Alabama Division of Construction Management, State Department of Education (if applicable), 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 Builder's Risk Policy shall be made payable to the Owner and Contractor, as their interests may appear. The policy amount shall be equal to 100% of the Contract Sum, written on a Causes of Loss - Special Form (current edition as of the date of Advertisement for Bids), or its equivalent. All deductibles shall be the sole responsibility of the Contractor.

(b) The policy shall be endorsed as follows:

"The following may occur without diminishing, changing, altering or otherwise affecting the coverage and protection afforded the insured under this policy:

(i) Furniture and equipment may be delivered to the insured premises and installed in place ready for use; or

(ii) Partial or complete occupancy by Owner; or

(iii) Performance of work in connection with construction operations insured by the Owner, by agents or lessees or other contractors of the Owner, or by contractors of the lessee of the Owner."

Exception: projects containing only abatement and/or only demolition do not require Builder's Risk insurance, unless required by the Owner. Note: projects containing any scope of work besides abatement and/or demolition require Builder's Risk insurance.

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 or Excess 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.

Numbers in margin correspond to second page of "Checklist", DCM Form B-7

(1) **PERFORMANCE BOND**

Do not staple this form; use clips.

SURETY'S BOND NUMBER

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

Name:

Address:

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

Name:

Address:

(4) The **OWNER** (*Entity name and address, same as appears in the Construction Contract*)

Name:

Address:

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

Dollars (\$)).

(6) **DATE** of the Construction Contract :

(7) 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.

Numbers in margin correspond to second page of "Checklist", DCM Form B-7

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 _____, _____.

(9 & 10) **SURETY:**

CONTRACTOR as PRINCIPAL:

Company Name

By _____
Signature

Name and Title

Company Name

By _____
Signature

Name and Title

- (11) **NOTE:** Original power of attorney for the Surety's signatory shall be furnished with each of the original three bond forms to be attached to each of the three contract copies (with original signatures) per project.

Do not staple this form; use clips. Purpose: quickly and efficiently scan thousands of documents into DCM's database.

Numbers in margin correspond to second page of "Checklist", DCM Form B-7

(1) **PAYMENT BOND**

SURETY'S BOND NUMBER

Do not staple this form; use clips.

- (2) The **PRINCIPAL** (Company name and address of Contractor, same as appears in the Construction Contract)

Name:

Address:

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

Name:

Address:

- (4) The **OWNER(s)** (Entity name and address, same as appears in the Construction Contract)

Name:

Address:

- (5) The **PENAL SUM** of this Bond (the Contract Sum)

Dollars (\$)).

- (6) **DATE** of the Construction Contract:

- (7) 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.

Numbers in margin correspond to second page of "Checklist", DCM Form B-7

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 _____, _____.

(9 & 10) **SURETY:**

CONTRACTOR as PRINCIPAL:

Company Name

Company Name

By _____
Signature

By _____
Signature

Name and Title

Name and Title

- (11) **NOTE:** Original power of attorney for the Surety's signatory shall be furnished with each of the original three bond forms to be attached to each of the three contract copies (with original signatures) per project.

Do not staple this form; use clips. Purpose: quickly and efficiently scan thousands of documents into DCM's database.

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. ALABAMA DIVISION OF CONSTRUCTION MANAGEMENT:** The Technical Staff of the Alabama Division of Construction Management.
- 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. COMMISSION:** The former Alabama Building Commission, for which the Alabama Division of Construction Management has been designated by the Legislature as its successor.
- D. 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)
- E. 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.
- F. 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 or Director. 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.
- G. 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.
- H. DCM:** The Alabama Division of Construction Management.
- I. DCM PROJECT INSPECTOR:** The member of the Technical Staff of the Alabama Division of Construction Management to whom the Project is assigned relative to executing the respective inspections and authorities described in Article 16, Inspection of the Work.
- J. 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.

- K. DIRECTOR:** The Director of the Alabama Division of Construction Management.
- L. 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.
- M. NOTICE TO PROCEED:** A proceed order issued by the Owner or Director, 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.
- N.1 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”.
- N.2 AWARDING AUTHORITY:** §39-2-1 (1) of the Code of Alabama, 1975, as amended definition: Any governmental board, commission, agency, body, authority, instrumentality, department, or subdivision of the state, its counties and municipalities. This term includes, but shall not be limited to, the Department of Transportation, the Division of Real Property Management of the Department of Finance, the State Board of Education, and any other entity contracting for public works. This term shall exclude the State Docks Department and any entity exempted from the competitive bid laws of the state by statute.
- O. 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.
- P. 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.
- Q. 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.
- R. 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.
- S. 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 REPRESENTATIONS

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, twenty sets 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 and (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 CONTRACTOR

- 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.
- 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. "Minor" deviations 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. "AS ISSUED" SET

The Contractor shall maintain at the Project site, in good order, at least one copy of all Addenda, Change Orders, supplemental drawings, written directives and clarifications, and approved Submittals intact as issued, and an updated construction schedule.

B. "POSTED" SET

The Contractor shall maintain at the Project site, in good order, at least one set of the Drawings and Project Manual into which the Contractor has "posted"(incorporated) all Addenda, Change Orders, supplemental drawings, clarifications, and other information pertinent to the proper performance of the Work. The Contractor shall assure that all sets of the Drawings and Project Manuals being used by the Contractor, Subcontractors, and suppliers are "posted" with the current information to insure that updated Contract Documents are used for performance of the Work.

C. RECORD SET

One set of the Drawings and Project Manual described in Paragraph B 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.

D. The documents and samples required by this Article to be maintained at the Project site shall be readily available to the Architect, Owner, DCM Project Inspector, and their representatives.

ARTICLE 11
“AS-BUILT” DOCUMENTS

- A. Unless otherwise provided in the Contract Documents, the Contractor shall deliver two (2) sets 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. If a schedule format is not specified elsewhere in the Contract Documents, the construction schedule shall be prepared using DCM Form C-11, "Sample 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. 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. If a more comprehensive schedule format is specified elsewhere in the Contract Documents or voluntarily employed by the Contractor, it may be used in lieu of DCM Form C-11.
- D. 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 and, in the opinion of the Architect or Owner, 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. 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.
- B. 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, Director, DCM Project Inspector, 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, Director, DCM Project Inspector, 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 the DCM Project Inspector as a representative of the Alabama Division of Construction Management.

(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.

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 DCM Project Inspector, and are attended by the Contractor and applicable Subcontractors, suppliers and manufacturers, and the DCM Project Inspector. 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) **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.

(d) **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 DCM Project Inspector 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 and require only a short period of time for accomplishment to establish Final Acceptance of the Work. 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.

(e) **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, and the DCM Project Inspector, 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 DCM Project Inspector, 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 DCM PROJECT INSPECTOR

- (1) The DCM Project Inspector 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 DCM Project Inspector shall have the authority to:
 - (a) reject Work that is not in compliance with the State Building Code adopted by the DCM, unless the Work is in accordance with the Contract Documents in which case the DCM Project Inspector will advise the Architect to initiate appropriate corrective action, and
 - (b) notify the Architect, Owner, and Contractor of Defective Work recognized by the DCM Project Inspector.

(3) The DCM Project Inspector'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 DCM Project Inspector, as well as other members of the Technical Staff, can be requested to schedule special inspections or meetings to address specific matters. The written findings of DCM Project Inspector will be transmitted to the Owner, Contractor, and Architect.

(4) The DCM Project Inspector 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 DCM Project Inspector 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.

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 the 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. "Minor" changes 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) All change orders require DCM Form C-12: Contract Change Order and DCM Form B-11: Change Order Justification. Only Change Orders 10% or greater of the current contract amount require the Owner's legal advisor's signature on DCM Form B-11: Change Order Justification.

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. Additions to the Contract Sum shall include the Contractor's direct costs plus a maximum 15% markup for overhead and profit. Where subcontract work is involved the total mark-up for the Contractor and a Subcontractor shall not exceed 25%. **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, job office, job office supplies and expenses, temporary facilities and utilities, and home office expenses.
- (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.
- (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
- (f) for additions to the Contract Sum, mark-up of the Contractor's direct costs for overhead and profit not exceeding 15% on Contractor's work nor exceeding 25% for Contractor and Subcontractor on a Subcontractor's work. **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 insurance other than mentioned above, bonds, superintendent and other job office personnel, watchman, use and rental of small tools, job office, job office supplies and expenses, temporary facilities and utilities, and home office expenses.

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.

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 21 days after receiving such a request, or such other time as may be stated in the request, the Contractor shall prepare and submit to the Architect a written proposal, 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. 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, DCM Project Inspector, or public authority having jurisdiction 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 Director, 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 Director that the Claim be resolved by decision of the Director. 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 Director. Upon receipt of a request to resolve a Claim, the Director 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.

E. FINAL RESOLUTION for LOCALLY-FUNDED CONTRACTS

If the Contract is funded in whole with funds provided by a city or county board of education or other local governmental authority and the Contract Documents do not stipulate a binding alternative dispute resolution method, the final resolution of Claims and Disputes which cannot be resolved by the Contractor (or its Surety) and Owner may be by any legal remedy available to the parties. Alternatively, upon the written agreement of the Contractor (or its Surety) and the Owner, final Resolution of Claims and Disputes may be by submission to binding arbitration before a neutral arbitrator or panel or by submission to the Director in accordance with preceding Paragraph D.

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 or 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 of \$100,000 or more):

(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 ten days after receiving the Notice to Proceed the Contractor shall submit to the Architect a DCM Form C-10SOV, 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 be printable on 8.5" x 11" and 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 DCM Form C-10, 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 DCM Form C-10, Application and Certificate for Payment shall match to the penny and be accompanied by an attached DCM Form C-10SOV, 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) The Applications for Payment of State Agency/Authority projects and Public School and College Authority (PSCA)-funded projects must be activated via the appropriate DocuSign link available from DCM's Engage Portal at <https://engagealabama-rpm.facilityforce.cloud>.

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” is defined as the money earned and, therefore, belonging to the Contractor (subject to final settlement of the Contract) which has been retained by the Owner conditioned on final completion and acceptance of all Work required by the Contract Documents. Retainage shall not be relied upon by Contractor (or Surety) to cover or off-set unearned monies attributable to uncompleted or uncorrected Work.

(2) In making progress payments the Owner shall retain five percent of the estimated value of Work performed and the value of the materials stored for the Work; but after retainage has been held upon fifty percent of the Contract Sum, no additional retainage will be withheld.

F. CONTRACTOR’S CERTIFICATION

(1) Each Application for Payment shall bear the Contractor’s 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.

- B.** 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.
- C.** 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.
- D.** 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 Technical Staff of the Alabama Division of Construction Management.
- 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 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. 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 (via the appropriate DocuSign link available from DCM's Engage Portal at <https://engagealabama-rpm.facilityforce.cloud>) and sign a Certificate of Substantial Completion to be signed in order by the Contractor, Owner, and Alabama Division of Construction Management.

(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, Owner, and Alabama Division of Construction Management as being ready for occupancy,
- (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 Certificate of Substantial Completion includes roofing work, the General Contractor's (5-year) Roofing Guarantee, DCM Form C-9, 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. The Alabama Division of Construction Management will not sign the Certificate of Substantial Completion in the absence of the roofing guarantees.

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.

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**

A. PREREQUISITES to FINAL PAYMENT

The following conditions are prerequisites to Final Payment becoming due the Contractor:

- (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) 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, warranties, etc.
- (4) Delivery to the Owner of a final Application for Payment, prepared by the Contractor and approved and certified by the Architect. Architect prepares DCM Form B-13: Final Payment Checklist and forwards it to the Owner along with the final Application for Payment.
- (5) Completion of an Advertisement for Completion pursuant to Paragraph C below.
- (6) Delivery by the Contractor to the Owner through the Architect of DCM Form C-18: Contractor's Affidavit of Payment of Debts and Claims, and a Release of Claims, if any, and such other documents as may be required by Owner, satisfactory in form to the Owner pursuant to Paragraph D below.
- (7) Consent of Surety to Final Payment, if any, to Contractor. This Consent of Surety is required for projects which have Payment and Performance Bonds.

- (8) Delivery by the Contractor to the Architect and Owner of other documents, if any, required by the Contract Documents as prerequisites to Final Payment.
- (9) See Manual of Procedures Chapter 7, Section L.7 concerning reconciliation of contract time, if any.

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 DCM Project Inspector, or **(2)** their resolution under Article 18, Deductions for Uncorrected Work.

C. ADVERTISEMENT for COMPLETION

(1) If the Contract Sum is less than \$100,000: Advertisement for Completion shall not apply to contractors performing contracts of less than \$100,000.00 in amount. §39-1-1(g)

(2) If the Contract Sum is \$100,000 or more: 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 weeks. The contractor can publish a notice in one or more of the following ways:

- (a) In a newspaper of general circulation in the county or counties in which the work, or some portion thereof, has been done.
- (b) On a website that is maintained by a newspaper of general circulation in the county or counties in which the work, or some portion thereof, has been done.
- (c) On a website utilized by the awarding authority for publishing notices.
- (d) If no newspaper is published in the county in which the work was done, and if the awarding authority does not utilize a website for the purpose of publishing notices, the notice may be given by posting at the courthouse for 30 days, and proof of the posting of the notice shall be given by the awarding authority and the contractor.

Proof of publication of the notice shall be made by the contractor to the authority by whom the contract was made by affidavit of the publisher or website owner and a printed copy of the notice published. A final settlement shall not be made upon the contract until the expiration of 30 days after the completion of the notice.

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 DCM Inspector. 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" (DCM Form C-9), 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 and the Division of Construction Management.

(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, Owner and Division of Construction Management.

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, Alabama Division of Construction Management, State Department of Education (if applicable), 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.

- A. 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.
- B. 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.
- C. 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) 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.

(3) 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.

(4) 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. 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

(5) 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:

<u>Coverage</u>	<u>Limit</u>
.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, Alabama Division of Construction Management, State Department of Education (if applicable), 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, Alabama Division of Construction Management, State Department of Education (if applicable), and their agents, consultants, and employees as additional insureds.

(4) COMMERCIAL UMBRELLA OR COMMERCIAL EXCESS LIABILITY INSURANCE

(a) Commercial Umbrella or Commercial Excess 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 Combined Primary Commercial General Liability and Commercial Umbrella or Commercial Excess Limits of:

- .1 \$ 5,000,000 per Occurrence
- .2 \$ 5,000,000 Aggregate

(c) Additional Requirements for Commercial Umbrella or Commercial Excess Liability Insurance:

- .1 The policy shall name the Owner, Architect, Alabama Division of Construction Management, State Department of Education (if applicable), 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 Builder's Risk Policy shall be made payable to the Owner and Contractor, as their interests may appear. The policy amount shall be equal to 100% of the Contract Sum, written on a Causes of Loss - Special Form (current edition as of the date of Advertisement for Bids), or its equivalent. All deductibles shall be the sole responsibility of the Contractor.

(b) The policy shall be endorsed as follows:

"The following may occur without diminishing, changing, altering or otherwise affecting the coverage and protection afforded the insured under this policy:

- (i) Furniture and equipment may be delivered to the insured premises and installed in place ready for use; or
- (ii) Partial or complete occupancy by Owner; or
- (iii) Performance of work in connection with construction operations insured by the Owner, by agents or lessees or other contractors of the Owner, or by contractors of the lessee of the Owner."

Exception: projects containing only abatement and/or only demolition do not require Builder's Risk insurance, unless required by the Owner. Note: projects containing any scope of work besides abatement and/or demolition require Builder's Risk insurance.

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 or Excess 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. **Any provision found herein which attempts to waive or invalidate the subrogation interests of Alabama's State Insurance Fund against any party to this contract or any other person or entity is void and invalid. No such waiver is intended or made by the parties to this agreement with regard to any property insured by the State Insurance Fund.**

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), DCM Forms C-6 and C-7 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. 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 a 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 Alabama Division of Construction Management, 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 **CONSTRUCTION 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.
- B. 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.

C. 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 as defined in Article 9, Submittals,
 - (b) make "minor" changes 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.

D. 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.

E. 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 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 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 TRADE 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.

EE. ALABAMA ECONOMIC BOYCOTT LAW

Per Act 2023-409 as 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, economic boycotts.

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, Alabama Division of Construction Management, State Department of Education (if applicable), 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.

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 iron or steel, that are made a permanent part of the structure, produced in the United States if the Contract Documents require the use of iron or 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. Fully locally-funded State Agency and Public Higher Education projects: DCM Form C-15: Detail of Project Sign must be included in the project manual regardless of expected bid amount. If the awarded contract sum is \$100,000.00 or more, Contractor shall furnish and erect a project sign. Other conditions besides the contract sum may warrant waiver of this requirement, but only with approval of the Technical Staff.
- B. Fully locally-funded K-12 school projects: Project sign is not required unless requested by Owner; if project sign is requested by Owner, include DCM Form C-15: Detail of Project Sign in the project manual.
- C. Partially or fully PSCA-funded projects: DCM Form C-15: Detail of Project Sign must be included in the project manual. Contractor shall furnish and erect a project sign for all PSCA-funded projects, regardless of the contract sum. "Alabama Public School and College Authority" as well as the local owner entity must be included as awarding authorities on the project sign of all PSCA-funded projects.

When required per the above conditions, the project sign shall be erected in a prominent location selected by the Architect and Owner and shall be maintained in good condition until completion of Work. If the Contract involves Work on multiple sites, only one project sign is required, which shall be erected on one of the sites in a location selected by the Architect and Owner. Slogan: The title of the current PSCA Act should be placed on the project sign of all PSCA-funded projects, otherwise the Awarding Authority/Owner's slogan, if any, should be used. If the Awarding Authority/Owner of a fully locally-funded project does not have a slogan, the project sign does not require a slogan.

END of
GENERAL CONDITIONS of the CONTRACT

SUPPLEMENT TO THE GENERAL CONDITIONS OF THE CONTRACT

- 1.1 The following supplements shall modify, delete and/or add to the General Conditions of the Contract. Where any article, paragraph or subparagraph in the General Conditions is supplemented by one of the following paragraphs, the provisions of such article, paragraph, or subparagraph shall remain in effect and the supplemental provisions shall be considered as added thereto. Where any article, paragraph or subparagraph in the General Conditions is amended, voided or superseded by any of the following paragraphs, the provisions of such article, paragraph or subparagraph not so amended, voided or superseded shall remain in effect.

A. **Refer to Article 2.A; Definition:**

1. **Architect:** Construction documents for this project have been developed by **McKee and Associates, Architects**, 631 South Hull Street, Montgomery, Alabama, 36104, (334) 834-9933 `commissioned by the Owner.
2. **Owner:** **Pike County Schools**. Unless otherwise stated, all papers required to be delivered to the Owner shall be forwarded through the Architect.

B. **Refer to Article 3:**

1. Add the following:
 - a. **Contractor's Qualification's:** The Roofing Contract shall possess the following, or stringent, minimum qualifications: the roofing contractor must be a firm of not less than five (5) years of successful experience in installation of roof systems similar to those specified for the project and which is acceptable to or licensed by the manufacturer of the primary roofing materials.
 - b. **Manufacturer's Qualifications:** In specifying acceptable manufacturers or minimum quality qualifications of manufacturers, the following, or more stringent criteria should be used: The manufacturer shall have a minimum of five (5) years of experience in the manufacture of the roofing system and must also be the **original material manufacturer** of the primary roofing material.

C. **Refer to Article 6;**

1. Add the following to Paragraph B:
 - a. The lowest bidding Contractor shall submit to the Architect within five (5) calendar days after the bid date the name(s) of the Superintendent(s) who will be in charge at the work site, along with the qualifications and experience.
 - b. NOTE: By submission of a Proposal the Bidder agrees that the Owner or Architect may reject a proposed Superintendent with or without a stated reason with no recourse to the Contractor.

D. **Refer to Article 6;**

1. Add the following to Paragraph C:
 - a. All labor shall be performed in the best and most workmanlike manner by persons skilled in their respective assignments or trades. Workmen whose work is unsatisfactory to the Architect or the Owner, or who are considered unfit or unskilled, or otherwise objectionable, shall be dismissed upon notice from the Architect or Owner.

E. **Refer to Article 9, Paragraph D;**

1. Add the following:
 - a. All submittals for color selections, to be made by the Architect for the entire project shall be submitted at the same time within 45 days from the "Notice to Proceed". Piece-meal submittals for color selection will not be permitted.
 - b. **Provide as follows unless otherwise specified:**

- 1) All submittals shall be sent to the Architect no later than **45 calendar days** from "Notice To Proceed" to: submittals@mckeeassoc.com or **Submittal Exchange** if applicable. A **Submittal Log** must accompany each submittal if using Submittals@mckeeassoc.com.

F. **Refer to Article 13;**

1. Add the following:
 - a. "If the bidder desires to substitute an "equal", he must secure written approval by the Architect of qualification to bid ten (10) days prior to date.
 - b. On all items specified as or equal substitutions must be submitted to the Architect ten (10) days prior to bid opening and Architect will act on substitution five (5) days prior to bids and notify all Contractors.
 - c. The request for substitutions are to be filled out completely and must be received prior to bid. Any subcontractor and/or material supplier that was not "approved" and their price is used at bid time will be the Contractors problem to absorb any cost associated with the use of a "non-approved material or equipment. If the "approval" is not listed in the addendum, then the "approval" is not accepted.

G. **Refer to Article 15:**

1. The General Contractor shall be solely responsible for all requirements under this Article.

H. **Refer to Article 16:**

2. Add the following: Article 16; General, (5)
 - a. **Single-Ply Roofs:** Should design or economic restrictions require the use of a single-ply elastomeric roofing system, ballasted systems of any type should be avoided.
 - b. **Interior Gutters:** The use of interior gutters should be avoided at all times.
 - c. **Protection During Application:** At no time during construction should the surface of the asphalt or coal tar pitch roofing system to be left unprotected. A glaze coat of asphalt or pitch must be applied to the surface of the membrane if the top pour or cap sheet cannot be applied during the same day.
 - d. **Contractor's Qualification's:** The Roofing Contract shall possess the following, or stringent, minimum qualifications: the roofing contractor must be a firm of not less than five (5) years of successful experience in installation of roof systems similar to those specified for the project and which is acceptable to or licensed by the manufacturer of the primary roofing materials.
 - e. **Manufacturer's Qualifications:** In specifying acceptable manufacturers or minimum quality qualifications of manufacturers, the following, or more stringent criteria should be used: The manufacturer shall have a minimum of five (5) years of experience in the manufacture of the roofing system and must also be the **original material manufacturer** of the primary roofing material.

I. **Refer to Article 19:**

1. In conjunction with Division of Construction Management Change Order documents provide all data required for Lathan Mckee Architects Form 0825 when submitting a Change Order Proposal

J. **Refer to Article 29, PROGRESS PAYMENTS,** paragraph "B", Schedule of Values:

1. Amend Paragraph as follows:
 - a. "Within ten days after receiving the Notice to Proceed the contractor shall submit to the Architect a DCM Form C-10SOV, Schedule of Values, which is a breakdown of the Contract Sum showing the value '**and category of Work with Subcontractor name(s)**' of the various parts of the Work for billing purposes."
2. Add the following:

- a. The Contractor shall list the Category of Work with the Subcontractor name(s) attributable to each line item value in the column "B", "Description of Work" line(s) of the DCM Form C-10SOV, Schedule of Values.
3. Add the following:
 - a. Values shall be broken down within principal contracts in amounts not greater than \$30,000, but in no case greater than 5 percent of the Contract Sum.
- K. **Refer to Article 32, SUBSTANTIAL COMPLETION**
 1. Add the following:
 - a. All manufacturers' warranties shall commence on the date as set forth on the Substantial Completion Form, no exceptions.
 - b. Contractor shall furnish to the Architect a written letter of "notification" that all "Punch List" items have been completed prior to re-inspection.
- L. **Refer to Article 35**, paragraph "D", Special Warranties:
 1. Change as follows:
 - a. 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.
- M. **Refer to Article 37:**
 1. The Architect shall not be liable for any damage or injury to property or any person or persons arising from the presence of/or effects of any hazardous materials or hazardous elements in any state of form in connection with the work under this Contract. All such liability shall lie with the Contractor.
- N. **Refer to Article 44:**
 1. Add the following: All work on this project shall be performed in accordance with the following codes:
 - a. 2010 ADA Standards For Accessible Design
 - b. 2021 International Building Code
 - c. 2021 International Plumbing Code
 - d. 2021 International Mechanical Code
 - e. 2021 International Fuel Gas Code
 - f. 2021 International Fire Code
 - g. 2020 National Electrical Code
 - h. 2019 National Fire Alarm and Signaling Code
 - i. ANSI/ASHRAE/IESNA Standard 90.1-2013 Energy Standard for Buildings Except Low-Rise Residential
- O. **Refer to Article 49:**
 1. Liquidated damages will be assessed at a rate of 6% per annum.
 2. If this contract extends thirty (30) days past Schedule Completion Date, Owner shall deduct from the Contractor's final payment, a sum equal to the additional expense incurred by the Owner for the Architect for contract administration past scheduled completion date.

END OF SECTION



State of Alabama Disclosure Statement

Required by Article 3B 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
----------------------------------	---------	-------------------------

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 oath and penalty of perjury that all statements on or attached to this form are true and correct to the best of my knowledge. I further understand that a civil penalty of ten percent (10%) of the amount of the transaction, not to exceed \$10,000.00, is applied for knowingly providing incorrect or misleading information.

Signature	Date
-----------	------

Notary's Signature	Date	Date Notary Expires
--------------------	------	---------------------

Article 3B of Title 41, Code of Alabama 1975 requires the disclosure statement to be completed and filed with all proposals, bids, contracts, or grant proposals to the State of Alabama in excess of \$5,000.



Kay Ivey
Governor

Bill Poole
Director of Finance

STATE OF ALABAMA
DEPARTMENT OF FINANCE
REAL PROPERTY MANAGEMENT
Division of Construction Management

P.O. Box 301150, Montgomery, AL 36130-1150
770 Washington Avenue, Suite 444, Montgomery, AL 36104
Telephone: (334) 242-4082 Fax: (334) 242-4182



Mickey Allen
Assistant Finance Director
Real Property Management

Frank Barnes, Director
Construction Management

E-Verify Memorandum of Understanding

Instructions for inclusion in project manuals.

Per DCM's May 29, 2012 bulletin *Guidance on Act 2012-491 Amending the Alabama Immigration Law*: "Contractors (including architects and engineers) will ... be required to enroll in the E-Verify program and to provide documentation of enrollment in the E-Verify program with their contracts or agreements."

Upon completing enrollment in the E-Verify program available at <https://www.e-verify.gov/employers/enrolling-in-e-verify>, an E-Verify Memorandum of Understanding (MOU) is issued to the enrolled business. The same E-Verify MOU can be repeatedly used until any information in the business's E-Verify user profile is updated, at which time E-Verify updates the printable Company Information section of the MOU, while the original signatory information remains the same. Typically, an E-Verify MOU is 13-18 pages long depending on business type and number of employees.

DCM requires a copy of the entire current E-Verify MOU document including the completed Department of Homeland Security – Verification Division section (with name, signature and date included) to be submitted as an attachment to each Construction Contract original and to each Agreement Between Owner and Architect original.



Supplemental E-Verify Memorandum of Understanding

Contractors (including architects and engineers) will be required to enroll in the E-Verify program and to provide documentation of enrollment in the E-Verify program with their contracts or agreements per Alabama Immigration Law.

McKee and Associates Architects requires a copy of the entire current E-Verify MOU document including the completed Department of Homeland Security – Verification Division section (with name, signature and date included) to be submitted as an attachment to each Construction Contract original and to each Agreement Between Owner and Architect original.

Refer to State of Alabama E-Verify Memorandum of Understanding Instructions (Revised August 2021) with ABC Bulletin (May 29, 2012) and Revised Alabama Immigration Law Guidance for School Boards (Revised May 2012).



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

ST: EXC-01
6/21

Application For Sales and Use Tax Certificate of Exemption

FOR GOVERNMENT ENTITY 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 ☐ 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					

CONTRACT SIGN DATE (PROVIDED BY GENERAL CONTRACTOR)		CONTRACT COMPLETION DATE (PROVIDED BY GENERAL CONTRACTOR)	
ESTIMATED START DATE (FOR APPLICANT)		ESTIMATED COMPLETION DATE (FOR APPLICANT)	
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 ☐ Contract 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 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

Sales and Use Tax Certificate of Exemption for Government Entity Project

NOTE: Exemption Certificates will be issued as of the contract sign 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.

***** Please allow 10 to 14 business days for your application to be processed. *****

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)
6. Any other municipal business licenses associated with the project

Subcontractor:

1. Signed Application
2. Alabama Board of General Contractor's License
3. State/County Business License (usually obtained through county probate office)
4. Any other municipal business licenses associated with the project
5. 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.
- Subcontractor's Estimated Start Date should be the date they will begin working on the project and ordering materials instead of the General Contractor's Estimated Start Date for the project.

THERE IS A FILING REQUIREMENT IF YOUR APPLICATION IS APPROVED. The return will be filed through the Consumer's Use Tax account. Please see the following page for detailed instructions and general information regarding the reporting requirements.

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

Fax: (334) 353-7867

Email: STExemptionUnit@revenue.alabama.gov

Mailing Address: ATTN: Contractor's Exemption
Alabama Department of Revenue
Sales & Use Tax Division
Room 4303
PO Box 327710
Montgomery, AL 36132-7710

General Information and Instructions Regarding the Reporting Requirements for Contractors Awarded an Exemption Certificate

A contractor's exemption certificate for a Government Entity project is needed in order to purchase materials tax exempt for the qualified project. Once the exemption certificate has been applied for and awarded, there is a monthly filing requirement to report the purchases that have been made for each exempt project. The Consumer's Use (CNU) tax account is used to report the tax-exempt purchases made with each certificate for each exempt project for each month.

The consumer's use tax return must be filed for each of the months covered by the exemption certificate. (For example, if the certificate's effective date is June 29, 2014 and the expected completion date is October 1, 2014, a consumer's use tax return must be filed for each of the following months: June, July, August, September, and October.) A return **MUST** be filed each month to report the monthly purchases. Therefore, all active exemption certificates must be included on the monthly report even if the monthly purchases for a specific project was \$0.

If a CNU tax account is not already open under the taxpayer/business name, one will automatically be assigned at the time the exemption certificate is generated. Electronic filing is required through the Department's online filing system, My Alabama Taxes (MAT). A letter containing the online filing information will be mailed to the address on file within a few days after the new CNU tax account has been assigned. This letter will contain all the information needed to create your online filing account in MAT. For questions relating to setting up the account on www.myalabamataxes.alabama.gov, please contact Business Registration at 334-242-1584 or the Sales Tax Division at 1-866-576-6531.

Once the MAT account is set up, please log in and file the monthly CNU tax return. There is a table located at the bottom left hand corner labeled "Contractor's Exemption for Government Construction Projects." All three fields in the table are required to be completed: exemption number, project number, and total amount of purchases for that specific project for the month. Additional projects may be added on the additional rows that appear as data is added; the table will allow the addition of more projects.

***Please do not use lines 1 through 9 of the return for reporting exempt project information. Leave these lines blank unless taxable purchases were made outside of the state of Alabama that need to be reported and tax remitted. (Lines 1 through 9 do not have anything to do with the exemption reporting requirements).

When the certificate expires (upon the project's completion) and the CNU tax account is no longer needed, please contact the Business Registration Unit at 334-242-1584 and close the CNU tax account. Please be advised that if there are multiple government entity projects open, the consumer's use tax account should remain open until the last project completion date. For example, if Project EXC00ABCD ends in June of 2014 but Project EXC00EFGH ends January of 2015, the CNU tax account must remain open until the end of January 2015. A return for Project EXC00EFGH must be filed all the way through January 2015.

If the applicant already has a CNU tax account and it is currently set up online, please use this account to report exempt project purchases through www.myalabamataxes.alabama.gov using the instructions provided above. The return may then be filed as usual.

***All Consumer's Use Tax returns are due on the 20th of the month following the month in which purchases were made (i.e., the return for the month of June is due July 20th, etc. There are 20 days to file the return before it is deemed late.)

***Any penalty waiver requests may be directed to the Sales and Use Tax Division at 1-866-576-6531. Only one waiver per 18 month period is allowed.



ALABAMA DEPARTMENT OF FINANCE
REAL PROPERTY MANAGEMENT
Division of Construction Management

www.dcm.alabama.gov, 334-242-4082, inspections@realproperty.alabama.gov

Revised December 2021

Department Use Only
Invoice # _____
Date Paid _____
Confirmation # _____

PERMIT FEE & PERMIT RE-INSPECTION FEE CALCULATION WORKSHEET

DCM (BC) # _____	Date _____
Project Name; Owner/Architect/Engineer Project # & Phase/Package # _____	
Owner Entity Name _____	
Architect/Engineer Firm Name _____	
Contractor Company Name _____	
Select only ONE of the following:	
☐ Basic Permit Fee. Fee is based on awarded contract sum.	☐ Permit Re-Inspection Flat Fee.
Awarded Contract Sum: _____	
Email address(es) for Payment Receipt: _____	

BASIC PERMIT FEE CALCULATION:

Awarded Contract Sum is less than \$1,000: N/A

Awarded Contract Sum is \$1,001 - \$50,000:

Contract Sum or Shelter Estimate less \$1,000= _____ /1,000 x \$5.00= _____ +\$15.00= _____

Awarded Contract Sum is \$50,001 - \$100,000:

Contract Sum or Shelter Estimate less \$50,000= _____ /1,000 x \$4.00= _____ +\$260.00= _____

Awarded Contract Sum is \$100,001 - \$500,000:

Contract Sum or Shelter Estimate less \$100,000= _____ /1,000 x \$3.00= _____ +\$460.00= _____

Awarded Contract Sum is \$500,001 and up:

Contract Sum or Shelter Estimate less \$500,000= _____ /1,000 x \$2.00= _____ +\$1,660.00= _____

PERMIT RE-INSPECTION FEE:

Flat fee of \$1,500.00 per occurrence

TOTAL DUE: _____

Basic Permit Fee: Covers all required pre-construction conferences, construction inspections and certificate of substantial completion issuance by the DCM Inspector. This fee is due when a construction contract or self-performance letter is received by DCM and must be paid before the required Pre-Construction Conference is scheduled with the DCM Inspector.

Permit Re-Inspection Fee: May be charged if (A) the contractor has not completed the work required for the particular inspection as detailed in DCM Form B-8: Pre-Construction Conference Checklist, or (B) the inspection is canceled or rescheduled without the required minimum 48 hours notice to all parties.

Make check payable to: "Finance - Construction Management," include the DCM (BC) Project # on the check and attach the fee worksheet. Mail payment to: Finance - Construction Management, P.O. Box 301150, Montgomery, AL 36130-1150.

State agency inter-fund transfer and payments using Public School and College Authority (PSCA) funds: contact Jennie Jones at 334-242-4808 or jennie.jones@realproperty.alabama.gov.

Fees may be paid online at www.dcm.alabama.gov (in which case a completed fee worksheet is not required).

The Basic Permit Fee is subject to Final Reconciliation of Fees at the end of construction.

PRE-CONSTRUCTION CONFERENCE CHECKLIST

The following are recommended topics to be covered during the required Pre-Construction Conference. Contact the DCM Project Inspector **via DCM's Engage Portal** at least fourteen (14) days prior to scheduling the conference.

**Shall be discussed while owner is present*

	*1. Name and relationship to job of local Owner personnel
	2. Public officials involved
	3. Names of architect/engineer personnel involved
	4. Provide e-mail addresses on Pre-Construction Sign-in sheet
	5. Construction sets of plans available to contractor
	6. Verify alternates accepted, etc.
	7. Approved list of sub-contractors
	*8. Point of contact for project. Project Manager _____ Job Superintendent _____
	9. Approved cost breakdown (DCM Form C-10SOV) & Progress Schedule (DCM Form C-11)
	*10. Method of approving monthly payment requests - All State Agency, PSCA-funded University, and PSCA-funded K-12 projects: payment applications must be submitted via DocuSign PowerForm links available from DCM's Engage Portal. - Fully locally-funded University and fully locally-funded K-12 projects: submit payment applications per Owner requirements.
	*11. Time Extensions
	*12. Overall phasing of job
	13. Project limits
	14. Shop drawings, time to process
	*15. Sales tax savings (Alabama Department of Revenue)
	*16. Project sign and other job signs
	17. ADEM permit, if more than one acre of land is disturbed. Coordinate offsite storm water drainage with the authority having jurisdiction when applicable.
	18. DCM Inspection Minimum Requirements.
	19. Advance notice for required DCM inspections The contractor will notify the architect by email of the date the project will be ready for an inspection by the Division of Construction Management. Inspections must be requested via DCM's Engage Portal 14 days in advance. When the DCM Inspector confirms the inspection date and time, the architect will send an email confirming the inspection date and time to all parties as well as a copy to inspections@rpm.alabama.gov . An Outlook calendar invite is also suggested for all inspections. Cancellations of any scheduled inspection must be received in writing no later than 48 hours prior to the scheduled inspection. If the inspection is canceled, it will be rescheduled subject to the DCM Inspector's availability. Cancellations received less than 48 hours in advance shall incur a \$1,500.00 re-inspection fee. If the project is not ready for the scheduled inspection, the General Contractor shall incur a \$1,500.00 re-inspection fee.

	20. <u>Pre-Construction Conference</u>: Required Attendees: DCM Inspector, Contractor, Owner, Architect, Major Subs - Fully-executed construction contract and Notice to Proceed - Verification of permit fee payment (Exception: fully locally-funded K-12 & public four-year University capital improvement, HVAC, or roof projects with an estimated cost of \$750,000.00 or Less, are exempt from DCM Fees.) - Fire alarm contractor and fire sprinkler contractor certification (from State Fire Marshal) - ADEM permit, if more than one acre of land is disturbed. - The General Contractor to perform and furnish all work, labor, services, supervision, materials, equipment, tools, scaffolds, appliances, insurance, taxes, and other things necessary to complete the work in strict accordance with all plans, specifications, and GENERAL CONDITIONS. The Contractor shall be liable for any omissions in contractors bid proposal or any other interpretations made by contractor. All items of Work related to each are to be provided so that no gaps, omissions, or conflicts arise that prevents a complete and functioning result. - Contractor's duty to coordinate work of separate contractors.
	21. <u>Pre-Construction Conference for Storm Shelter</u>: Required Attendees: DCM Inspector, Contractor, Owner, Architect, Structural Engineer, Major Subs, Special Inspections Representative - The completed & signed DCM Form B-15: Owner's Statement of Responsibility for Tornado Storm Shelter (Hurricane Shelter Where Applicable) must be submitted to the DCM Inspector at Pre-Construction Conference. Must be kept with Owner's storm shelter records. - The completed & signed DCM Form C-17: Contractor's Statement of Responsibility for Construction of Tornado Storm Shelter (Hurricane Shelter Where Applicable) along with required Quality Assurance Plan (QAP) must be submitted to DCM Inspector at Pre-Construction Conference. - The completed and signed DCM Form B-14: Certification of Structural Observations from the Structural Engineer of Record must be attached to the Certificate of Substantial Completion form via DocuSign link available from DCM's Engage Portal. - Storm Shelter Impact-protective systems Listing and labeling: Impact-protective systems shall be listed and labeled. Marking: The following function and performance characteristics shall be provided on the label for each impact protective system tested: - Manufacturer's identification reference or listing number for the assembly. - Type of impact-protective system, such as window assembly, door assembly shutter assembly or louver. - Hazard: hurricane, tornado, or both. - Missile weight and speed. - Design wind pressure. - Edition of ICC 500.
	22. <u>Pre-Roofing Conference</u>: Required Attendees: DCM Inspector, Contractor, Owner, Architect, Roofing Sub, Roofing Manufacturer's Representative - This conference shall be conducted by the design professional as described in Chapter 5, Section C.4 of the DCM Manual of Procedures. - Roofing submittals must be approved by the architect prior to pre-roofing conference. - Roofing manufacturer must provide documentation that roof design and roofing materials meet code requirements for wind uplift and impact resistance. - Copy of sample roof warranty – 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. - Contractor shall video existing building interior and exterior prior to roofing operations and provide copy to owner. - General Contractor's Roofing Guarantee and Manufacturer's Roofing Warranties must be presented to DCM Inspector at Final Inspection and submitted with Certificate of Substantial Completion for all projects via DocuSign PowerForm links available from DCM's Engage Portal.

	23. <u>Above Ceiling Inspections</u>: Required Attendees: DCM Inspector, Contractor, Owner, Architect, MEP Engineers, Major Subs • All work must be completed except for installation of ceiling tiles, and/or hard ceilings. • Space must be conditioned. • Permanent power must be connected unless otherwise arranged with the DCM Inspector. • Grease duct must be inspected and approved by the DCM Inspector prior to fire wrapping and above-ceiling inspection.
	24. <u>Life Safety Inspections and Final Inspection</u>: Required Attendees: DCM Inspector, Contractor, Owner, Architect, Engineers, Major Subs, Local Fire Marshal • Fire alarm certification • Kitchen hood fire suppression system certification • General contractor's 5-year roofing guarantee (DCM Form C-9) • Roofing manufacturer's warranty • Above ground and below ground sprinkler certifications • Completed certificate of structural engineer's observations (for storm shelter) • Emergency and exit lighting tests. • Fire alarm must be monitored. • Elevator inspection completed and certificate of operation provided by the State of Alabama Department of Labor • Boiler/vessels inspection completed, and certificate of operation provided by the State of Alabama Department of Labor • Pressure test/Flush test for underground sprinkler lines (witnessed by local fire marshal, fire chief and/or DCM Inspector) • Flush/pressure test for new and/or existing fire hydrants • Must have clear egress/access and emergency (for first responders) access to building • Must have ADA access completed. • Comply with ADA requirements: plumbing fixture heights, toilet partition widths, turnaround, signage, parking lot striping and signage, etc. • Emergency Responder Radio Coverage
	25. <u>Year-End Inspection</u>: Required Attendees: DCM Inspector, Contractor, Owner, Architect, Engineers and/or Major Subs may be required. • Owner's list of documented warranty items • Reconciliation of user fees with DCM shall be completed prior to inspection
	26. Other inspections required before work is covered
	27. Third-party inspections/special inspections. Structural components, Roofing, Geotechnical, Commissioning, lab tests, etc.
	28. Procedure if bad soil or rock is encountered: Geotech and special inspections
	29. Inspection report distribution – weekly per Owner-Architect Agreement. All site inspections and observations are to be recorded and transmitted to the DCM Inspector via DCM's Engage Portal. The design professional must also concisely report any deficiencies encountered, problems or questions raised by the contractor, instructions or answers given to the contractor, and administrative or construction delays observed. The design professional must endeavor to write his or her reports utilizing descriptions of components and areas that are consistent with descriptions contained in the plans and specifications so that the "third-party reader" can understand what is being discussed and where it is located in the project. Photographs may be included for clarity. Keep photos to a minimum. Each report shall also be distributed by the design professional to the Owner and contractor promptly after conducting an inspection so that all parties are kept current regarding events on the project.
	30. Ready mix plant, file delivery tickets, slump tests, cylinders. Quality of concrete work; concrete testing
	31. Light gauge metal roof framing and/or wood truss framing to be inspected by the structural engineer.

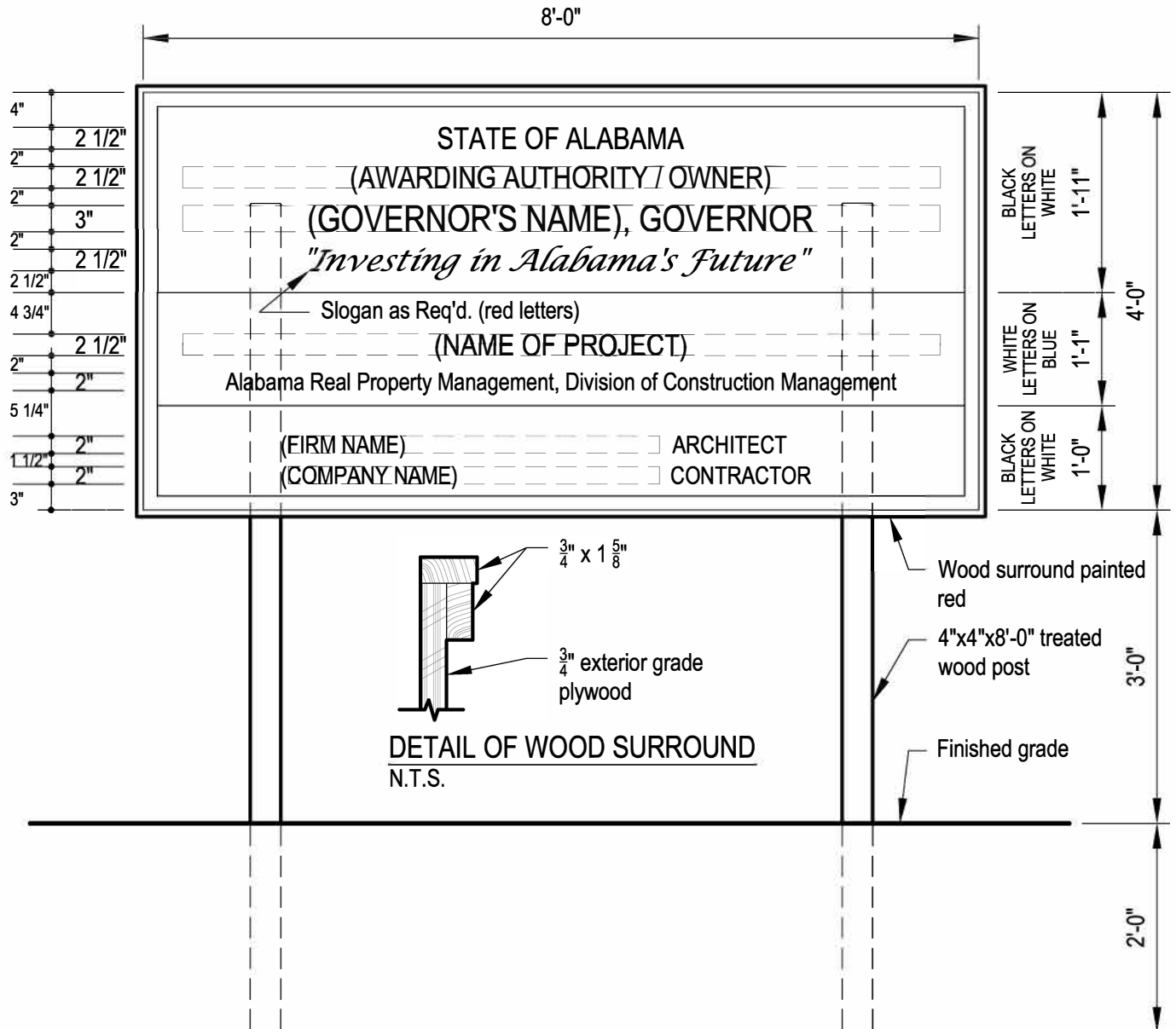
	32. Record Drawings and As-Built Drawings: Contractor will maintain a set of drawings designated solely for As-Built Drawings to satisfy its closeout requirements. Contractor/Subcontractor shall, on a weekly basis, record all changes, revisions, modifications, additions, etc. to accurately reflect its completed work.
	33. Protection Of the Work: The General Contractor shall carefully secure and protect the work and all materials, equipment, or work of Sub-Contractors and others in the vicinity of the work and shall be liable for any loss or damage that results from Contractor's failure to do so.
	*34. Use of site and existing building, access drive, signs
	*35. Conduct of contractor's personnel: No interaction with staff and/or students. No foul language, no smoking or use of tobacco products, no drugs, and no firearms on school property.
	*36. Use of existing toilets
	*37. Coordinate any utilities supplied by Owner
	*38. Coordinate outages and work in existing building with Owner
	*39. Keeping existing exit paths open
	*40. Routine job clean-up to be performed daily. Clean-up areas where work is performed including paths of access/egress utilized by Contractor's personnel and equipment. All generated waste and debris will be placed in dumpsters or other containment boxes.
	41. O.S.H.A. - Report all accidents - safety General Contractor's responsibility
	42. Contractor is reminded of obligation to comply with the Alabama Child Labor Law and E-Verify
	43. Building location relative to critical property line, easement, setback, etc.
	44. Surveyor to check foundation wall if location critical
	45. Verify sanitary outfall before committing floor level
	46. Procedure if bad soil or rock is encountered: Geotech and special inspections
	47. Stockpiling topsoil
	48. Protecting trees
	49. Soil Treatment, mix on site in presence of Job Superintendent
	50. What is expected of masonry work, mortar additive
	51. Problems with hollow metal - install proper fire labels
	52. Potential conflict of mechanical and electrical equipment; shop drawings
	53. Return air plenums (no combustibles)
	54. Fire damper installation issues
	55. Kraft-faced insulation is not to be installed exposed.
	56. 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.
	57. Comply with fire hydrant requirement; coordinate with local Fire Authority or State Fire Marshal.
	*58. Certificate of Substantial Completion/Final Inspection All projects: Certificate must be activated via DocuSign link after final inspection and receipt of DCM Inspector's report. The correct DocuSign link is available from DCM's Engage Portal .
	59. Release of retainage – 30 days to complete punch list and closeout
	*60. Project Closeout - precedes Final Payment a. Warranties b. Operating and Maintenance Manuals c. As-built Drawings d. Other requirements

61. Advertisement of Completion - start ad after substantial completion

- a. for projects less than \$100,000.00, Advertisement of Completion is not required.
- b. for projects \$100,000.00 or more, Contractor advertises for 3 weeks. The contractor can publish a notice using one or more of the following methods:
 - In a newspaper of general circulation in the county or counties in which the work, or some portion thereof, has been done.
 - On a website that is maintained by a newspaper of general circulation in the county or counties in which the work, or some portion thereof, has been done.
 - On a website utilized by the awarding authority for publishing notices.
 - If no newspaper is published in the county in which the work was done, and if the awarding authority does not utilize a website for the purpose of publishing notices, the notice may be given by posting at the courthouse for 30 days, and proof of the posting of the notice shall be given by the awarding authority and the contractor.

DETAIL OF PROJECT SIGN

N.T.S.



Notes:

1. Fully locally-funded State Agency and Public University projects: DCM Form C-15 must be included in the project manual regardless of expected bid amount. If the awarded contract sum is \$100,000.00 or more, Contractor shall furnish and erect a project sign.
Fully locally-funded K-12 school projects: Project sign is not required unless requested by Owner, if project sign is requested by Owner, include DCM Form C-15 in the project manual.
Partially or fully PSCA-funded projects: DCM Form C-15 must be included in the project manual. Contractor shall furnish and erect a project sign for all PSCA-funded projects, regardless of contract sum. "Alabama Public School and College Authority" as well as the local owner entity must be included as awarding authorities on the project sign of all PSCA-funded projects. Exception: Alabama Community College System (ACCS) PSCA-funded projects with Notice-To-Proceeds issued after July 31, 2021 are not submitted to DCM.
Fully locally-funded ACCS projects with Notice-To-Proceeds issued prior to August 1, 2021: DCM Form C-15 must be included in the project manual regardless of expected bid amount. If the awarded contract sum is \$100,000.00 or more, Contractor shall furnish and erect a project sign.
2. Sign to be constructed of 3/4" exterior grade plywood.
3. Paint with two coats best grade exterior paint before letters are painted. Option: In lieu of painted lettering on plywood, a corrugated plastic sign (displaying the same lettering, layout and colors as above) may be secured directly to the unpainted exterior grade plywood.
4. Sign shall be placed in a prominent location and easily readable from existing street or roadway.
5. Sign shall be maintained in good condition until project completion.
6. Slogan: Act 2020-167's title *"Investing In Alabama's Future"* should be placed on the project signs of all PSCA-funded projects, otherwise the Awarding Authority/Owner's slogan, if any, should be used. If the Awarding Authority/Owner of a fully locally-funded project does not have a slogan, the project sign does not require a slogan.

DCM (BC) No. _____

PSCA Projects: PSCA No. _____

Application No. _____

Date: _____

APPLICATION and CERTIFICATE for PAYMENT

Attach DCM Form C-10SOV: Schedule of Values

TO OWNER: Entity Name: Address:	PROJECT:
FROM CONTRACTOR: Company Name & Address, which must exactly match co. name & payment address spelling as registered in State of AL Accounting & Resource System (STAARS) or AL Buys to avoid rejection: STAARS or AL Buys Vendor #:	ARCHITECT / ENGINEER: Firm Name: Address:

A. Total Original Contract	\$
B. Fully Executed (fully signed) Change Order(s) Numbers ___ through ___	+\$
C. Total Contract To Date	\$
1. Work Completed to Date per attached Schedule of Values <i>(Form C-10SOV's Column F Total)</i>	\$
2. Materials Presently Stored <i>(When this amount is greater than \$0.00, attach Form C-10SM: Inventory of Stored Materials, or similar list)</i>	+\$
3. Total Work Completed to Date & Materials Presently Stored <i>(_____% of Contract To Date)</i>	\$
4. Less Retainage <i>(If Total Work Completed to Date & Materials Presently Stored (#3) is less than or equal to 50% of Total Contract to Date (C), Retainage = #3 x 0.05. Once #3 exceeds 50% of C and up until project is complete, Retainage = C x 0.025. \$0 is retained on final payment application, see last bullet point below Instructions.)</i>	-\$
5. Total Due	\$
6. Less Total Previous Payments Billed <i>(Must exactly match #5 Total Due from previous payment application. # 6 is \$0.00 if there is no previous payment application)</i>	-\$
7. Balance Due This Estimate	\$

Final pay app?
☐ Yes.

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, Year Seal: _____ Notary Public's Signature	ARCHITECT'S / ENGINEER'S CERTIFICATION In accordance with the Contract Documents, the Architect/ Engineer certifies to the Owner that, to the best of the Architect's/ Engineer's knowledge and belief, the Work has progressed to the point indicated herein, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the amount approved. By _____ Architect's / Engineer's Signature Name & Title _____ Date _____
--	--

INSTRUCTIONS • PSCA-funded projects, and State Agency-owned projects: Two copies of pay. app., each with original signatures and all attachments required. • Date of first payment application cannot precede the Notice to Proceed's Begin Date. • Pay. app. must exactly match an attached DCM Form C-10SOV: Schedule of Values. • A change order must be fully executed before inclusion on a payment application. • Contractor's signature date cannot precede the payment application date. • Contractor and Notary signee dates must match. • Progress schedules must be included with non-final payment applications. • One payment application per month may be submitted. • On a final payment application, the following is required for release of retainage: all change orders must be fully executed (signed by all parties and approval authorities) and included in B., the Certificate of Substantial Completion for entire work is fully executed, and all other close-out requirements per General Conditions Article 34 are completed.	APPROVAL _____ Owner Entity By _____ Signature Name & Title _____ Date _____
--	---

SCHEDULE OF VALUES (SOV)								DCM Form C-10SOV Revised October 2021	
Project:						DCM (BC) Project Number:			
						PSCA Project Number, if any:			
Contractor Company:						Application Number:			
						Application Date:			
						Period From:		Period To:	
A	B	C	D	E	F	G	H	I	J
Item No.	Description of Work	Scheduled Value (including fully executed [signed by all parties] change order amounts)	Work Completed		Total Work Completed to Date (This application SOV's D + E)	Materials Presently Stored (G total greater than \$0 must match C-10SM's column E total. This SOV's G amounts are not in this SOV's D nor E amounts.)	Total Work Completed to Date & Materials Presently Stored (This SOV's F + G)	Percent of Contract Completed to Date (This SOV's H / C)	Retainage (This column's Total's cell formula calculates the applicable variable rate)
			Work Previously Completed (Previous pay app SOV's column F. D is \$0 if this SOV is for first pay app.)	Work Completed This Period (Period as noted above)					
1.					\$ -		\$ -		Retainage Variable Rate: If Total Work Completed to Date & Materials Presently Stored (H) is less than or equal to 50% of Total Scheduled Value (C), Retainage = H x 0.05. Once H exceeds 50% of C and up until project is complete, Retainage = C x 0.025. There will be no retainage on final payment application.
2.					\$ -		\$ -		
3.					\$ -		\$ -		
4.					\$ -		\$ -		
5.					\$ -		\$ -		
6.					\$ -		\$ -		
7.					\$ -		\$ -		
8.					\$ -		\$ -		
9.					\$ -		\$ -		
10.					\$ -		\$ -		
11.					\$ -		\$ -		
12.					\$ -		\$ -		
13.					\$ -		\$ -		
14.					\$ -		\$ -		
15.					\$ -		\$ -		
16.					\$ -		\$ -		
17.					\$ -		\$ -		
18.					\$ -		\$ -		
19.					\$ -		\$ -		
20.					\$ -		\$ -		
21.					\$ -		\$ -		
22.					\$ -		\$ -		
23.					\$ -		\$ -		
24.					\$ -		\$ -		
25.					\$ -		\$ -		
TOTALS:		\$ -	\$ -	\$ -	\$ -	\$ -	\$ -		\$ -
This pay app SOV's column totals must match amounts in this pay app Form C-10 per the following indicated Form C-10 line #s:		C.	None	None	1.	2.	3.	3.	4.

Note: If this SOV's column G: Materials Presently Stored includes any amounts other than \$0, then DCM Form C-10SM: Inventory of Stored Materials with back-up receipts must be submitted as part of the payment application documentation.

INVENTORY OF STORED MATERIALS				DCM Form C-10SM Revised October 2021	
Project:			DCM (BC) No.:		
			PSCA No, if any:		
Contractor Company:			For Estimate No.:		
			For Period Ending:		
A	B	C	D	E	
Description	Materials Stored Last Period	Materials Purchased This Period (period noted above)	Materials Used This Period (period noted above)	Materials Presently Stored (B + C - D)	
TOTALS:					
Instructions :					
· This Form C-10SM must be submitted as part of the payment application documentation when a Materials Presently Stored amount of anything greater than \$0 is noted on line 2 of DCM Form C-10: Application and Certificate for Payment.					
· Receipts must be provided as attachments to this form C-10SM for all amounts placed in Column C: Materials Purchased This Period.					
· The total \$ amount of this Form C-10SM's column E: Materials Presently Stored must match both Form C-10's line 2: Materials Presently Stored, and Form C-10SOV: Schedule of Values' total \$ amount of Column G: Materials Presently Stored.					
· The \$ amounts in this current Form C-10SM's Column D: Materials Used This Period are amounts that must all be included in the current payment application's Form C-10SOV's Column E: Work Completed This Period.					
· The \$ amounts in this current Form C-10SM's Column E: Materials Presently Stored are the amounts that must be listed in the next payment application's Form C-10SM's Column B: Materials Stored Last Period.					

SAMPLE PROGRESS SCHEDULE & REPORT				CONTRACTOR (Contractor may use own form in lieu of Form C-11):								DATE OF REPORT:							
DCM (BC) No.:												ARCHITECT/ENGINEER:				PROCEED DATE:			
PSCA projects: PSCA No.:																PROJECTED COMPLETION DATE:			
PROJECT:																			
WORK DIVISION		%	AMOUNT																
1.	GENERAL REQUIREMENTS																		
2.	SITWORK																		
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.	

DCM Form C-11
August 2021

**Alabama Department of Finance
Real Property Management
Division of Construction Management**

770 Washington Avenue, Suite 444
Montgomery, Alabama 36104
(334) 242-4082 (phone)

DCM Form B-12
Revised July 2022

CHANGE ORDER CHECKLIST

For use with DCM Form C-12 and DCM Form 9-J

WHICH FORM DO YOU USE?

Use **DCM Form C-12** for contracts of state agencies and departments and State Department of Education (SDE) projects. Also use for ACCS projects with Notice-to-Proceeds issued prior to August 1, 2021.

Use **DCM Form 9-J** for contracts of projects partially or fully Public School and College Authority (PSCA)-funded, except for ACCS projects with Notice-To-Proceeds issued after July 31, 2021. Include a completed

DCM Form B-11: Change Order Justification with **each copy of** either DCM Forms C-12 or 9-J.

Verify that the following information is inserted in the spaces provided on the CONTRACT CHANGE ORDER form, or attached to the form where attachments are noted to be acceptable or obviously necessary. Do not staple forms; use clips.

1.	CHANGE ORDER NUMBER: Insert current change order number.
2.	DATE: Insert date.
3.	DCM (BC) PROJECT NUMBER: Insert DCM Project Number in the block provided at top of document.
4.	CONTRACTOR Insert name and address of the Contractor, exactly as they appear on the Construction Contract.
5.	NAME OF PROJECT: Under "Project", insert the complete name of the project as identified in the bid documents. If using DCM Form 9-J, insert the PSCA Project Number in the space provided.
6.	CONTRACTOR'S PROPOSALS: Under "TERMS", identify the change order proposals submitted by the contractor that are being addressed by the Contract Change Order. Identify these proposals by inserting their dates.
7.	DESCRIPTION OF THE CHANGE(S) IN WORK: Fully describe the change or changes to the original contract work for which the Construction Contract is being modified. This description should be written so that a reader of the document who is not directly involved in the project can understand what is being changed. If the space provided on the form is inadequate for such a description, use attachments and cite them.
8.	CONTRACT AND CHANGE ORDER AMOUNTS: Insert the applicable dollar amounts to record the original contract sum, change orders, and the currently revised contract sum.
9.	EXTENSION OF TIME: If the Contract Time is being extended by the Contract Change Order, insert appropriate number of calendar days in the space provided. If the Contract Time is not being extended, insert "NONE".
10.	RESPONSIBILITY FOR CHANGE ORDER FUNDING - DCM Form 9-J ONLY: The authority responsible for funding the change order is to be identified in the following sentence in the form,: "The amount of this Change Order will be the responsibility of _____." Insert whichever is appropriate: (1) "PSCA", (2) name of LEA, or (3) "PSCA" and name of LEA.
11.	SIGNATURES: The signature spaces for State Agency, PSCA and fully locally-funded Alabama Community College System projects are different from each other. Download the appropriate document per Owner/project type from www.dcm.alabama.gov/forms.aspx . Before submitting a Contract Change Order to DCM, the document must be signed by the contractor, surety (for additive change orders only), design professional and owner (local owner or using agency). Signature by the surety is not necessary on deductive change orders or change orders involving only extensions of time. If the cumulative change order amount exceeds 10% of the original contract amount then the Owner's legal consultant must sign DCM Form B-11: Change Order Justification.
12.	ATTACHMENTS: To each of the three (3) copies (with original signatures) of the Contract Change Order form, attach with clips (do not staple): a. Contractor's change order proposals and/or invoices providing a detailed breakdown of change order costs. General Contractors (GC) must include subcontractors' (sub) quotes as backup. All GC and sub quotes must be broken down by labor (hours and rates), materials including quantities and unit prices (with receipts or quotes attached), equipment whether rented or owned (with receipts or quotes attached), and Overhead & Profit (OH&P). 1. Total OH&P can be a maximum of 25% divided between GC and subs; GC can have a maximum of 15% OH&P (in which case a sub could have up to 10% OH&P). See General Conditions- Article #19. 2. Sales tax cannot be included in change orders. 3. Deductive change orders also require backup including breakdown of labor and material, and must also deduct OH&P if included in original bid. Include specification section regarding allowances. b. POWER OF ATTORNEY for the individual signing the Contract Change Order for the surety. c. DCM Form B-11, CHANGE ORDER JUSTIFICATION: completed and signed by the design professional and owner.

This form is provided solely for the purpose of inclusion in the project manual. A Construction Contract for fully locally-funded K-12 projects must be initiated via the appropriate DocuSign link from DCM's Engage Portal at <https://engagealabamapm.facilityforce.cloud> by the Lead Design Professional Firm.

DCM Form C-12 (fully locally-funded K-12 school project)
revised October 2024
A Change Order is not valid without an accompanying completed Change Order Justification (DCM Form B-11).

CONTRACT CHANGE ORDER

Change Order No. _____ **Date** _____ **DCM (BC) No.** _____

TO: (Contractor) Co. Name: Address:	PROJECT:
--	-----------------

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; only use an attachment if fields below become full.*):

Description continued from Page 1:

ORIGINAL CONTRACT SUM	\$	_____
NET TOTAL OF PREVIOUS CHANGE ORDERS	\$	_____
PREVIOUS REVISED CONTRACT SUM	\$	_____
THIS CHANGE ORDER WILL INCREASE DECREASE		
THE CONTRACT SUM BY	\$	_____
REVISED CONTRACT SUM, INCLUDING THIS CHANGE ORDER	\$	_____

EXTENSION OF TIME resulting from this Change Order None or _____ Calendar days.

The Owner does hereby certify that this Change Order was executed in accordance with the provisions of Title 39, Code of Alabama, 1975, as amended.

Architectural/Engineering Firm
Recommended By _____
Name & Title _____

APPROVAL
ALABAMA STATE DEPARTMENT OF EDUCATION
(SDE)
(Required for locally-funded, SDE projects.)
By _____ Date: _____
State Superintendent of Education

CONTRACTING PARTIES

Contractor Company
By _____
Name & Title _____

Awarding Authority/Owner Entity
By _____
Name & Title _____
CONSENT OF SURETY (for additive \$ change orders only)

Surety Company
By _____
(Attach current Power of Attorney)
Name & Title _____

Routing of the Construction Contract to reviewers and e-signers is automated through DocuSign. DocuSign links for fully locally-funded contract documents are available from DCM's Engage Portal at <https://engagealabama-rpm.facilityforce.cloud>

TO: **Alabama Department of Finance**
Real Property Management
Division of Construction Management
 770 Washington Avenue, Suite 444
 Montgomery, Alabama 36104
 (334) 242-4082 FAX (334) 242-4182

CHANGE ORDER JUSTIFICATION

Change Order No. _____

Date: _____

DCM (BC) No. _____

Purpose and instructions on next page.

Do not staple this form and/or attachments; use clips.

(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)							
	AMOUNT: ☐ ADD ☐ DEDUCT \$ _____ TIME EXTENSION: _____ CALENDAR DAYS							
(C)	<table style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 33%;">ORIGINAL CONTRACT AMOUNT</td> <td style="width: 33%;">PREVIOUS C.O.'s _____ THRU _____</td> <td style="width: 34%; text-align: right;">CONTRACT AMOUNT PRIOR TO PROPOSED CHANGE ORDER</td> </tr> <tr> <td>\$ _____</td> <td>+ \$ _____</td> <td style="text-align: right;">= \$ _____</td> </tr> </table>		ORIGINAL CONTRACT AMOUNT	PREVIOUS C.O.'s _____ THRU _____	CONTRACT AMOUNT PRIOR TO PROPOSED CHANGE ORDER	\$ _____	+ \$ _____	= \$ _____
ORIGINAL CONTRACT AMOUNT	PREVIOUS C.O.'s _____ THRU _____	CONTRACT AMOUNT PRIOR TO PROPOSED CHANGE ORDER						
\$ _____	+ \$ _____	= \$ _____						
(D)	JUSTIFICATION FOR NEED OF CHANGE(S):							
(E)	JUSTIFICATION OF CHANGE ORDER vs. COMPETITIVE BID:							
(F)	ARCHITECT / ENGINEER'S EVALUATION OF PROPOSED COST:							
(G)	CHANGE ORDER RECOMMENDED _____ ARCHITECTURAL / ENGINEERING FIRM NAME By: _____ ARCHITECT / ENGINEER'S SIGNATURE By: _____ OWNER'S PROJECT REPRESENTATIVE'S SIGNATURE	CHANGE ORDER JUSTIFIED AND APPROVED _____ LOCAL OWNER ENTITY NAME By: _____ OWNER'S SIGNATURE By: _____ OWNER'S LEGAL COUNSEL'S SIGNATURE						

CHANGE ORDER JUSTIFICATION: PURPOSE and INSTRUCTIONS

PURPOSE

The awarding of work through an existing contract may potentially conflict with, or violate, the "Competitive Bid Laws" of the State of Alabama. **The determination of legality of Change Orders rests with the Awarding Authority and its legal advisor.** In a June 15, 1979, Opinion, the Office of the Attorney General offered guidelines for making such determinations in conjunction with considering the facts and merits of each situation. The purpose of the CHANGE ORDER JUSTIFICATION is to provide a means through which the Awarding Authority considers these guidelines and the intent of the "Competitive Bid Laws" when authorizing Change Orders. Pursuant to these guidelines, the following types of changes meet the criteria for awarding work through Change Orders in lieu of through the Competitive Bid process:

- I. Minor Changes for a monetary value less than required for competitive bidding.
- II. Changes for matters relatively minor and incidental to the original contract necessitated by unforeseeable circumstances arising during the course of the work.
- III. Emergencies arising during the course of the work of the contract.
- IV. Bid alternates provided for in the original bidding where there is no difference in price of the change order from the original best bid on the alternate.
- V. Changes of relatively minor items not contemplated when the plans and specifications were prepared and the project was bid which are in the public interest and which do not exceed 10% of the contract price.

Under these guidelines the cumulative total of Change Orders, including any negotiations to bring the original contract price within the funds available, would become questionable if the total of such changes and negotiations exceed 10% of the original contract price. These guidelines are not intended to interfere with the Awarding Authority's good faith discretion to respond to specific situations in the public's best interest. If the cumulative change order amount exceeds 10% of the original contract amount then the Owner's legal consultant must sign the Change Order Justification prior to submission to the Division of Construction Management (DCM).

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 B-11: CHANGE ORDER JUSTIFICATION must accompany the proposed DCM Form C-12: Change Order. Instructions for completing the B-11 form are:

1. Insert the proposed Change Order Number, date of the Justification, and DCM (BC) 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, CONTRACTOR, AND ARCHITECT/ENGINEER.
3. **Section (B):** Provide a complete description of the proposed changes in work, referring to and attaching revised specifications and/or drawings as appropriate. An attachment may be used if additional space is needed, but insert the proposed amount and time extension of the change(s) in the spaces provided. **Attached a copy of the contractor's detailed cost proposal.**
4. **Section (C):** Insert the Original Contract amount, the net increase or decrease of previous Change Orders, and the Current Contract amount (preceding the currently proposed Change Order).
5. **Section (D):** Explain why it is necessary, or in the public's interest, to make the proposed change(s) to the Work.
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 evaluation of the reasonableness and fairness of the proposed costs based upon his 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. The Owner must sign the document indicating that they believe change order action in lieu of the competitive bid process is justified for the proposed change(s). **Review of the matter and signing of the document by the Owner's legal counsel is highly recommended. If the cumulative change order amount exceeds 10% of the original contract amount then the Owner's legal consultant must sign the Change Order Justification prior to submission to DCM.**

CHANGE PROPOSAL RECAP SHEET

Project Name : _____
 Arch# Project Number : _____
 Contractor Name : _____
 Reference Change Proposal Request Number : _____
 Brief Description of Proposed Change : _____

Date : _____

Initiated By : Owner/Architect ☐
 (Check One) Contractor ☐
 Subcontractor ☐

GENERAL CONTRACTOR Direct Cost Summary (Attach Supplemental Sheets as necessary)

Item / Description *	Quantity	Unit	Amount					
			Unit \$	Material	Unit \$	Labor	Unit \$	Equipment
Sub Totals :			\$ -		\$ -		\$ -	
Material :	\$ -							
Labor :	\$ -							
Equipment :	\$ -							
General Contractor Subtotal :	\$ -							

SUBCONTRACTOR Direct Cost Summary (Attach Supplemental Sheets as necessary)

Item / Description *	Quantity	Unit	Amount							
			Unit \$	Material	Unit \$	Labor	Unit \$	Equipment	Unit \$	Sub-sub
Sub Totals :			\$ -		\$ -		\$ -		\$ -	
Material :	\$ -									
Labor :	\$ -									
Equipment :	\$ -									
Sub-sub :	\$ -									
Subcontractor Subtotal :	\$ -									

UNIT PRICE Cost Summary (Attach Supplemental Sheets as necessary)

Item / Description *	Quantity	Unit	Amount	
			Unit \$	Total Unit Price
Sub Totals :			\$ -	
Unit Price Subtotal :	\$ -			

Mark-up Calculations

Subcontractors Subtotal :	\$ -		
General Contractor Subtotal :	\$ -		
Unit Price Subtotal :	\$ -		
TOTAL Direct Cost :	\$ -		
** General OH&P on Own Work :	\$ -	15%	Amount not to exceed 15%, see Article 19 of the General Conditions
** Total OH&P on Sub Work :	\$ -	25%	Amount not to exceed 25%, see Article 19 of the General Conditions

TOTAL COST CHANGE \$ - Add ☐
 Deduct ☐

*** TOTAL TIME CHANGE _____ Calendar Days (Critical paths impact only)

* Materials permanently installed in the building shall be sales tax free.

** "Overhead" shall cover the Contractor's indirect costs of the change, such as the cost of bonds, superintendent and other job office personnel, watchman, job office, job office supplies and expenses, temporary facilities and utilities, and home office expenses.

*** Any requests for additional time are only considered if the critical path of the project is extended. Attach additional pages with explanation of how the change affects the critical path of the project.

TO: **Alabama Department of Finance
Real Property Management
Division of Construction Management**

770 Washington Avenue, Suite 444
Montgomery, AL 36130-1150
(334) 242-4082

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

DCM Form C-13A
Revised November 2022;
(To be used for fully locally-funded K-12 & Public 4-Year University
Capital Improvement, HVAC, & Roof Projects with **both** a total cost
of \$750,000 or Less **and a contract awarded on or after 10/01/22**)

CERTIFICATE OF SUBSTANTIAL COMPLETION

ROUTING PROCEDURES ON NEXT PAGE

DCM (BC) No. _____

OWNER ENTITY NAME AND ADDRESS: Email to receive executed copy: _____	ARCHITECTURAL / ENGINEERING FIRM NAME AND ADDRESS: Email to receive executed copy: _____
CONTRACTOR COMPANY NAME AND ADDRESS: Email to receive executed copy: _____	BONDING COMPANY NAME AND ADDRESS: 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 designated Work is sufficiently complete, in accordance with the Contract Documents, such that the Owner may occupy or utilize the Work for its intended use without disruption or interference by the Contractor in completing or correcting any remaining unfinished Work. The Date of Substantial Completion is the date upon which all warranties for the designated Work commence, unless otherwise agreed and recorded herein.

Punch List: A _____ page list of items to be completed or corrected prior to the Owner's approval of Final Payment is attached hereto, but does not alter the Contractor's responsibility to complete or correct all Work in full compliance with the Contract Documents. The Contractor shall complete or correct all items on the attached list, ready for re-inspection for Final Acceptance, within 30 days after the above Date of Substantial Completion, unless another date is stated here: _____. 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.

Only one (1) originally executed substantial completion form shall be routed for signature. DCM office will mail the fully-executed original to the Owner and email copies to all parties.

RECOMMENDED BY (signature and email address required): ARCHITECT/ENGINEER: _____ CONTRACTING PARTIES: CONTRACTOR: _____ OWNER: _____ _____	DATE: _____ DATE: _____ DATE: _____ DATE: _____
☐ DCM recommends occupancy, subject to completion of all Punch List items referenced above. ☐ DCM does NOT recommend occupancy. Violations of State Building Code have been identified but not corrected. DCM signatures below do not indicate concurrence with occupancy. List of violations are attached. DCM INSPECTOR: _____ DCM CHIEF INSPECTOR: _____ DCM DIRECTOR: _____	
DATE: _____ DATE: _____ DATE: _____	

CERTIFICATE OF SUBSTANTIAL COMPLETION ROUTING PROCEDURE

Only one (1) originally executed substantial completion form shall be routed for signature. DCM office will mail the fully-executed original to the owner and email copies to all parties.

ARCHITECT/ENGINEER: Sign and date document, then mail it to Contractor. Provide Owner with DCM Inspector's name & field office address; territories and addresses are available at www.dcm.alabama.gov/staff.aspx.

CONTRACTOR: Sign and date document, then mail it to Owner.

OWNER: Sign and date document, then mail it to DCM Inspector's field office address; DCM Inspector territories and addresses are available at www.dcm.alabama.gov/staff.aspx.

DCM INSPECTOR: Sign and date document, then mail it to DCM Montgomery office.

DCM OFFICE: After review and signature/date by DCM Chief Inspector and DCM Director, DCM office will mail the fully-executed original document to Owner and will email copies to all parties.

NOTICE

THE EXECUTED "GENERAL CONTRACTOR'S ROOFING GUARANTEE" (DCM Form C-9) AND ANY OTHER ROOFING WARRANTY REQUIRED BY THE CONTRACT MUST ACCOMPANY THIS CERTIFICATE TO OBTAIN DCM APPROVAL.

Also, any 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.

FINAL PAYMENT CHECKLIST (FPC)

To be completed by the Architect/Engineer and submitted to DCM for review *via the correct DocuSign link from the Engage Portal*; applicable only to state agencies, partially or fully PSCA-funded and other bond-funded projects. The FPC shall include all attachments including the Contractor's Application for Final Payment. If all PSCA funds are expended prior to Final Payment, it is not a requirement to submit the Application & Certificate for Final Payment along with the supporting documentation to DCM.

(For further guidance refer to Article 34/Final Payment of DCM Form C-8: General Conditions of the Contract.)

PROJECT:		DCM No. _____ PSCA No. _____ (If applicable)
YES	N/A	Select "YES" or "N/A" as applicable.
☐	☐	Application and Certificate for Final Payment, DCM Form C-10: Attach one copy to FPC. The application must include original signatures of all parties and include all application attachments.
☐	☐	Certificate of Substantial Completion, DCM Form C-13: Attach one fully-executed copy to FPC.
☐	☐	Affidavit of Advertisement for Completion: Attach one copy of the affidavit of publication, including the image of the advertisement which may be based on DCM Form C-14, to the FPC. An affidavit is a legal document issued by the publisher, which must be requested from the publisher.
☐	☐	Contractor's Affidavit of Payment of Debts & Claims, DCM Form C-18: Attach one copy to FPC.
☐	☐	Contractor's Affidavit of Release of Liens, if required by Owner, DCM Form C-19: Attach one copy to the FPC.
☐	☐	Consent of Surety to Final Payment, if any, To Contractor, DCM Form C-20: Consent is required for projects with P&P Bonds. Original has been delivered to Owner. Attach one copy to FPC.
☐	☐	General Contractor's Roofing Guarantee, DCM Form C-9, and Other Specified Roofing Guarantees, if any: Attached to Certificate of Substantial Completion.
☐	☐	Contractor's One-Year Warranty: Original has been delivered to the Owner. Attach one copy to the FPC.
☐	☐	Other Warranties: All other specified original warranties has been delivered to the Owner. Attach one copy to the FPC.
☐	☐	Record Documents: Specified "As-built" plans and specifications have been delivered to the Owner.
☐	☐	O & M Manuals: Specified instructions and O&M Manuals have been delivered to the Owner.
☐	☐	Time Extension: Over-run of Contract Time has been reconciled by: ☐ Change Order ☐ Liquidated Damages ☐ Attached explanation
☐	☐	Additional Documents or Explanations which are attached:
Submitted By: _____ Architectural / Engineering Firm _____ Signature _____ Printed Name and Title _____ Date		

Final Reconciliation of Fees: Between the final change order execution and the year-end inspection, report the final project cost to the Engage Portal at <https://engagealabama-rpm.facilityforce.cloud> (back-up is not needed unless requested by DCM). DCM will then email a Final Reconciliation of Fees Statement to the Owner. If the Final Statement shows a net payment is owed to DCM, that amount must be paid prior to scheduling the year-end inspection. If the Final Statement shows a net refund is owed then a check will be mailed to the Owner.

DCM (BC) Number: _____

PSCA Projects: PSCA Number: _____

Date of the Construction Contract: _____

Contractor's Affidavit of Payment of Debts and Claims

To Owner (<i>Entity name and address</i>): 	Project (<i>Same as appears in the Construction Contract</i>):
---	---

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, Consent of Surety is required. DCM Form C-20, Consent of Surety to Final Payment, may be used for this purpose.

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, DCM Form C-19.

Contractor (*Insert company name and address*):

By: _____
Signature of authorized representative

Name and Title

Sworn to and subscribed before me this _____ day
of _____, _____.

Notary Public's Signature

My commission expires: _____

Seal:

DCM (BC) Number: _____

PSCA Projects: PSCA Number: _____

Date of the Construction Contract: _____

Contractor's Affidavit of Release of Liens

To Owner (<i>Entity name and address</i>):	Project (<i>Same as appears in the Construction Contract</i>):

STATE OF:

COUNTY OF:

The undersigned hereby certifies that, except as listed below, the Releases or Waivers of Lien attached hereto include the Contractor, all Subcontractors, all suppliers of materials and equipment, and all performers of Work, labor or services who have or may have liens or encumbrances or the right to assert liens or encumbrances against any property of the Owner arising in any manner out of the performance of the Construction Contract referenced above.

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 (*Insert company name and address*):

By: _____
Signature of authorized representative

Name and Title

Sworn to and subscribed before me this _____ day
of _____, _____.

Notary Public's Signature

My commission expires: _____

Seal:

DCM (BC) Number: _____

PSCA Projects: PSCA Number: _____

Date of the Construction Contract: _____

Surety's Bond Number: _____

CONSENT OF SURETY TO FINAL PAYMENT

To Owner (<i>Entity name and address</i>): 	Project (<i>Same as appears in the Construction Contract</i>):
---	---

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above, the

Surety (*Insert name and address of Surety*)

on bond of

Contractor (*Insert name and address 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

Owner (*Insert name and address of Entity*):

as set forth in said Surety's bond.

SIGNED AND SEALED this _____ day of _____, _____.

SURETY:

Seal:

Company Name

By _____
Signature of Authorized Representative

Printed Name and Title

Note: Original Power of Attorney for the Surety's signatory shall be furnished with each of the original forms to be attached to each of the four (4) final payment forms.

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 _____
(Name of Project):

at _____
(Insert location data in County or City)

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)

(Contractor)

(Business Address)

NOTE: This notice must be run for a minimum of three weeks for projects of \$100,000.00 or more. For acceptable methods of advertisement, see General Conditions of the Contract, Article 34. Proof of publication of the notice shall be made by the contractor to the authority by whom the contract was made by affidavit of the publisher or website owner and a printed copy of the notice published. A final settlement shall not be made upon the contract until the expiration of 30 days after the completion of the notice.

CERTIFICATE OF ASBESTOS FREE BUILDING MATERIALS

The undersigned hereby states that all building materials incorporated, installed, and used during the construction process for the below listed project by the Contractor or its Subcontractors of any tier are 100% asbestos free. **Asbestos Free means containing 0% asbestos in any form.** Refer to Section 01600, Product Requirements.

McKee Project Name: _____

McKee Project Number: _____

CERTIFICATION: The undersigned certifies that he or she is authorized to execute contracts and legal documents on behalf of the General Contractor as legally named, that this certification is submitted in good faith without fraud or collusion with any other person, that the information indicated in this document is true and complete, and that the document is made in full legal agreement.

To: _____
(Owner / Awarding Authority of Construction Contract)

Date _____

Legal Name of General Contractor _____

General Contractor State License No. _____
(Exactly as appears on license including designation letters)

General Contractor Mailing Address _____

By (Legal Signature) _____

Name & Title (print) _____

Telephone Number _____

E-Mail Address _____

SECTION 01000 - ALTERNATES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including General and Supplementary Conditions and Division 1 Specification sections apply to work of this section.

1.2 DESCRIPTION OF REQUIREMENTS

- A. Definition: An Alternate is an amount proposed by bidders and stated on the Proposal Form that will be added to or deducted from Base Bid amount if the Owner decides to accept a corresponding change in either scope of work or in products, materials, equipment, systems or installation methods described in Contract Documents.
- B. Coordination: Coordinate related work and modify or adjust adjacent work as required to ensure that work affected by each accepted Alternate is complete and fully integrated into the project.
- C. Notification: Immediately following award of Contract, prepare and distribute to each party involved notification of the status of each Alternate. Indicate whether Alternates have been accepted, rejected or deferred for consideration at a later date. Include a complete description of negotiated modifications to Alternates, if any.
- D. Schedule: A "Schedule of Alternates" is included at the end of this section. Specification section referenced in the Schedule contain requirements for materials and methods necessary to achieve the work described under each Alternate.
- E. Include as part of each Alternate, miscellaneous devices, appurtenances and similar items incidental to or required for a complete installation whether or not mentioned as part of the Alternate.

1.3 SCHEDULE OF ALTERNATES

- A. **ADDITIVE Bid Alternate #1** -This alternate shall be to include the cost of the band storage room addition.
- B. **ADDITIVE Bid Alternate #2** -This alternate shall be to include the cost for providing the resurfacing of the entire parking lot area. Base bid to include the area along the sidewalk.

PART 2 - NOT APPLICABLE

PART 3 - NOT APPLICABLE

END OF SECTION

SECTION 01010 - SCOPE OF THE WORK

PART 1 – GENERAL

1.1 RELATED DOCUMENTS AND GENERAL INFORMATION

- A. Drawings and general provisions of the Contract including General and Supplementary Conditions and other Division 1 specification sections apply to the work of this section.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Type of the Contract.
 - 2. Work Under This Contract.
 - 3. **Completion Times.**
 - 4. **Division of Construction Management User Fees.**
 - 5. Project Work Identification.
 - 6. Owner-furnished products.
 - 7. Supervision.
 - 8. Contractor Use of premises.
 - 9. Definitions.
 - 10. Work Under Other Contracts.
 - 11. Building and Site Construction.
 - 12. General Issues.
 - 13. Temporary Electrical Power and Jobsite Utilities.
 - 14. Site Security and Insurance Requirements.
 - 15. Protection of Work in Place.
 - 16. Work restrictions.
 - 17. Owner's occupancy requirements.
 - 18. Specification formats and conventions.
 - 19. **Site Visit Re-Inspection Fees**
- B. Related Sections include the following:
 - 1. Division 1 Section 01500 "Temporary Facilities and Controls" for limitations and procedures governing temporary use of Owner's facilities.

1.3 TYPE OF CONTRACT

- A. Construction Contract (DCM Form C-5).

1.4 WORK UNDER THIS CONTRACT

- A. Sealed Proposal shall be received as follows:
 - 1. One (1) Sealed Envelope MUST include the following:
 - a. General Contractor's Name and State General Contractor's License number MUST be legible on the front of the envelope.
 - b. One (1) Bid Proposal for all work as indicated on drawings and specifications.
 - c. Unit Price Attachment Sheet MUST be included if document is included in the project manual.
 - d. One (1) Bid Bond or certified check.

Renovations to the Arts Center At
Goshen High School For The
Pike County BOE
Troy, Alabama

SCOPE OF THE WORK
01010-1

- e. One (1) Sales Tax Form.

1.5 COMPLETION TIMES

- A. **All work must be completed no later than August 1, 2026.**

1.6 DIVISION OF CONSTRUCTION MANAGEMENT USER FEES & OTHER FEES

- A. The Contractor shall **include** any Alabama Division of Construction Management Fees in their bid proposals.
- B. The Contractor **MUST Include** all costs for permits and fees per the General Conditions of the Contract DCM Form C-8; Article 44 "Permits, Laws and Regulations", Paragraph A Permits, Fees and Notices Sub Paragraphs (1) and (2).
- C. The Contractor shall be responsible for all "Re-Inspection Fees." Site Visit Re-Inspection Fees: It is the contractor's responsibility to have the project ready for site visits (inspections) when they are scheduled. If the project is not ready for the scheduled inspection and it is determined, and failed inspection requiring additional visits, by the Architect, AHJ, (Authorities Having Jurisdiction), any governmental agency or any other entity requires a re-inspection with the Architect, AHJ, or Engineer present, the contractor shall pay the Architect, Engineers or AHJ each, a re-inspection fee of \$1,500.00, or other amounts (less or greater) set forth by other portions of the Contract Documents. Payments shall be made directly to the Architect, Engineer, or AHJ respectfully, five (5) days prior to the scheduled re-inspection unless other arrangements are made and agreed upon by each party in writing.

1.7 PROJECT / WORK IDENTIFICATION

- A. General: Project name is as indicated in the Advertisement for Bids and as shown on the Contract Documents prepared by McKee & Associates, 631 S. Hull Street Montgomery, Alabama 36104.
- B. Contract Documents: Indicate the work of the Contract and related requirements and conditions that have an impact on the project. Related requirements and conditions that are indicated on the Contract Documents include, but are not limited to the following:
 - 1. Existing site conditions and restrictions on use of the site including ingress and egress to the site.
 - 2. Grading operations at the site.
 - 3. The Contractor shall be responsible to secure the site during the execution of the work and provide proof of insurance including but not limited to General Liability, W/C, Auto, Equipment, etc.
- C. Summary by References: Work of the Contract can be summarized by references to the Contract, General Conditions, Supplementary Conditions, the Project Manual, Technical Specification Sections, Drawings, Addenda and modifications to the Contract Documents issued subsequent to the initial printing of this Project Manual and the Drawings, and including but not necessarily limited to, printed material referenced by any of the above. It is recognized that the Work of the Contract is also unavoidably affected or influenced by governing regulations, natural phenomenon including weather conditions, and other forces outside the contract documents.

1.8 OWNER FURNISHED PRODUCTS

- A. None

1.9 SUPERVISION

- A. Supervision: The Contractor shall provide adequate supervision of the project to ensure proper supervision for all work.

1.10 CONTRACTOR USE OF PREMISES

- A. General: During the entire cleanup period the Contractor shall have the exclusive use of the premises for cleanup operations, including full use of the site as shown on the Drawings.
- B. Limitations of exclusive use of the site:

Renovations to the Arts Center At
Goshen High School For The
Pike County BOE
Troy, Alabama

SCOPE OF THE WORK
01010-2

1. Confine operations at the site to the areas permitted under the Contract. Portions of the site beyond areas on which work is indicated are not to be disturbed. Conform to applicable rules and regulations affecting the work while engaged in project performance. See site plan for ingress and egress to the site, or if not indicated, same shall be as designated by the Architect.
2. Keep existing public roads, driveways and entrances serving the premises clear and available at all times. Do not use these areas for parking or storage of materials. Remove dirt, mud, debris, etc., from site, sidewalks, streets, and public right-of-way as it occurs.
3. Do not unreasonably encumber the site with materials or equipment. Confine stockpiling of materials and location of storage sheds and or designated storage areas as indicated.
4. Lock automotive type vehicles, such as passenger cars and trucks and other mechanized or motorized construction equipment, when parked and unattended, so as to prevent unauthorized use. Do not leave such vehicles or equipment unattended with the motor running or the ignition key in place.
5. The Owner, and their representatives, the Architect and their Consultants, as well as authorities having jurisdiction will require site accessibility for inspections, observations, and perhaps other purposes, related to the planned new construction. All Contractors shall assist in such accessibility, to at least the point of providing and maintaining accessible dry paths to work in progress.
6. Furnish and install by contractor temporary barricades, fencing, etc., as indicated or otherwise required, to restrict pedestrian and vehicular traffic from construction operations, including in part, Owner's staff, the public, students, children, and residents of the adjacent residential neighborhoods.
7. Construction operations shall not affect in any manner, the on-going operations of the Owner, immediately adjacent facilities, adjacent property owners or businesses, or others. Refer to Division 1 Section "Special Conditions" for additional information and requirements regarding coordination with Owner's activities, etc.
8. Construction equipment shall not come in contact with or swing over existing facilities to remain, public areas, occupied buildings, right-of-ways, etc., which are to remain.
9. All contractors and their employees shall limit any discussion of the Work of this project to the Owner's representatives named in the front of this Project Manual, Consultants employed, inspecting authorities with jurisdiction, and the Architect. In no instance shall this project be discussed with others, except as may otherwise be indicated herein.
10. Parking on-site, if any, shall be limited to the "staging areas" indicated on the Drawings, or if not indicated, as mutually agreed between the Architect and Contractor at the Pre-Construction Conference.
11. Smoking or other use of tobacco products shall not be permitted within the structure of the Building, Owner's facilities or on roofs.
12. The use or presence of alcohol and/or other debilitating substances shall not be permitted in the construction of the building and or on the project site.
13. Firearms and/or other weapons shall not be permitted on the project site.
14. The Contractor shall furnish necessary temporary toilets for all work forces on the job site.

PART 2 - SCOPE OF THE WORK

2.1 DEFINITIONS

- A. The Scope of the Work of the Contract is meant to be viewed as a successor to the General Special Conditions of the Contract. Should any discrepancy or ambiguity be noted, the Scope of the Work of the Contract shall apply and the General Special Conditions of the Contract shall defer to Scope of the Work of the Contract Documents. The scope of the work shall be taken in its entirety by all contractors. In signing the contract all contractors have read and understand that the Scope of

the Work and the General Special Conditions are taken in their entirety.

1. The term "Design Consultant" shall be construed to mean "Architect".
2. The terms "Owner" shall mean " Pike County Schools ".
3. **Site Visit Re-Inspection Fees**: The contractor is responsible for all Fees.

2.2 WORK UNDER OTHER CONTRACTS

- A. General: Cooperate fully with separate contractors so work on those contracts may be carried out smoothly, without interfering with or delaying work under this Contract. Coordinate the Work of this Contract with work performed under separate contracts.
- B. Concurrent Work: Owner will award separate contract(s) for the following construction operations at the Project site. Those operations will be conducted simultaneously with work under this Contract.
 1. Work done by others or by Owner.
 - a. Any items noted N.I.C.
 - b. Construction Testing as defined in applicable sections of the project manual.

2.3 BUILDING AND SITE CONSTRUCTION

- A. The Contractor shall maintain the entire site, provide dust control and keep the streets clean at all times and or as directed by the Architect. The Contractor shall call for and be responsible for the locating of all utilities prior to start of work. Use extreme care when working in close proximity to the existing water lines to prevent movement and damage to the water lines.
- B. The Contractor shall install and or replace all fencing including furnish and install all temporary fencing as required for all work including safety barriers, signs, traffic directional signals, temporary stripping, flagman, temporary road plates and any temporary roads around any obstruction and or work being constructed. The Contractor shall make all provisions to keep the public and or temporary access roads open during the duration of the work.
- C. The Contractor shall maintain & level, all temporary roads and temporary lay down and storage areas using same stone base material. Roads must have no potholes, dips, or rises and provide access to and from the site and other locations on site. The Contractor shall maintain the temporary roads used to move material on the site. Temporary roads are existing and the Contractor shall maintain these temporary roads throughout the duration of construction activity while Contractor is onsite.
- D. The Contractor is responsible for all work required to install new work to include demolition preparation of surface to receive new work, dust controls and cleaning of all surfaces affected by work.

2.4 GENERAL ISSUES

- A. The Contractor shall be responsible for their own on-site safety requirements within the site per OSHA regulations.
- B. Only an approved company owned and insured vehicle shall be allowed on to the construction site. Vehicles shall be clearly marked and identified with the company logo and or name.

2.5 TEMPORARY ELECTRICAL POWER AND JOBSITE UTILITIES

- A. The Contractor is responsible for the all costs associated with temporary electrical requirements for performance of the work. The Contractor shall be responsible for the all costs associated with temporary water required for the performance of the work. The Contractor is responsible for all other utility costs as required for the performance of the work.

2.6 SITE SECURITY / INSURANCE REQUIREMENTS

- A. The Contractor shall have care custody and control of the site. Contractor shall be responsible for the replacement of their material, equipment, and any loss of such. Contractor shall be

responsible for securing all material and equipment. If there is a loss and or damage of material and equipment, that loss shall go against the Contractor's insurance coverage.

2.7 PROTECTION OF WORK IN PLACE

- A. The Contractor shall protect all completed work and any rework shall be the responsibility of the contractor **at** no additional cost to the owner.

2.8 WORK RESTRICTIONS

- A. Existing Utility Interruptions: 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 and Owner not less than two days in advance of the proposed utility interruptions.
 - 2. Do not proceed with utility interruptions without Architect's and Owner's written permission.
- B. Nonsmoking Building: Smoking and smokeless tobacco will not be permitted within the new construction after floor slabs are poured.

2.9 OWNER'S OCCUPANCY REQUIREMENTS

- A. Owner Occupancy: Owner will occupy adjacent parking lots during entire construction period. Cooperate with Owner during construction operations adjacent to or near the existing building and parking to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's day-to-day operations. Maintain existing exits, unless otherwise indicated.
- B. Maintain access to existing walkways and other adjacent occupied or used facilities. Do not close or obstruct walkways or other occupied or used facilities without written permission from Owner and authorities having jurisdiction. Provide not less than 72 hours' notice to Owner of activities that will affect Owner's operations.
- C. Owner Occupancy of Completed Areas of Construction: Owner reserves the right to place and install equipment in completed areas of building, before Substantial Completion, provided such does not interfere with completion of the Work. Such placement of equipment shall not constitute acceptance of the total Work.

2.10 SPECIFICATION FORMATS AND CONVENTIONS

- A. Specification Format: The Specifications are organized into Divisions and Sections using the 16-division format numbering system.
 - 1. Section Identification: The Specifications use Section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete because all available Section numbers are not used. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of Sections in the Contract Documents.
- B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
 - 1. Abbreviated Language: Language used in the Specifications another Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be inferred as the sense requires. Singular words shall be interpreted as plural, and plural words shall be interpreted as singular where applicable as the context of the Contract Documents indicates.
 - 2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the Section Text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when so noted.

- a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.

PART 3 - NOT APPLICABLE

END OF SECTION

SECTION 01011 - CONTINGENCY ALLOWANCE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS AND GENERAL INFORMATION

- A. Drawings and general provisions of the Contract including General and Supplementary Conditions and other Division 1 specification sections apply to the work of this section.

PART 2 - CONTINGENCY ALLOWANCES

2.1 BASE BID PROPOSAL

- A. The General Contractor shall include the following sums:
 - 1. **One Hundred Thousand Dollars (\$100,000.00)** as a contingency to cover unforeseen conditions or minor changes that are necessary to correct or supplement the work as detailed in the Contract Documents.
 - 2. **Thirty Thousand Dollars (\$30,000.00)** as a contingency to cover the costs for an emergency two-way radio system.
 - 3. **Fifteen Thousand Dollars (\$15,000.00)** as a contingency to cover additional security equipment.

- 2.2 The Contractor shall include in his bid proposal(s) all costs of office, job supervision, overhead, profit, and bond on these Contingency 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).

PART 3 – AUTHORIZATION OF CONTINGENCY ALLOWANCES

- 3.1 After unknown conditions are identified and examined and the scope of work and method of repair determined, or request for a proposal to cover additional work has been issued by the Owner, the Contractor shall submit a proposal for such work to the Architect for the Owner's approval. If the Owner approves of such proposal, he will issue written authorization to the Contractor to perform the work and charge the related costs to the Contingency Allowance. At the Owner's option, work performed under this provision may be ordered done on a time and material basis, in which case; the Contractor shall keep accurate records of all time and materials used and submit such records to the Architect for his approval at the end of each day's work.
- 3.2 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. Any of this Contingency Allowance not spent shall be credited to the Owner by Change Order at close out of the project. Refer to Contingency Allowance Form attached to this Section.
- 3.3 Provide for payment.
 - A. The Contractor shall include a line item in the *Schedule of Values* entitled "Contingency Allowance". 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.

3.4 CONTINGENCY ALLOWANCE AUTHORIZATION FORM

Form to be filled in its entirety.

To: Mckee & Associates , Architects From: _____
Project: _____ Company _____
_____ Address _____
_____ Contact and Email _____
Project Number _____ Date: _____
Building Commission Number: _____ Authorization Number: _____

In accordance with Specification Section 01011 – CONTINGENCY ALLOWANCE, 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 01011. 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 CONTINGENCY ALLOWANCE	\$
NET TOTAL OF PREVIOUS AUTHORIZATIONS	\$
PREVIOUS REMAINING CONTINGENCY ALLOWANCE	\$
TOTAL AMOUNT OF THIS AUTHORIZATION	\$
CONTINGENCY ALLOWANCE REMAINING AFTER THIS CONTINGENCY	\$

Recommended By:	Authorized By:	Accepted By:
_____ Architect	_____ Owner	_____ Contractor

END OF SECTION

SECTION 01250 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including General and Supplementary Conditions and other Division 1 Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.
- B. Related Sections include the following:
 - 1. Section 01600 "Product Requirements" for administrative procedures for handling requests for substitutions made after Contract award.

1.3 MINOR CHANGES IN THE WORK

- A. Architect will issue supplemental instructions authorizing Minor Changes in the Work, that may or may not involve an adjustment to the Contract Sum or the Contract Time, as an Architect's Supplemental Instructions, "ASI".

1.4 PROPOSAL REQUESTS

- A. Owner-Initiated Proposal Requests: Architect will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time in the form of an ASI. If necessary, the description will include supplemental or revised Drawings and Specifications.
 - 1. ASIs issued by Architect, if adjustments to contract sum or contract time are involved, are for information only. Do not consider them instructions either to stop work in progress or to execute the proposed change.
 - 2. Within time specified in ASI after receipt of ASI, submit a quotation estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - b. Indicate applicable delivery charges, equipment rental, and amounts of trade discounts.
 - c. Include costs of labor and supervision directly attributable to the change.
 - d. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 - e. Include data as needed to validate material costs
- B. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a request for a change to Architect.
 - 1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 - 2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
 - 3. Indicate applicable taxes, delivery charges, equipment rental, and amounts of trade discounts.
 - 4. Include costs of labor and supervision directly attributable to the change.

5. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
6. Comply with requirements in Division 1 Section "Product Requirements" if the proposed change requires substitution of one product or system for product or system specified.

1.5 CHANGE ORDER PROCEDURES

- A. On Owner's approval of a Change Order, Architect will issue a Change Order for signatures as required.

1.6 CONSTRUCTION CHANGE DIRECTIVE

- A. Construction Change Directive, "CCD": Architect may issue a Construction Change Directive. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order. Construction Change Directive contains a complete description of change in the Work.

PART 2 – NOT APPLICABLE

PART 3 – NOT APPLICABLE

END OF SECTION

SECTION 01290 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including General and Supplementary Conditions and other Division 1 Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.

1.3 DEFINITIONS

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

- A. **At the discretion of the Architect, the contractor shall provide separate Schedule of Values for work on projects involving multiple locations, campuses, sites, buildings etc. and/or multiple scopes of work. Additional line items may be required within each separate Schedule of Values (i.e. separate line items for multiple buildings located on same site).**
- B. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
 - 1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with Continuation Sheets.
 - b. Submittals Schedule.
 - c. Contractor's Construction Schedule.
 - 2. Submit the Schedule of Values to Architect at earliest possible date but no later than seven days before the date scheduled for submittal of initial Applications for Payment.
- C. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.
 - 1. Identification: Include the following Project identification on the Schedule of Values:
 - a. Project name and location.
 - b. Name of Architect.
 - c. Architect's project number.
 - d. Contractor's name and address.
 - e. Date of submittal.
 - 2. Submit draft of DCM Form C-11.
 - 3. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:
 - a. Related Specification Section or Division.
 - b. Description of the Work.
 - c. Name of subcontractor.
 - d. Name of manufacturer or fabricator.
 - e. Name of supplier.

- f. Change Orders (numbers) that affect value.
 - g. Dollar value.
 - 1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
4. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.
 5. Round amounts to nearest whole dollar; total shall equal the Contract Sum.
 6. Provide a separate listing on Application and Certificate for Payment (Standard ABC Form C-10) for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.
 - a. Differentiate between items stored on-site and items stored off-site. Include evidence of insurance or evidence of bonded warehousing.
 7. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.
 8. Unit Costs: Provide a separate line item in the Schedule of Values for each unit cost. Line-item to show value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities.
 9. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.
 - a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at Contractor's option.
 10. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

1.5 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.
 1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
- B. Payment Application Times: Progress payments shall be submitted to Architect by the 25th of the month. The period covered by each Application for Payment is one month, ending on the 23rd of the month.
- C. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Architect will return incomplete applications without action.
 1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
 2. Include amounts of Change Orders issued before last day of construction period covered by application only after all agency approvals.
- D. Transmittal: Submit 6 signed and notarized original copies of each Application for Payment to Architect by a method ensuring receipt within 24 hours. One copy shall include waivers of lien and similar attachments if required.
 1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

- E. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. List of subcontractors.
 2. Schedule of Values.
 3. Contractor's Construction Schedule (preliminary if not final).
 4. Products list.
 5. Schedule of unit prices.
 6. Submittals Schedule (preliminary if not final).
 7. List of Contractor's staff assignments.
 8. List of Contractor's principal consultants.
 9. Copies of building permits.
 10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 11. Initial progress report.
 12. Report of preconstruction conference.
- F. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
- G. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
1. Evidence of completion of Project closeout requirements.
 2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
 3. Updated final statement, accounting for final changes to the Contract Sum.
 4. Certificate of Substantial Completion (DCM Form C-13)
 5. Form of Advertisement for Completion (DCM Form C-14)
 6. Evidence that claims have been settled.
 7. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
 8. Final, liquidated damages settlement statement.

PART 2 – NOT APPLICABLE

PART 3 – NOT APPLICABLE

END OF SECTION

SECTION 01320 - CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including General and Supplementary Conditions and other Division 1 Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Contractor's Construction Schedule.
 - 2. Submittals Schedule.
 - 3. Daily construction reports.
 - 4. Material location reports.
 - 5. Field condition reports.
 - 6. Special reports.
- B. Related Sections include the following:
 - 1. Division 1 Section 01290 "Payment Procedures" for submitting the Schedule of Values.
 - 2. Division 1 Section 01310 "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
 - 3. Division 1 Section 01330 "Submittal Procedures" for submitting schedules and reports.
 - 4. Division 1 Section 01322 "Photographic Documentation" for submitting construction photographs.
 - 5. Division 1 Section 01400 "Quality Requirements" for submitting a schedule of tests and inspections.

1.3 SUBMITTALS

- A. Submittals Schedule: Submit three copies of schedule. Arrange the following information in a tabular format:
 - 1. Scheduled date for first submittal.
 - 2. Specification Section number and title.
 - 3. Submittal category (action or informational).
 - 4. Name of subcontractor.
 - 5. Description of the Work covered.
 - 6. Scheduled date for Architect's final release or approval.
- B. Contractor's Construction Schedule: Submit two opaque copies of initial schedule, large enough to show entire schedule for entire construction period.
- C. Daily Construction Reports: Submit two copies at weekly intervals.
- D. Material Location Reports: Submit two copies at monthly intervals.
- E. Field Condition Reports: Submit two copies at time of discovery of differing conditions.
- F. Special Reports: Submit two copies at time of unusual event.
- G. Pre-scheduling Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to the Preliminary Construction Schedule and Contractor's Construction Schedule, including, but not limited to, the following:

1. Verify availability of qualified personnel needed to develop and update schedule.
2. Discuss any constraints.
3. Review time required for review of submittals and re-submittals.
4. Review requirements for tests and inspections by independent testing and inspecting agencies.
5. Review time required for completion and startup procedures.
6. Review and finalize list of construction activities to be included in schedule.
7. Review submittal requirements and procedures.
8. Review procedures for updating schedule.

1.4 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's Construction Schedule with the Schedule of Values, list of subcontracts, Submittals Schedule, progress reports, payment requests, and other required schedules and reports.
 1. Secure time commitments for performing critical elements of the Work from parties involved.
 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.

PART 2 - PRODUCTS

2.1 SUBMITTALS SCHEDULE

- A. Preparation: Submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, re-submittal, ordering, manufacturing, fabrication, and delivery when establishing dates.
 1. Coordinate Submittals Schedule with list of subcontracts, the Schedule of Values, and Contractor's Construction Schedule.
 2. Initial Submittal: Include submittals required during the first 60 days of construction. List those required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
 3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction Schedule.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Procedures: Comply with procedures contained in AGC's "Construction Planning & Scheduling."
- B. Time Frame: Extend schedule from date established for the Notice to Proceed to date of Substantial Completion.
 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- C. Activities: Treat each story or separate area as a separate numbered activity for each principal element of the Work. Comply with the following:
 1. Activity Duration: Define activities so no activity is longer than 30 days, unless specifically allowed by Architect.
 2. Procurement Activities: Include procurement process activities for the following 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.

3. Submittal Review Time: Include review and re-submittal times indicated in Division 1 Section 01330 "Submittal Procedures" in schedule. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
 4. Startup and Testing Time: Include not less than 14 days for startup and testing.
 5. Substantial Completion: Indicate completion in advance of date established for Substantial Completion and allow time for Architect's administrative procedures necessary for certification of Substantial Completion.
- D. Constraints: Include constraints and work restrictions, if any, and show how the sequence of the Work is affected.
- E. 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.
1. Refer to Division 1 Section 01290 "Payment Procedures" for cost reporting and payment procedures.
 2. Contractor shall assign cost to construction activities on the CPM schedule. Costs shall not be assigned to submittal activities unless specified otherwise but may, with Architect's approval, be assigned to fabrication and delivery activities. Costs shall be broken down within principal contracts in amounts typically not greater than \$30,000, but in no case greater than 5 percent of the Contract Sum.
 3. Each activity cost shall reflect an accurate value subject to approval by Architect.
 4. Total cost assigned to activities shall equal the total Contract Sum.
- F. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis to demonstrate the time effect, if any, of the proposed change on the overall project schedule.

2.3 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

- A. General: Prepare network diagrams using AON (activity-on-node) format.
- B. Preliminary Network Diagram: Submit diagram within 14 days of date established for the Notice to Proceed. Outline significant construction activities for the first 60 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.
- C. CPM Schedule: Prepare Contractor's Construction Schedule using a computerized, cost-and resource-loaded, time-scaled CPM network analysis diagram for the Work.
1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 30 days after date established for the Notice to Proceed.
 - a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Architect's approval of the schedule.
 2. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
 3. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.
 4. Use "one workday" as the unit of time. Include list of nonworking days and holidays incorporated into the schedule.
- D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the preliminary network diagram, prepare a skeleton network to identify probable critical paths.

1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
 - a. Preparation and processing of submittals.
 - b. Mobilization and demobilization.
 - c. Purchase of materials.
 - d. Delivery.
 - e. Fabrication.
 - f. Utility interruptions.
 - g. Installation.
 - h. Work by Owner that may affect or be affected by Contractor's activities.
 - i. Testing and commissioning.
 2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
 3. Processing: Process data to produce output data on a computer-drawn, timescaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
 4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
 - a. Sub-networks on separate sheets are permissible for activities clearly off the critical path.
- E. Initial Issue of Schedule: Prepare initial network diagram from a list of straight "early start-total float" sort. Identify critical activities. Prepare tabulated reports showing the following:
1. Contractor or subcontractor and the Work or activity.
 2. Description of activity.
 3. Principal events of activity.
 4. Immediate preceding and succeeding activities.
 5. Early and late start dates.
 6. Early and late finish dates.
 7. Activity duration in workdays.
 8. Total float or slack time.
 9. Average size of workforce.
 10. Dollar value of activity (coordinated with the Schedule of Values).
- F. Schedule Updating: Concurrent with making revisions to schedule, prepare tabulated reports showing the following:
1. Identification of activities that have changed.
 2. Changes in early and late start dates.
 3. Changes in early and late finish dates.
 4. Changes in activity durations in workdays.
 5. Changes in the critical path.
 6. Changes in total float or slack time.
 7. Changes in the Contract Time.

- G. Value Summaries: Prepare two cumulative value lists, sorted by finish dates.
1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.
 2. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.
 3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.
 4. Prepare list for ease of comparison with payment requests; coordinate timing with progress meetings.
 - a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.
 - b. Submit value summary printouts one week before each regularly scheduled progress meeting.

2.4 REPORTS

- A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at Project site. **Copies of reports are to be uploaded to eBlder.**
1. List of subcontractors at Project site.
 2. Approximate count of personnel at Project site by trade.
 3. Equipment at Project site.
 4. Material deliveries.
 5. High and low temperatures and general weather conditions.
 6. Accidents.
 7. Meetings and significant decisions.
 8. Unusual events (refer to special reports).
 9. Stoppages, delays, shortages, and losses.
 10. Meter readings and similar recordings.
 11. Emergency procedures.
 12. Orders and requests of authorities having jurisdiction.
 13. Change Orders received and implemented.
 14. Construction Change Directives and Architect Supplemental Interpretations (Instructions) received and implemented.
 15. Services connected and disconnected.
 16. Equipment or system tests and startups.
- B. Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site.
- C. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents, prepare and submit a detailed report. Submit with a Request For Interpretation (RFI). Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

2.5 SPECIAL REPORTS

- A. General: Submit special reports directly to Owner within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.

- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 3 - EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor must employ skilled personnel with experience in scheduling and reporting techniques or must employ a scheduling consultant. Submit qualifications and examples of previous scheduling for evaluation (and approval) by the Architect.
- B. Contractor's Construction Schedule Updating: At monthly intervals, update schedule to reflect actual construction progress and activities. Issue schedule three (3) work days before each regularly scheduled progress meeting or Contractor may update schedule at the monthly progress meeting.
 - 1. The revised schedule should be updated 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, no later than three days after the progress 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.
- C. 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.

END OF SECTION

SECTION 01322 - PHOTOGRAPHIC DOCUMENTATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including General and Supplementary Conditions and other Division 1 Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for the following:
 - 1. Preconstruction digital video.
 - 2. Periodic construction photographs.

1.3 SUBMITTALS

- A. Key Plan: Submit key plan of Project site and building with notation of vantage points marked for location and direction of each digital photograph. Indicate elevation or story of construction. Include same label information as corresponding set of photographs.
- B. Digital Construction Photographs: Submit one print of each digital photographic view within seven days of taking photographs.
 - 1. Format: Digital.
 - 2. Identification: The following information is required on each CD submitted:
 - a. Name of Project.
 - b. Name of Architect.
 - c. Name of Contractor.
 - d. Date photograph was taken if not date stamped by camera.
 - e. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
 - f. Unique sequential identifier.
 - 3. Digital Images: Submit a complete set of digital image electronic files as a Project Record document on USB Drives. Identify electronic media with date photographs were taken. Submit images that have same aspect ratio as the sensor, uncropped.
- C. Digital Video: Submit one copy of each digital video with protective sleeve or case within seven days of recording.
 - 1. Identification: On each copy, provide an applied label with the following information:
 - a. Name of Project
 - b. Name of Architect.
 - c. Name of Contractor.
 - d. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.
 - e. Date digital video was recorded.
 - f. Weather conditions at time of recording.
 - 2. Transcript: To include an audio narrative with the following information as a minimum.
 - a. Name of Project.
 - b. Date digital video was recorded.
 - c. Weather conditions at time of recording.

- d. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.

PART 2 - EXECUTION

2.1 CONSTRUCTION PHOTOGRAPHS

- A. Film Images:
 1. Date Stamp: Unless otherwise indicated, date and time stamp each photograph as it is being taken so stamp is integral to photograph.
 2. Field Office Prints: Retain one set of prints of progress photographs in the field office at Project site, available at all times for reference. Identify photographs same as for those submitted to Architect.
- B. Digital Images: Submit digital images exactly as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
 1. Date and Time: Include date and time in filename for each image.
 2. Field Office Images: Maintain one set of images on USB Drives in the field office at Project site, available at all times for reference. Identify images same as for those submitted to Architect.
- C. Preconstruction Photographs: Before starting construction, take color, digital photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Architect.
 1. Flag construction limits before taking construction photographs.
 2. Take eight photographs to show existing conditions adjacent to property before starting the Work.
 3. Take eight photographs of existing buildings either on or adjoining property in order to accurately record physical conditions at start of construction.
 4. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.
- D. Periodic Construction Photographs: Take 12 color, digital photographs monthly, coinciding with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.

2.2 CONSTRUCTION DIGITAL VIDEO

- A. Narration: Describe scenes on digital video by audio narration by microphone while video is recorded. Include description of items being viewed, recent events, and planned activities. At each change in location, describe vantage point, location, direction (by compass point), and elevation or story of construction.
 1. Confirm date and time at beginning and end of recording.
 2. Begin each digital video with name of Project, Contractor's name, and Project location.
- B. Preconstruction Digital Video: Before starting construction, provide digital video of the Project site and surrounding properties from different vantage points, as needed to properly record all preexisting site conditions and adjacent conditions of all roadways, drives, structures that will incur construction traffic.
 1. Flag construction limits before recording construction video.
 2. Show existing conditions adjacent to Project site before starting the Work.
 3. Show existing buildings either on or adjoining Project site to accurately record physical conditions at the start of construction.
 4. Show protection efforts by Contractor.

PART 3 – NOT APPLICABLE
END OF SECTION

SECTION 01330 - SUBMITTAL PROCEDURES

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including General and Supplementary Conditions and other Division 1 Specification Sections apply to this Section.

1.2 SUMMARY

- A. The General Contractor shall use website software “**Submittal Exchange**” to conduct all submittal reviews in electronic format. **Paper format submittals will NOT be accepted.** All recordkeeping, date stamping, access controls, shall be **paid for by the Contractor** with access given to the entire Project Team. The software shall be capable of the following:
 - B. Costs:
 - 1. The General Contractor shall include the full cost of Submittal Exchange project subscription in their proposal. **The Contractor shall cover the full cost of Submittal Exchange project subscription for the project. The Contractor contractually, shall be fully responsible for all costs required to maintain full functionality through the acceptance of ALL project closeout requirements and documents. NO OTHER SOFTWARE WILL BE CONSIDERED.**
 - 2. **Contact Submittal Exchange at subex-sales_ww@oracle.com or call 1-800-633-0738 to verify costs prior to bid.**
 - 3. At the Contractor’s option, training is available from **Submittal Exchange** regarding use of website and PDF submittals. Contact Submittal Exchange at 1-800-714-0024 ext. 2
 - 4. Internet Service and Equipment Requirements:
 - a. Email address and Internet access at the Contractor’s main office.
 - b. Adobe Acrobat (www.adobe.com), Bluebeam PDF Revu (www.bluebeam.com), or other similar PDF review software for applying electronic stamps and comments.
 - 5. The General Contractor is responsible for maintaining and keeping Submittal Exchange active throughout the entire project, including closeout documents.
 - C. Procedures:
 - 1. Shop drawing and product data submittals shall be transmitted to Architect in electronic (PDF) format using **Submittal Exchange**, a website service designed specifically for transmitting submittals between construction team members.
 - 2. The intent of electronic submittals is to expedite the construction process by reducing paperwork, improving information flow, and decreasing turnaround time.
 - 3. The electronic submittal process is not intended for color samples, color charts, or physical material samples.
 - 4. Submittal Preparation – the Contractor may use any or all of the following options:
 - a. Subcontractors and Suppliers provide electronic (PDF) submittals to the Contractor via the **Submittal Exchange** website.
 - b. Subcontractors and Suppliers provide paper submittals to the General Contractor who electronically scans and converts to PDF format.
 - c. Subcontractors and Suppliers provide paper submittals to Scanning Service which electronically scans and converts to PDF format.
 - 5. The Contractor shall review and apply electronic stamp certifying that the submittal complies with the requirements of the Contract Documents including verification of manufacturer / product, dimensions and coordination of information with other parts of the work.

6. The Contractor shall transmit each submittal to Architect using the Submittal Exchange website, www.submittalexchange.com.
7. The Architect / Engineer review comments will be made available on the Submittal Exchange website for downloading. Contractor will receive email notice of completed review.
8. Distribution of reviewed submittals to subcontractors and suppliers is the responsibility of the Contractor.
9. Submit paper copies of reviewed submittals at project closeout for record purposes in accordance with Section 01770 – Closeout Procedures.

D. Related Sections include the following:

1. Division 1 Section 01290 "Payment Procedures" for submitting Applications for Payment and the Schedule of Values.
2. Division 1 Section 01320 "Construction Progress Documentation" for submitting schedules and reports, including Contractor's Construction Schedule and the Submittals Schedule.
3. Division 1 Section 01322 "Photographic Documentation" for submitting construction photographs and construction videotapes.
4. Division 1 Section 01770 "Closeout Procedures" for submitting warranties.
5. Division 1 Section 01781 "Project Record Documents" for submitting Record Drawings, Record Specifications, and Record Product Data.
6. Division 1 Section 01782 "Operation and Maintenance Data" for submitting operation and maintenance manuals.
7. Division 1 Section 01820 "Demonstration and Training" for submitting videotapes of demonstration of equipment and training of Owner's personnel.
8. Divisions 2 through 16 Sections for specific requirements for submittals in those Sections.

1.3 DEFINITIONS

- A. Action Submittals: Written and graphic information that requires Architect's responsive action.
- B. Informational Submittals: Written information that does not require Architect's responsive action. Submittals may be rejected for not complying with requirements.

1.4 SUBMITTAL PROCEDURES

- A. General: Electronic copies of CAD Drawings of the Contract Drawings will, under certain circumstances described hereinafter, be provided by Architect for Contractor's use in preparing submittals.
- B. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.
- C. Submittals Schedule: Comply with requirements in Division 1 Section 01320 "Construction Progress Documentation" for list of submittals and time requirements for scheduled performance of related construction activities.
- D. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including re-submittals.

1. Initial Review: Allow **14** business days for initial review of each digital submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.
 2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
 3. Re-submittal Review: Allow **10** business days for review of each re-submittal.
 4. Sequential Review: Where sequential review of submittals by Architect's consultants, Owner, or other parties is indicated, allow **10** business days for initial review of each submittal.
 - a. Structural, mechanical, plumbing, electrical, civil, audio/visual, sound system, and kitchen equipment components are examples of the Work that require sequential review. Architect will advise if there are others.
- E. Identification: Place a permanent label or title block on each submittal for identification.
1. Indicate name of firm or entity that prepared each submittal on label or title block.
 2. Provide a space approximately 6 by 8 inches on label or beside title block to record Contractor's review and approval markings. Provide another area of this same size for the Architect to affix his stamp. Stamp includes the following four categories: Reviewed, Furnish as Noted, Rejected, Revise and Resubmit; the Architect will mark one or more of these categories and return submittal to Contractor.
 3. Include the following information on label for processing and recording action taken:
 - a. Project name.
 - b. Date.
 - c. Name and address of Architect.
 - d. Name and address of Contractor.
 - e. Name and address of subcontractor.
 - f. Name and address of supplier.
 - g. Name of manufacturer.
 - h. Submittal number or other unique identifier, including revision identifier.
 - i. Submittal number shall use Specification Section number followed by a decimal point and then a sequential number (e.g., 06100.D.2.01). Re-submittals shall include an alphabetic suffix after another decimal point (e.g., 06100.D.2.R1 (R2, R3 etc. if necessary).
 - i. Number and title of appropriate Specification Section.
 - j. Drawing number and detail references, as appropriate.
 - k. Location(s) where product is to be installed, as appropriate.
 - l. Other necessary identification.
- F. Deviations: Encircle or otherwise specifically identify deviations and list the deviations from the Contract Documents on submittals and list the deviations on the transmittal form accompanying submittal.
- G. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return submittals, without review, received from sources other than Contractor.
1. Transmittal Form: Use AIA Document G810 or equivalent with at least the following information.
 - a. Project name.
 - b. Date.

- c. Destination (To:).
 - d. Source (From:).
 - e. Names of subcontractor, manufacturer, and supplier.
 - f. Category and type of submittal.
 - g. Submittal purpose and description.
 - h. Specification Section number and title.
 - i. Drawing number and detail references, as appropriate.
 - j. Transmittal number, numbered consecutively.
 - k. Submittal and transmittal distribution record.
 - l. Remarks.
 - m. Signature of transmitter.
2. On an attached separate sheet, prepared on Contractor's letterhead, record relevant information, requests for data, revisions other than those requested by Architect on previous submittals, and deviations from requirements in the Contract Documents, including minor variations and limitations. Include same label information as related submittal.
- H. Re-submittals: Make re-submittals in same form and number of copies as initial submittal.
- 1. Note date and content of previous submittal.
 - 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 - 3. Resubmit submittals until they are marked "Reviewed" or "Furnished as Noted".
- I. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
- J. Use for Construction: Use only final submittals with mark indicating "Reviewed" or "Furnished as Noted".

1.5 CONTRACTOR'S USE OF ARCHITECT'S CAD FILES

- A. General: McKee & Associates CAD Files shall not be released.
- 1. Should the Contractor require CAD Files they are encouraged to seek PDF to CAD Conversion vendors and/or software.

PART 2 - PRODUCTS

2.1 DIGITAL ACTION SUBMITTALS

- A. General: Prepare and submit Digital Action Submittals required by individual Specification Sections.
- B. All submittals shall be sent to the Architect no later than 45 calendar days from "Notice To Proceed".
- 1. Submittals shall be sent to submittals@mckeeassoc.com or the following email address: **subex-sales_ww@oracle.com** or **1-800-714-0024 ext. 1**
- C. Submittals regarding mechanical, plumbing, electrical and structural items shall be sent directly to the Engineer of record.
- 1. A digital copy of the transmittal shall be sent to the Architect at the following email address: submittals@mckeeassoc.com or **subex-sales_ww@oracle.com** or also at **1-800-714-0024 ext. 1**
- D. Product Data: Collect information into a single digital submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each the digital submittal to show which products and options are applicable.
3. Include the following information, as applicable:
 - a. Manufacturer's written recommendations.
 - b. Manufacturer's product specifications.
 - c. Manufacturer's installation instructions.
 - d. Standard color charts.
 - e. Manufacturer's catalog cuts.
 - f. Wiring diagrams showing factory-installed wiring.
 - g. Printed performance curves.
 - h. Operational range diagrams.
 - i. Mill reports.
 - j. Standard product operation and maintenance manuals.
 - k. Compliance with specified referenced standards.
 - l. Testing by recognized testing agency.
 - m. Application of testing agency labels and seals.
 - n. Notation of coordination requirements.
4. Submit Product Data before or concurrent with Samples.
5. Number of Copies: Submit digital copy of the Product Data, unless otherwise indicated. Mark up and retain returned digital copy as a Project Record Document.
- E. Digital Shop Drawings: Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
 1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Dimensions.
 - b. Identification of products.
 - c. Fabrication and installation drawings.
 - d. Roughing-in and setting diagrams.
 - e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
 - f. Shopwork manufacturing instructions.
 - g. Templates and patterns.
 - h. Schedules.
 - i. Design calculations.
 - j. Compliance with specified standards.
 - k. Notation of coordination requirements.
 - l. Notation of dimensions established by field measurement.
 - m. Relationship to adjoining construction clearly indicated.
 - n. Seal and signature of professional engineer if specified.

- o. Wiring Diagrams: Differentiate between manufacturer-installed and field installed wiring.
- 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Digital Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 30 by 42 inches.
- 3. Number of Copies:
 - a. Submit each original digital drawing submittal (specifically prepared for the project). Do not include MSDS documentation in any submittal. Architect will retain marked-up copy for his records and will return 1 (one) digital marked-up copy to the Contractor.
 - b. Submit digital copy (bound in sets) of hardware submittals, fixture schedules, manufacturers' data and all other submittals that have been prepared in an 11 inch by 17 inch or smaller format. The Architect will return 1 (one) digital copy set to the Contractor.
 - i. Upon receipt of his digital marked up shop drawings/submittals, the Contractor shall make as many copies for distribution as he deems necessary, however he shall retain one copy to mark-up further to show any and all construction changes that modify the submittal in any form. This document(s) shall be turned over to the Owner at the end of the Project along with the Record Documents.
- F. Color code: On all digital shop drawings submittals, schedules, etc., the Contractor's marks shall be in red, the Architect's in green and the Engineer's (if any involved) in blue. All comments shall be initialed by a responsible party within each organization.
- G. Samples: Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
 - 1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 - 2. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of Sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of appropriate Specification Section.
 - 3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
 - 4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available. **Colors will not be approved until all color submittals are received by the architect.**
 - a. Number of Samples: Submit two full sets of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return one submittal with options selected.
 - b. All color submittals are due within 45 days of the Notice to Proceed.
 - c. The architect will be allowed 15 days from the date of the receipt of the last color submittal to approve colors.
 - 5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of

materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

- a. Number of Samples: Submit two sets of Samples. Architect will retain one Sample set and one will be returned. Mark up returned Sample set as a Project Record Sample.
 - i. Construct a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - ii. If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.
- H. Interior Color Selections: Any submittals that are associated with the aesthetics of the interior design shall not be approved until all submittals associated with the interior design are in the Architect's possession.
- I. Submittals Schedule: Comply with requirements specified in Division 1 Section 01320 "Construction Progress Documentation."
- J. Application for Payment: Comply with requirements specified in Division 1 Section 01290 "Payment Procedures."
- K. Schedule of Values: Comply with requirements specified in Division 1 Section 01290 "Payment Procedures."

2.2 INFORMATIONAL SUBMITTALS

- A. General: Prepare and submit Informational Submittals required by other Specification Sections.
 - 1. Number of Copies: Submit digital copy of each submittal, unless otherwise indicated.
 - 2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 - 3. Test and Inspection Reports: Comply with requirements specified in Division 1 Section 01400 "Quality Requirements."
- B. Coordination Drawings: Comply with requirements specified in Division 1 Section, 01310 "Project Management and Coordination."
- C. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.
- D. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.
- E. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.
- F. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.
- G. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.
- H. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

- I. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.
- J. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- K. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - 1. Name of evaluation organization.
 - 2. Date of evaluation.
 - 3. Time period when report is in effect.
 - 4. Product and manufacturers' names.
 - 5. Description of product.
 - 6. Test procedures and results.
 - 7. Limitations of use.
- L. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.
- M. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- N. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.
- O. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Division 1 Section 01782 "Operation and Maintenance Data."
- P. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
- Q. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:
 - 1. Preparation of substrates.
 - 2. Required substrate tolerances.
 - 3. Sequence of installation or erection.
 - 4. Required installation tolerances.
 - 5. Required adjustments.
 - 6. Recommendations for cleaning and protection.

- R. **Manufacturer's Field Reports:** Prepare written information documenting factory authorized service representative's tests and inspections. Include the following, as applicable:
1. Name, address, and telephone number of factory-authorized service representative making report.
 2. Statement on condition of substrates and their acceptability for installation of product.
 3. Statement that products at Project site comply with requirements.
 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 6. Statement whether conditions, products, and installation will affect warranty.
 7. Other required items indicated in individual Specification Sections.
- S. **Insurance Certificates and Bonds:** Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.
- T. **Construction Photographs and Videotapes:** Comply with requirements specified in Division 1 Section 01322 " Photographic Documentation."
- U. **Material Safety Data Sheets (MSDSs):** Submit information directly to Owner; do not submit to Architect.
1. Architect will not review submittals that include MSDSs and will return the entire submittal for re-submittal.

2.3 DELEGATED DESIGN

- A. **Performance and Design Criteria:** Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.
- B. **Delegated-Design Submittal:** In addition to Shop Drawings, Product Data, and other required submittals, submit one copy of a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.
1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. **Review each digital submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents.** Note corrections and field dimensions. Mark with approval stamp before submitting to Architect.
- B. **Approval Stamp:** Stamp each digital submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

- A. **General:** Architect will not review digital submittals that do not bear Contractor's approval stamp and will return them without action.

- B. Action Submittals: Architect will review each digital submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each digital submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:
1. REVIEWED—Indicates that reviewed submittal is satisfactory.
 2. REJECTED—Indicates submittal is not satisfactory and another properly prepared submittal of same or another product must be prepared and resubmitted.
 3. FURNISH AS NOTED—Indicates submittal is satisfactory if the changes, modifications, notes, etc. marked by the Architect are made a part of the submittal.
 4. REVISE AND RESUBMIT—Indicates although parts of the submittal are satisfactory, there are enough significant modifications that must be made to require the Contractor, subcontractor, supplier, and/or manufacturer to provide additional essential information to his submittal and then resubmit it to the Architect.
- C. Informational Submittals: Architect will review each submittal and will not return it or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.
- D. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.
- E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

END OF SECTION

SECTION 01500 - TEMPORARY FACILITIES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including General and Supplementary Conditions and other Division 1 Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section includes requirements for temporary utilities, support facilities, and security and protection facilities.
- B. Related Sections include the following:
 - 1. Division 1 Section 01100 "Summary" for limitations on utility interruptions and other work restrictions.
 - 2. Division 1 Section 01330 "Submittal Procedures" for procedures for submitting copies of implementation and termination schedule and utility reports.
 - 3. Division 1 Section 01700 "Execution Requirements" for progress cleaning requirements.
 - 4. Divisions 2 through 16 Sections for temporary heat, ventilation, and humidity requirements for products in those Sections.
 - 5. Division 2 Section 02282 "Termite Control" for pest control.

1.3 DEFINITIONS

- A. Permanent Enclosure: As determined by Architect, permanent or temporary roofing is complete, insulated, and weathertight; exterior walls are insulated and weathertight; and all openings are closed with permanent construction or substantial temporary closures.

1.4 USE CHARGES

- A. General: Cost or use charges for temporary facilities shall be included in the Contract Sum. Allow other entities to use temporary services and facilities without cost, including, but not limited to, Architect, testing agencies, and authorities having jurisdiction.
- B. Sewer Service: Sewer connections will not be in place for most if not all of the duration of the project. When and if the off-site sewer is installed by others and sewer piping under this contract is installed, should the contractor decide to connect to the sewer he must pay all sewer use charges until the project is turned over to the Owner.
- C. Water Service: Pay water service use charges for water used by all entities for construction operations.
- D. Electric Power Service: Pay electric power service use charges for electricity used by all entities for construction operations.

1.5 SUBMITTALS

- A. Site Plan: Show temporary facilities, utility hookups, staging areas, and parking areas for construction personnel.

1.6 QUALITY ASSURANCE

- A. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.7 PROJECT CONDITIONS

- A. Temporary Use of Permanent Facilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use

as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 TEMPORARY FACILITIES

- A. Field Offices, General: Prefabricated or mobile units with serviceable finishes, temperature controls, and foundations adequate for normal loading.
 - 1. **Minimum Requirement: One (1) 10 foot wide x 44 foot long unit required.**
- B. Common-Use Field Office: Of sufficient size to accommodate needs of construction personnel. Keep office clean and orderly. Furnish and equip offices as follows:
 - 1. Furniture required for Project-site documents including file cabinets, plan tables, plan racks, and bookcases.
 - 2. Conference room of sufficient size to accommodate meetings of 10 individuals. Provide electrical power service and 120-V ac duplex receptacles, with not less than 1 receptacle on each wall. Furnish room with conference table, chairs, and 4-foot- square tack board.
 - 3. Drinking water and private toilet.
 - 4. Coffee machine and supplies.
 - 5. Heating and cooling equipment necessary to maintain a uniform indoor temperature of 68 to 72 deg F.
 - 6. Lighting fixtures capable of maintaining average illumination of 20 fc at desk height.
- C. Storage and Fabrication Sheds: Provide sheds sized, furnished, and equipped to accommodate materials and equipment for construction operations.
 - 1. Store combustible materials apart from building.

2.2 EQUIPMENT

- A. Fire Extinguishers: Portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
- B. HVAC Equipment: Provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 - 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 - 2. Heating Units: Listed and labeled for type of fuel being consumed, by a testing agency acceptable to authorities having jurisdiction and marked for intended use.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
- B. Provide each facility ready for use when needed to avoid delay. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.2 TEMPORARY UTILITY INSTALLATION

- A. General: Install temporary service or connect to existing service.
 - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services. Sanitary Sewers and Drainage: Provide temporary utilities to remove effluent lawfully.

2. Connect temporary sanitary sewer from construction office to a submerged temporary holding tank, as directed by authorities having jurisdiction.
 3. Provide erosion control structures to drain storm water from site.
- B. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction from existing water lines in the street. Contractor shall pay for any metering costs and associated fees required by the City Water Department.
- C. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking water for use of construction personnel. Comply with authorities having jurisdiction for type, number, location, operation, and maintenance of fixtures and facilities.
1. Toilets: Use of Owner's existing toilet facilities will not be permitted.
- D. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed.
- E. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
- F. Electric Power Service: Provide temporary electric meter power service and distribution system of sufficient size, capacity, and power characteristics required for construction operations. Contractor shall be responsible for any charges associated with said service.
1. Install electric power service overhead, unless otherwise indicated.
- G. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.
- H. Telephone Service: Provide temporary telephone service in common-use facilities for use by all construction personnel. Install one telephone line for each field office.
1. Provide additional telephone lines for the following:
 - a. Provide a dedicated telephone line for each facsimile machine and computer in each field office.
 2. At each telephone, post a list of important telephone numbers.
 - a. Police and fire departments.
 - b. Ambulance service.
 - c. Contractor's home office.
 - d. Architect's office.
 - e. Engineers' offices.
 - f. Owner's office.
 - g. Principal subcontractors' field and home offices.
 3. Provide superintendent with cellular telephone or portable two-way radio for use when away from field office.
- I. Electronic Communication Service: Provide temporary electronic communication service, including electronic mail, in common-use facilities, or other suitable high speed internet connection.
1. Provide DSL in primary field office.

3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
 - 1. Provide incombustible construction for offices, shops, and sheds located within construction area with good visibility of construction. Comply with NFPA 241.
 - 2. Maintain support facilities until near Substantial Completion. Remove before Substantial Completion. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Traffic Controls: Comply with requirements of authorities having jurisdiction.
 - 1. Protect existing site improvements to remain including curbs, pavement, and utilities.
 - 2. Maintain access for fire-fighting equipment and access to fire hydrants.
- C. Dewatering Facilities and Drains: Comply with requirements of authorities having jurisdiction. Maintain Project site, excavations, and construction free of water.
 - 1. Dispose of rainwater in a lawful manner that will not result in flooding Project or adjoining properties nor endanger permanent Work or temporary facilities.
- D. Project Identification and Temporary Signs: Erect Project identification, General Contractor's sign, Architect's sign and other signs as approved. Install signs where directed to inform public and individuals seeking entrance to Project. Subcontractor signs are not permitted.
- E. Waste Disposal Facilities: Provide waste-collection containers in sizes adequate to handle waste from construction operations. Comply with requirements of authorities having jurisdiction. Comply with Division 1 Section "Execution Requirements" for progress cleaning requirements.
- F. Temporary Stairs: Until permanent stairs are available, provide one temporary stair between floors, located near the center of the building.
- G. Temporary Use of Permanent Stairs: Cover finished, permanent stairs with protective covering of plywood or similar material so finishes will be undamaged at time of acceptance.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects.
 - 1. Comply with work restrictions specified in Division 1 Section "Summary."
- B. Temporary Erosion and Sedimentation Control: Comply with requirements specified in Division 2 02100 Section "Site Preparation."
- C. Stormwater Control: Comply with authorities having jurisdiction. Provide barriers in and around excavations and subgrade construction to prevent flooding by runoff of stormwater from heavy rains.
- D. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- E. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
 - 1. Where heating or cooling is needed and permanent enclosure is not complete, insulate temporary enclosures.
- F. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241.
 - 1. Prohibit smoking in construction areas.

2. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition according to requirements of authorities having jurisdiction.
3. Develop and supervise an overall fire-prevention and protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

3.5 OPERATION, TERMINATION, AND REMOVAL

- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
- B. Maintenance: Maintain facilities in good operating condition until removal.
 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
- C. Temporary Facility Changeover: Do not change over from using temporary security and protection facilities to permanent facilities until Substantial Completion.
- D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or no later than Substantial Completion. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 1. Materials and facilities that constitute temporary facilities are property of Contractor. Carefully remove and turn over Architect's sign to the Architect.
 2. Where area is intended for landscape development, in an area that has been used as a compacted temporary road bed, remove soil and aggregate fill that do not comply with requirements for landscaping fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.
 3. At Substantial Completion, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements specified in Division 1 Section 01770 "Closeout Procedures."

END OF SECTION

SECTION 01600 - PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including General and Supplementary Conditions and other Division 1 Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; product substitutions; and equal products.
- B. Related Sections include the following:
 - 1. Divisions 2 through 16 Sections for specific requirements for warranties on products and installations specified to be warranted.

1.3 DEFINITIONS

- A. Products: Items purchased for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3. Equal Product: Product that is demonstrated and approved through submittal process, or where indicated as a product substitution, to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
- C. Basis-of-Design Product Specification: Where a specific manufacturer's product is named and accompanied by the words "basis of design," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating equal products of other named manufacturers.

1.4 SUBMITTALS

- A. Product List: Submit a list, in tabular form, showing specified products. Include generic names of products required. Include manufacturer's name and proprietary product names for each product.
 - 1. Coordinate product list with Contractor's Construction Schedule and the Submittals Schedule.
 - 2. Form: Tabulate information for each product under the following column headings:
 - a. Specification Section number and title.
 - b. Generic name used in the Contract Documents.
 - c. Proprietary name, model number, and similar designations.
 - d. Manufacturer's name and address.
 - e. Supplier's name and address.
 - f. Installer's name and address.
 - g. Projected delivery date or time span of delivery period.

- h. Identification of items that require early submittal approval for scheduled delivery date.
- 3. Completed List: Within 60 days after date of commencement of the Work, submit 3 copies of completed product list. Include a written explanation for omissions of data and for variations from Contract requirements.
- 4. Architect's Action: Architect will respond in writing to Contractor within 15 days of receipt of completed product list. Architect's response will include a list of unacceptable product selections and a brief explanation of reasons for this action. Architect's response, or lack of response, does not constitute a waiver of requirement to comply with the Contract Documents.
- B. Substitution Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Substitution Request Form: Use CSI Form 13.1A.
 - 2. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Statement indicating why specified materials or products cannot be provided.
 - b. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors that will be necessary to accommodate proposed substitution.
 - c. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 - d. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
 - e. Samples, where applicable or requested.
 - f. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
 - g. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - h. Research/evaluation reports evidencing compliance with building code in effect for Project, from a model code organization acceptable to authorities having jurisdiction.
 - i. Detailed comparison of Contractor's Construction Schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating lack of availability or delays in delivery.
 - j. Cost information, including a proposal of change, if any, in the Contract Sum.
 - k. Contractor's certification that proposed substitution complies with requirements in the Contract Documents and is appropriate for applications indicated.
 - l. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
- 3. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within 7 days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
 - a. Form of Acceptance: Change Order.
 - b. Use product specified if Architect cannot make a decision on use of a proposed substitution within time allocated.

- c. If Contractor's Substitution Requests are repeatedly (i.e. 3 times) submitted incomplete, i.e., no definitive response to items "a" through "l", the Architect will not consider any further Substitution Requests.
- C. Equal Product Requests: Submit three copies of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within one week of receipt of an equal product request. Architect will notify Contractor of approval or rejection of proposed equal product request within 15 days of receipt of request, or 7 days of receipt of additional information or documentation, whichever is later.
 - a. Use product specified if Architect cannot make a decision on use of an equal product request within time allocated.
- D. Basis-of-Design Product Specification Submittal: Comply with requirements in Division 1 Section 01330 "Submittal Procedures." Show compliance with requirements.

1.5 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, product selected shall be compatible with products previously selected, even if previously selected products were also options.
- B. The Contractor MUST provide the Owner with a Certificate of Asbestos Free Building Materials at the end of the project certifying that all building materials incorporated, installed, and used during the construction process of the project by the Contractor or its Subcontractors of any tier are 100% asbestos free. Asbestos Free means containing 0% asbestos in any form. The Certificate of Asbestos Free Building Materials form is included in the project manual.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
 - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 - 2. 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.
 - 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 - 4. Inspect products on delivery to ensure compliance with the Contract Documents and to ensure that products are undamaged and properly protected.
- C. Storage:
 - 1. Store products to allow for inspection and measurement of quantity or counting of units.
 - 2. Store materials in a manner that will not endanger Project structure.
 - 3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
 - 4. Store cementitious products and materials on elevated platforms.
 - 5. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
 - 6. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.

7. Protect stored products from damage and liquids from freezing.
8. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.
9. 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:
 - a. 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.
 - b. 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.
 - c. 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.
 - d. 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.
 - e. 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.

1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 1. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 2. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution. Submit a draft for approval before final execution.
 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 2. Refer to Divisions 2 through 16 Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Warranty start for mechanical and electrical equipment being date of substantial completion.
- D. General Product Requirements: Provide products that comply with the Contract Documents, that are undamaged and, unless otherwise indicated, that are new at time of installation.
 1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.

4. Where products are accompanied by the term "as selected," Architect will make selection.
5. Where products are accompanied by the term "match sample," sample to be matched is Architect's.
6. Descriptive, performance, and reference standard requirements in the Specifications establish "salient characteristics" of products.
7. Or Equal: Where products are specified by name and accompanied by the term "or equal" or "or approved equal" or "or approved," comply with provisions in Part 2 "Equal Products" Article to obtain approval for use of an unnamed product.

E. Product Selection Procedures:

1. Products and Manufacturers: In particular instances there may only be a single product or manufacturer appropriate for use on the project, in which case where Specifications name a single product and manufacturer and say "no equal", provide the named product.
2. Products and Manufacturers: When one or two products or manufacturers are specified and have the words "or approved equal", the Contractor may propose to provide alternatives in the form of a Substitution Request which once reviewed by the Architect will be either accepted or rejected. If Substitution Request is submitted for approval 7 days prior to the receipt of bids and approved by the Architect, said approvals will be included in Addenda. Only those Substitution Requests listed as approved in Addenda may bid the project.
3. Products and Manufacturers: Where Specifications include a list of three (3) or more names of both products and manufacturers, provide one of the products listed that complies with requirements. No substitutions will be accepted.
4. Basis-of-Design Product: Where Specifications name a product and include a list of manufacturers, provide the specified product or an equal product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named.
5. Visual Matching Specification: Where Specifications require matching an established Sample, product must comply with all requirements and must match Architect's sample. Architect's decision will be final on whether a proposed product matches.
 - a. If no product available within specified category matches and complies with other specified requirements, comply with provisions in Part 2 "Product Substitutions" Article for proposal of product
6. Visual Selection Specification: Where Specifications include the phrase "as selected from manufacturer's colors, patterns, textures" or a similar phrase, select a product that complies with other specified requirements.
 - a. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that does not include premium items.
 - b. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.

1.8 PRODUCT SUBSTITUTIONS

- A. Timing: Architect will consider requests for substitution under the conditions set forth in this section under Product Selection Procedures, if received within 60 days after the Notice to Proceed. Requests received after that time may be considered or rejected at discretion of Architect.
- B. Conditions: Architect will consider Contractor's request for substitution under the conditions set forth in this section under Product Selection Procedures and when the following conditions are satisfied. If the following conditions are not satisfied,

- C. Architect will return requests without action, except to record noncompliance with these requirements:
1. Requested substitution offers Owner a substantial advantage in cost, time, energy conservation, or other considerations, after deducting additional responsibilities Owner must assume. Owner's additional responsibilities may include compensation to Architect for redesign and evaluation services, increased cost of other construction by Owner, and similar considerations.
 2. Requested substitution requires no or only very minor revisions (as determined by the Architect), to the Contract Documents.
 3. Requested substitution is consistent with the Contract Documents and will produce indicated results.
 4. Substitution request is fully documented and properly submitted.
 5. Requested substitution will not adversely affect Contractor's Construction Schedule.
 6. Requested substitution has received necessary approvals of authorities having jurisdiction.
 7. Requested substitution is compatible with other portions of the Work.
 8. Requested substitution has been coordinated with other portions of the Work.
 9. Requested substitution provides specified warranty.
 10. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

PART 2 - NOT APPLICABLE

PART 3 - NOT APPLICABLE

END OF SECTION

SECTION 01700 - EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including General and Supplementary Conditions and other Division 1 Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Construction layout.
 - 2. Field engineering and surveying.
 - 3. General installation of products.
 - 4. Coordination of Owner-installed products.
 - 5. Progress cleaning.
 - 6. Starting and adjusting.
 - 7. Protection of installed construction.
 - 8. Correction of the Work.
- B. Related Sections include the following:
 - 1. Division 1 Section 01310 "Project Management and Coordination" for procedures for coordinating field engineering with other construction activities.
 - 2. Division 1 Section 01330 "Submittal Procedures" for submitting surveys.
 - 3. Division 1 Section 01770 "Closeout Procedures" for submitting Project Record Documents, recording of Owner-accepted deviations from indicated lines and levels, and final cleaning.

1.3 SUBMITTALS

- A. Qualification Data: For professional engineer.
- B. Certificates: Submit certificate signed by professional engineer certifying that location and elevation of improvements comply with requirements.
- C. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.
- D. Certified Surveys: Submit two copies signed by professional engineer.

1.4 QUALITY ASSURANCE

- A. Land Surveyor Qualifications: A professional land surveyor who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing land-surveying services of the kind indicated.

PART 2 - EXECUTION

2.1 EXAMINATION

- A. Existing Conditions: The existence and location of site improvements, utilities, and other construction indicated as existing are not guaranteed. Before beginning work, investigate and verify the existence and location of mechanical and electrical systems and other construction affecting the Work.
 - 1. Before construction, verify the location and points of connection of utility services.
- B. Existing Utilities: The existence and location of underground and other utilities and construction

indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.

1. Before construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping; and underground electrical services.
 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.
- C. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 - a. Description of the Work.
 - b. List of detrimental conditions, including substrates.
 - c. List of unacceptable installation tolerances.
 - d. Recommended corrections.
 2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

2.2 PREPARATION

- A. Existing Utility Information: Furnish information to local utility and Owner that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.
- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents. Submit requests on RFI, "Request for Interpretation."

2.3 CONSTRUCTION LAYOUT

- A. Verification: Before proceeding to lay out the Work, verify layout information shown on Drawings, in relation to the property survey and existing benchmarks. If discrepancies are discovered, notify Architect promptly.
- B. General: Engage a professional engineer to lay out the Work using accepted surveying practices.
 1. Establish benchmarks and control points to set lines and levels at each story of construction and elsewhere as needed to locate each element of Project.
 2. Establish dimensions within tolerances indicated. Do not scale Drawings to obtain required

dimensions.

3. Inform installers of lines and levels to which they must comply.
 4. Check the location, level and plumb, of every major element as the Work progresses.
 5. Notify Architect when deviations from required lines and levels exceed allowable tolerances.
 6. Close site surveys with an error of closure equal to or less than the standard established by authorities having jurisdiction.
- C. Site Improvements: Locate and lay out site improvements, including pavements, grading, fill and topsoil placement, utility slopes, and invert elevations.
- D. Building Lines and Levels: Locate and lay out control lines and levels for structures, building foundations, column grids, and floor levels, including those required for mechanical and electrical work. Transfer survey markings and elevations for use with control lines and levels. Level foundations and piers from two or more locations.
- E. Record Log: Maintain a log of layout control work. Record deviations from required lines and levels. Include beginning and ending dates and times of surveys, weather conditions, name and duty of each survey party member, and types of instruments and tapes used. Make the log available for reference by Architect.

2.4 FIELD ENGINEERING

- A. Reference Points: Locate existing permanent benchmarks, control points, and similar reference points before beginning the Work. Preserve and protect permanent benchmarks and control points during construction operations.
1. Do not change or relocate existing benchmarks or control points without prior written approval of Architect. Report lost or destroyed permanent benchmarks or control points promptly. Report the need to relocate permanent benchmarks or control points to Architect before proceeding.
 2. Replace lost or destroyed permanent benchmarks and control points promptly. Base replacements on the original survey control points.
- B. Benchmarks: Establish and maintain a minimum of two permanent benchmarks on Project site, referenced to data established by survey control points. Comply with authorities having jurisdiction for type and size of benchmark.
1. Record benchmark locations, with horizontal and vertical data on Project Record Documents.
 2. Where the actual location or elevation of layout points cannot be marked, provide temporary reference points sufficient to locate the Work.
 3. Remove temporary reference points when no longer needed. Restore marked construction to its original condition.
- C. Certified Survey: On completion of foundation walls, major site improvements, and other work requiring field-engineering services, prepare a certified survey showing dimensions, locations, angles, and elevations of construction and sitework.
- D. Final Property Survey: Submit a final property survey certifying exact locations of site improvements including building(s), parking lots, roadways and utilities including structure elevations, top and invert, distances from property lines, and with any variation from the original civil staking and layout and utility drawings identified.

2.5 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
1. Make vertical work plumb and make horizontal work level.
 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.

3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
 4. Maintain minimum headroom clearance of 8 feet in spaces without a suspended ceiling unless shown otherwise on drawings.
- B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
 - C. Install products at the time and under conditions that will ensure the best possible results.
 - D. Maintain conditions required for product performance until Substantial Completion.
 - E. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
 - F. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.
 - G. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
 - H. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.
 1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
 2. Allow for building movement, including thermal expansion and contraction.
 3. Coordinate installation of anchorages. 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.
 - I. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
 - J. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

2.6 OWNER-INSTALLED PRODUCTS

- A. Site Access: Provide access to Project site for Owner's construction forces.
- B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction forces.
 1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
 2. Pre-installation Conferences: Include Owner's construction forces at pre-installation conferences covering portions of the Work that are to receive Owner's work. Attend pre-installation conferences conducted by Owner's construction forces if portions of the Work depend on Owner's construction.

2.7 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.
 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg F.
 3. Containerize hazardous and unsanitary waste materials separately from other waste.

Mark containers appropriately and dispose of legally, according to regulations.

- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - 1. Remove liquid spills promptly.
 - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces in Finished Areas: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

2.8 STARTING AND ADJUSTING

- A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Division 1 Section 01400 "Quality Requirements."

2.9 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

2.10 CORRECTION OF THE WORK

- A. Repair or remove and replace defective construction. Restore damaged substrates and finishes.
 - 1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.
- B. Restore permanent facilities used during construction to their specified condition.
- C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

- D. Repair components that do not operate properly. Remove and replace operating components that cannot be repaired.
- E. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

PART 3 – NOT APPLICABLE

END OF SECTION

SECTION 01770 - CLOSEOUT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including General and Supplementary Conditions and other Division 1 Specification Sections apply to this Section.

1.2 SUMMARY

- B. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:
 - 1. Inspection procedures.
 - 2. Warranties.
 - 3. Final cleaning.

1.3 SUBSTANTIAL COMPLETION

- A. Preliminary Procedures: Before requesting inspection for determining date of Substantial Completion, complete the following. List items below that are incomplete in request.
 - 1. Prepare a list of items to be completed and corrected (punch list), the value of items on the list, and reasons why the Work is not complete.
 - 2. Advise Owner of pending insurance changeover requirements.
 - 3. Submit specific warranties, workmanship bonds, maintenance service agreements, final certifications, and similar documents.
 - 4. Obtain and submit releases permitting Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
 - 5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs, damage or settlement surveys, property surveys, and similar final record information.
 - 6. Deliver spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
 - 7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
 - 8. Complete startup testing of systems.
 - 9. Submit test/adjust/balance records.
 - 10. Terminate and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
 - 11. Advise Owner of changeover in heat and other utilities.
 - 12. Submit changeover information related to Owner's occupancy, use, operation, and maintenance.
 - 13. Complete final cleaning requirements, including touchup painting.
 - 14. Touch up and otherwise repair and restore marred exposed finishes to eliminate visual defects.
- B. Inspection: Submit a written request for inspection for Substantial Completion. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare the Certificate of Substantial Completion after inspection or will notify Contractor of items, either on Contractor's list or additional items identified by Architect, that must be completed or corrected before certificate will be issued.

1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.
2. Results of completed inspection will form the basis of requirements for Final Completion.

1.4 FINAL COMPLETION

- A. Preliminary Procedures: Before requesting final inspection for determining date of Final Completion, complete the following:
 1. Submit a final Application for Payment according to Division 1 Section 01290 "Payment Procedures."
 2. Submit certified copy of Architect's Substantial Completion inspection list of items to be completed or corrected (punch list), endorsed and dated by Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance.
 3. Submit evidence of final, continuing insurance coverage complying with insurance requirements.
 4. Submit pest-control final inspection report and warranty.
 5. Instruct Owner's personnel in operation, adjustment, and maintenance of products, equipment, and systems. Submit demonstration and training videotapes.
- B. Inspection: Submit a written request for final inspection for acceptance. On receipt of request, Architect will either proceed with inspection or notify Contractor of unfulfilled requirements. Architect will prepare a final Certificate for Payment after inspection or will notify Contractor of construction that must be completed or corrected before certificate will be issued.
 1. Re-inspection: Request re-inspection when the Work identified in previous inspections as incomplete is completed or corrected.

1.5 LIST OF INCOMPLETE ITEMS (PUNCH LIST)

- A. Preparation: Submit three copies of list. Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
 1. Mark the Architect's punch-list so-as-to identify those items that are still outstanding and uncorrected at the time of submission.

1.6 WARRANTIES

- A. Submittal Time: Submit written warranties on request of Architect for designated portions of the Work where commencement of warranties other than date of Substantial Completion is indicated.
- B. Organize warranty documents into an orderly sequence based on the table of contents of the Project Manual.
 1. Bind warranties and bonds in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
 2. Provide heavy paper dividers with plastic-covered tabs for each separate warranty. Mark 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 Installer.
 3. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project name, and name of Contractor.
- C. Provide additional copies of each warranty to include in operation and maintenance manuals.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 - 1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion for Project.
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - d. Clean exposed exterior and interior hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Avoid disturbing natural weathering of exterior surfaces. Restore reflective surfaces to their original condition.
 - e. Remove debris and surface dust from limited access spaces, including roofs, plenums, shafts, trenches, equipment vaults, manholes, attics, and similar spaces.
 - f. Remove labels that are not permanent.
 - g. Touch up and otherwise repair and restore marred, exposed finishes and surfaces. Replace finishes and surfaces that cannot be satisfactorily repaired or restored or that already show evidence of repair or restoration.
 - i. Do not paint over "UL" and similar labels, including mechanical and electrical nameplates.
 - h. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - i. Replace parts subject to unusual operating conditions.
 - j. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.
 - k. Clean ducts, blowers, and coils if units were operated without filters during construction.
 - l. Leave Project clean and ready for occupancy.

END OF SECTION

SECTION 01781 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including General and Supplementary Conditions and other Division 1 Specification Sections apply to this Section.

1.2 SUMMARY

- B. This Section includes administrative and procedural requirements for Project Record Documents, including the following:
 - 1. Digital Record Drawings.
 - 2. Digital Record Specifications.
 - 3. Digital Record Product Data.

1.3 SUBMITTALS

- A. Record Drawings: Comply with the following:
 - 1. Number of Copies: Submit one set of digitally scanned marked-up Record Prints.
- B. Record Specifications: Submit one copy of digitally scanned Project Specifications, including addenda and contract modifications.
- C. Record Product Data: Submit one digitally scanned copy of each Product Data submittal.
- D. Where Record Product Data is required as part of operation and maintenance manuals, submit marked-up Product Data as an insert in manual instead of submittal as Record Product Data.

PART 2 - PRODUCTS

2.1 RECORD DRAWINGS

- A. Record Prints: Maintain one clean set of blue- or black-line white prints of the Contract Drawings and Shop Drawings and one copy of the project manual (specification) at the job site for the sole purpose of recording changes to the drawings and specifications.
- B. Preparation: Mark Record Prints to show the actual installation where installation varies from that shown originally. Require individual or entity who obtained record data, whether individual or entity is Installer, subcontractor, or similar entity, to prepare the marked-up Record Prints.
 - 1. Give particular attention to information on concealed elements that would be difficult to identify or measure and record later.
 - 2. Accurately record information in an understandable drawing technique.
 - 3. Record data as soon as possible after obtaining it. Record and check the markup before enclosing concealed installations.
- C. Content: Types of items requiring marking include, but are not limited to, the following:
 - 1. Dimensional changes to Drawings.
 - 2. Revisions to details shown on Drawings.
 - 3. Locations and depths of underground utilities.
 - 4. Revisions to routing of piping and conduits.
 - 5. Revisions to electrical circuitry.
 - 6. Actual equipment locations.
 - 7. Duct size and routing.
 - 8. Locations of concealed internal utilities.

9. Changes made by Change Order or Construction Change Directive. (Posted on Documents.)
 10. Changes made following Architect's written orders, i.e. ASIs. (Posted on Documents.)
 11. Details not on the original Contract Drawings. (Posted on Documents.)
 12. Field records for variable and concealed conditions.
 13. Record information on the Work that is shown only schematically.
 14. Changes made in response to Contractor's questions, i.e. RFIs. (Posted on Documents.)
- D. Mark the Contract Drawings or Shop Drawings, whichever is most capable of showing actual physical conditions, completely and accurately. If Shop Drawings are marked, show cross-reference on the Contract Drawings.
 - E. Mark record sets with erasable, red-colored pencil. Use other colors to distinguish between changes for different categories of the Work at same location.
 - F. Mark important additional information that was either shown schematically or omitted from original Drawings.
 - G. Note Construction Change Directive numbers, alternate numbers, Change Order numbers, and similar identification, where applicable. Where posting is required, post on Drawing Set and in Specifications on sheets or pages adjacent to or on top of where modification applies.
 - H. Attachment method shall be taped at top only, so as to access original underneath.
 - I. Digitally scan all documents and provide on CD Rom to Architect.

2.2 RECORD SPECIFICATIONS

- A. Preparation: Mark Specifications to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications. Maintain one clean copy of the project manual (specification) at the job site for the sole purpose of recording changes to the drawings and specifications.
 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 3. Record the name of manufacturer, supplier, Installer, and other information necessary to provide a record of selections made.
 4. For each principal product, indicate whether Record Product Data has been submitted in operation and maintenance manuals instead of submitted as Record Product Data.
 5. Note related Change Orders, Record Product Data, and Record Drawings where applicable.
- B. Digitally scan all documents and provide on CD Rom to Architect.

2.3 RECORD PRODUCT DATA

- A. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
- B. Maintain one clean set at the job site for the sole purpose of recording changes to the drawings and specifications.
 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 3. Note related Change Orders, Record Specifications and Record Drawings where applicable.
- C. Digitally scan all documents and provide on CD Rom to Architect.

2.4 MISCELLANEOUS RECORD SUBMITTALS

- A. Assemble miscellaneous records required by other Specification Sections for miscellaneous record keeping and submittal in connection with actual performance of the Work. Bind or file miscellaneous records and identify each, ready for continued use and reference.

PART 3 - RECORDING AND MAINTENANCE

- A. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and modifications to Project Record Documents as they occur; do not wait until the end of Project.
- B. Maintenance of Record Documents and Samples: Store Record Documents and Samples in the field office apart from the Contract Documents used for construction. Do not use Project Record Documents for construction purposes. Maintain Record Documents in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents for Architect's reference during normal working hours. Architect's representative will review Record Documents with the project superintendent each month to determine to his satisfaction whether or not Record Documents are being kept up to date. Failure to do so will result in the delay of processing pay request until Record Documents are brought up to date.

END OF SECTION

SECTION 01782 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including General and Supplementary Conditions and other Division 1 Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation and maintenance documentation directory.
 - 2. Emergency manuals.
 - 3. Operation manuals for systems, subsystems, and equipment.
 - 4. Maintenance manuals for the care and maintenance of products, materials, finishes, systems and equipment.

1.3 DEFINITIONS

- A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.
- B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 SUBMITTALS

- A. Submittal: Submit one copy of each manual in final form at least 15 days before final inspection. Architect will return copy with comments within 15 days after final inspection.
 - 1. Correct or modify each manual to comply with Architect's comments. Submit three copies of each corrected manual within 15 days of receipt of Architect's comments.

1.5 COORDINATION

- A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

- A. Organization: Include a section in the directory for each of the following:
 - 1. List of documents.
 - 2. List of systems.
 - 3. List of equipment.
 - 4. Table of contents.
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE

Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.2 MANUALS, GENERAL

- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
 - 1. Title page.
 - 2. Table of contents.
 - 3. Manual contents.
- B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:
 - 1. Subject matter included in manual.
 - 2. Name and address of Project.
 - 3. Name and address of Owner.
 - 4. Date of submittal.
 - 5. Name, address, and telephone number of Contractor.
 - 6. Name and address of Architect.
 - 7. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.
 - 1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
 - 1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.
 - a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross-reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.
 - b. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets.
 - 2. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual.
 - 3. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.
 - 4. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
 - 5. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.
 - a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
 - b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual,

insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.3 EMERGENCY MANUALS

- A. Content: Organize manual into a separate section for each of the following:
 - 1. Type of emergency.
 - 2. Emergency instructions.
 - 3. Emergency procedures.
- B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:
 - 1. Fire.
 - 2. Flood.
 - 3. Gas leak.
 - 4. Water leak.
 - 5. Power failure.
 - 6. Water outage.
 - 7. System, subsystem, or equipment failure.
 - 8. Chemical release or spill.
- C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.
- D. Emergency Procedures: Include the following, as applicable:
 - 1. Instructions on stopping.
 - 2. Shutdown instructions for each type of emergency.
 - 3. Operating instructions for conditions outside normal operating limits.
 - 4. Required sequences for electric or electronic systems.
 - 5. Special operating instructions and procedures.

2.4 OPERATION MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
 - 1. System, subsystem, and equipment descriptions.
 - 2. Performance and design criteria if Contractor is delegated design responsibility.
 - 3. Operating standards.
 - 4. Operating procedures.
 - 5. Operating logs.
 - 6. Wiring diagrams.
 - 7. Control diagrams.
 - 8. Piped system diagrams.
 - 9. Precautions against improper use.
 - 10. License requirements including inspection and renewal dates.
- B. Descriptions: Include the following:
 - 1. Product name and model number.

2. Manufacturer's name.
 3. Equipment identification with serial number of each component.
 4. Equipment function.
 5. Operating characteristics.
 6. Limiting conditions.
 7. Performance curves.
 8. Engineering data and tests.
 9. Complete nomenclature and number of replacement parts.
- C. Operating Procedures: Include the following, as applicable:
1. Startup procedures.
 2. Equipment or system break-in procedures.
 3. Routine and normal operating instructions.
 4. Regulation and control procedures.
 5. Instructions on stopping.
 6. Normal shutdown instructions.
 7. Seasonal and weekend operating instructions.
 8. Required sequences for electric or electronic systems.
 9. Special operating instructions and procedures.
- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.
- E. Piped Systems: Diagram piping as installed and identify color-coding where required for identification.

2.5 PRODUCT MAINTENANCE MANUAL

- A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
- C. Product Information: Include the following, as applicable:
1. Product name and model number.
 2. Manufacturer's name.
 3. Color, pattern, and texture.
 4. Material and chemical composition.
 5. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
1. Inspection procedures.
 2. Types of cleaning agents to be used and methods of cleaning.
 3. List of cleaning agents and methods of cleaning detrimental to product.
 4. Schedule for routine cleaning and maintenance.

5. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 1. Include procedures to follow and required notifications for warranty claims.

2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.
- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
 1. Standard printed maintenance instructions and bulletins.
 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 3. Identification and nomenclature of parts and components.
 4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
 1. Test and inspection instructions.
 2. Troubleshooting guide.
 3. Precautions against improper maintenance
 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 5. Aligning, adjusting, and checking instructions.
 6. Demonstration and training videotape, if available.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
 1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Maintenance Service: Some equipment and products require maintenance by the manufacturer, supplier or subcontractor, i.e., an authorized service representative, as part of the warranty. The General Contractor shall ensure that said maintenance work is done and provide copies of service reports to the Owner.
- H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

- A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.
- B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.
- C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.
- D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.
 - 1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
 - 2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.
- E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.
 - 1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.
- F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.
 - 1. Do not use original Project Record Documents as part of operation and maintenance manuals.
 - 2. Comply with requirements of Record Drawings in Division 1 Section 01781 "Project Record Documents."
- G. Comply with Division 1 Section 01770 "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION

SECTION 01820 - DEMONSTRATION AND TRAINING

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract including General and Supplementary Conditions and other Division 1 Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
 - 1. Demonstration of operation of systems, subsystems, and equipment.
 - 2. Training in operation and maintenance of systems, subsystems, and equipment.
 - 3. Demonstration and training digital media.

1.3 SUBMITTALS

- A. Instruction Program: Submit two copies of outline of instructional program for demonstration and training, including a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.
 - 1. At completion of training, submit one complete training manual for Owner's use.

1.4 QUALITY ASSURANCE

- A. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 1 Section 01400 "Quality Requirements," experienced in operation and maintenance procedures and training.

1.5 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a combined training manual.
- B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

- A. Instructor: Engage a qualified instructor to prepare instruction program and training modules, and

to coordinate between Contractor and Owner for number of participants, instruction times, and location.

- B. Instructor shall demonstrate to Owner's personnel how to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
- C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
 - 1. Schedule training with Owner, through Architect, with at least seven days' advance notice.

END OF SECTION

SECTION 02070 - SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 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.

1.2 DESCRIPTION OF WORK

- A. Extent of demolition work is shown on drawings, as well as all items necessary to complete new work indicated on plans.
- B. Schedule of Demolition Work: Demolition includes but is not limited to the following:
 - 1. Any damage to existing facilities at the site after the Contractor takes possession shall be repaired by this Contractor at his expense.
 - 2. Contractor shall replace grass/sod damaged during the construction. Fill in ruts caused by equipment with topsoil and grass over to match existing conditions.
 - 3. As indicated on the Drawings.
 - 4. All other items indicated required to be demolished to complete new work.

1.3 SUBMITTALS

- A. Schedule: Submit proposed methods and operations of demolition work to Architect for review prior to start of work. Include in schedule coordination for shut-off, capping and continuation of utility services as required.
 - 1. Provide a detailed sequence of demolition and removal work to ensure uninterrupted progress of Owner's on-site operations.

1.4 JOB CONDITIONS

- A. Condition of Structures: Conditions existing at time of inspection for bidding purposes will be maintained by Owner in so far as practicable.
- B. Explosives: Use of explosives will not be permitted.
- C. Traffic: Conduct demolition operations and removal of debris to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.
- D. Do not close or obstruct streets, walks or other occupied or used facilities without permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.
- E. Protections: Ensure safe passage of persons (night or day) around area of demolition. Conduct operations to prevent injury to adjacent buildings, structures, other facilities and persons.
 - 1. Erect temporary covered passageways as required by authorities having jurisdiction.
 - 2. Provide temporary fencing as necessary to secure the limits of construction. Fencing shall be substantial to deter passage, fencing material shall be at Contractors discretion.
- F. Damages: Promptly repair damages caused to adjacent facilities by demolition operations at no cost to Owner.
- G. Utility Services: Maintain existing utilities indicated to remain, keep in service, and protect against damage during demolition operations.
 - 1. Do not interrupt existing utilities serving occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.
 - 2. All electrical work to be removed, relocated or reconnected shall be performed by a licensed Electrical Contractor in accordance with the NEC and any applicable local codes and

Renovations of the Arts Center To
Goshen High School for the
Pike County Schools
Troy, Alabama

SELECTIVE DEMOLITION
02070-1

ordinances.

PART 2 – PRODUCTS [NOT APPLICABLE]

PART 3 - EXECUTION

3.1 DEMOLITION - DISPOSAL OF DEMOLISHED MATERIALS

- A. General: Remove from site debris, rubbish and other materials resulting from demolition operations.
- B. Burning of removed materials from demolished structures will not be permitted on site.
- C. Removal: Transport materials removed from demolished structures and legally dispose of off-site, in area approved by all local authorities and ADEM.

END OF SECTION

SECTION 02100 - SITE PREPARATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract including General and Supplementary Conditions and Division 1 Specification Sections apply to work of this section.

1.2 DESCRIPTION OF WORK

- B. Perform site preparation work as shown and specified. Site preparation includes, but is not limited to the following:
 - 1. Protection of existing trees to remain
 - 2. Removal of trees and other vegetation.
 - 3. Stripping and stockpiling of topsoil.
 - 4. Clearing and grubbing.
 - 5. Removing above grade improvements.
 - 6. Removing below grade improvements.
 - 7. Installation of erosion control devices.

1.3 JOB CONDITIONS

- A. Protection of Existing Trees and Vegetation: Protect existing trees and other vegetation indicated to remain in place, against unnecessary cutting, breaking or skinning of roots, skinning and bruising of bark, smothering of trees by stockpiling construction materials or excavated materials within drip line, excess foot or vehicular traffic, or parking of vehicles within drip line. Provide temporary guards to protect trees and vegetation to be left standing. Leave all protection in place and maintain until construction work has been completed and all danger of damage has passed. Protection shall be removed only after approval is given by Architect.

1.4 QUALITY ASSURANCE

- A. **The General Contractor shall obtain (*In accordance with ADEM Admin. Code Chapter 335-6-12*) an ADEM storm water permit from the State of Alabama. An NPDES construction site also includes construction sites, irrespective of size, whose stormwater discharges have a reasonable potential to be a significant contributor of pollutants to a water of the State, or whose stormwater discharges have a reasonable potential to cause or contribute to a violation of an applicable Alabama water quality standard as determined by the Department. The General Contractor shall include in Base Bid all permit fees associated to obtain this permit. The Contractor shall submit a Notice of Registration, the fee and develop a Construction Best Management Practices Plan (CBMPP) prior to construction and shall maintain all erosion control measures until the permit is relinquished.**
- A. The Contractor shall use care when working near existing and future installed Best Management Practice (BMP) structures to prevent damage to the structures resulting in erosion and storm water runoff containing silt and soil from the site. The Contractor shall walk the site and verify the condition of the BMP structures during the execution of the work. Any repair work that is deemed necessary as a result of damage caused by the Contractor shall be the responsibility of the Contractor and shall be performed prior to payment of the next scheduled payment application.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Temporary Soil Erosion and Sediment Control Items: Items including silt fence, wattles, inlet protection, sand bags and other erosion control items are to meet the requirements of Section 665 of the Alabama Department of Transportation Standard Specifications for Highway Construction (ALDOTSSHC), latest edition.

PART 3 - EXECUTION

3.1 EROSION CONTROL

- A. Prior to the starting of any work, install erosion control measures as required in the Erosion Control or Best Management Practice Plan. Maintain all erosion control measures in place during full construction period and until such time as the site is substantially vegetated. Install erosion control measures in accordance with Section 665 of the Alabama Department of Transportation Standard Specifications for Highway Construction (ALDOTSSH), latest edition, and the manufacturer's recommendations. Inspection of the silt fence shall be daily, and repair or replacement must be made promptly as required. Any sediment collected by the erosion control measures must be removed when it reaches 6" in height. Erosion control measures shall be removed only after approval is given by the Architect. Removal of erosion control measures is to be carried out by the Contractor who installed the measures.

3.2 SITE CLEARING

- A. General: Remove vegetation, improvements or obstructions interfering with installation of new construction and within limits indicated on the Drawings. Remove all demolished items from the site. Removal includes digging out stumps and roots. Carefully and cleanly cut roots and branches of trees indicated to be left standing where such roots and branches obstruct new construction.
- B. Clearing and Grubbing: Clear site of trees, shrubs and other vegetation, except for those indicated to be left standing. Completely remove stumps, roots and other debris protruding through ground surface. Do not grub inside the drip line of trees to remain. On site burning is not permitted.
- C. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated. Place fill material in horizontal layers not exceeding 8" loose depth and thoroughly compact to a density equal to adjacent original ground.
- D. Positive drainage must be maintained or installed by the Contractor to insure that storm water runoff flows to the proper drainage structure or swale.
- E. Restore all areas disturbed by construction activities and which are outside the limits of clearing as indicated on the drawing to their original condition. The expense for this work will be borne by the contractor. The work must be in accordance with the directions of the Architect.

3.3 STRIPPING TOPSOIL

- A. Topsoil is defined as friable clay loam surface soil found in a depth of not less than 4". Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones and other objects over 2" in diameter, and without weeds, roots and other objectionable material. Strip topsoil to its full depth at all areas to be regraded, resurfaced or paved in a manner to prevent intermingling with underlying subsoil or other objectionable material. Remove heavy growths of grass from areas before stripping. Where trees are indicated to be left standing, stop topsoil stripping at drip line, unless directed otherwise, to prevent damage to main root system. Stockpile topsoil in storage piles in a location acceptable to the Architect. Construct storage piles to freely drain surface water. Cover storage piles if required to prevent wind-blown dust. Maintain topsoil storage piles separate from other stockpiled soil materials.

3.4 SITE IMPROVEMENTS

- A. Remove above grade and below grade improvements necessary to permit construction, and other work as indicated. Abandonment or removal of certain underground pipe or conduits are shown on the civil drawings and is included under work of those sections. Removal of abandoned underground piping or conduit interfering with construction is included under this section.

3.5 DISPOSAL OF WASTE MATERIAL

- A. Removal from Owner's Property: Remove waste materials, including unacceptable excavated materials, trash and debris, and legally dispose of it off Owner's property site, in area approved by all local authorities and ADEM.

END OF SECTION

SECTION 02513 - ASPHALTIC CONCRETE PAVING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract, including General and Supplementary Conditions and Division 1 Specification Sections apply to work of this section.

1.2 DESCRIPTION OF WORK

- A. Extent of asphaltic concrete paving work is shown on drawings.

1.3 QUALITY ASSURANCE

- A. Referenced Standards: Where the term "Referenced Standard" is used in these Project Specifications, it shall be interpreted as **referring to the current edition of "Standard Specifications for Highway Construction, 2018" or latest edition for Alabama Department of Transportation "**. Referenced Divisions of the "Standard" are hereby made a part of this Project Specification insofar as they may be termed applicable. In no case will requirements for "Method of Measurement" and "Basis of Payment" be considered as applicable to this Project Specification.

1.4 TESTING AND INSPECTION

- A. Testing and Inspection Service: The **Owner** will select a firm to provide testing and inspection service, to include testing soil materials proposed for use in work and provide field facilities for quality control testing during paving operations and shall pay cost for testing. Spot checking of the depths of the compacted base prior to paving shall be done to verify that materials meet the minimum required thickness. Temperature and thickness of paving will be periodically monitored during the paving operation.

1.5 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.

1.6 JOB CONDITIONS

- A. Weather Limitations: Apply prime and tack coats when ambient temperature is above 50 degrees Fahrenheit and when temperature has not been below 35 degrees Fahrenheit for 12 hours immediately prior to application. Do not apply when base is wet or contains an excess of moisture.
- B. Construct asphalt concrete surface course when atmospheric temperature is above 40 degrees Fahrenheit and when base is dry. Base course may be placed when air temperature is above 30 degrees Fahrenheit and rising.
- C. Grade Control: Establish and maintain required lines and elevations.

PART 2 - PRODUCTS

2.1 MATERIALS: See Civil Drawings and Geotechnical Report for paving sections.

- A. Herbicide Treatment: Commercial chemical for weed control, registered by Environmental Protection Agency. Provide granular, liquid, or wettable powder form.
- B. Manufacturer: Subject to compliance with requirements, provide products of one of the following:
 - 1. Allied Chemical Corporation
 - 2. Achem Products, Inc.
 - 3. Ciba-Geigy Corporation
 - 4. Dow Chemical U.S.A.
 - 5. E.I. DuPont De Nemours and Company, Inc.

6. FMC Corporation
7. Thompson-Hayward Chemical Company
8. U. S. Borax and Chemical Company

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

- A. General: The top six inches of finish subgrade soil beneath pavement and base, shall be mixed, moisture adjusted and remolded in accordance with Section 230, Modified Roadbed, of the before mentioned referenced standard.
- B. Proof roll prepared subgrade surface to check for unstable areas and areas requiring additional compaction.
- C. Notify Architect of unsatisfactory conditions. Do not begin paving work until deficient subgrade areas have been corrected and are ready to receive paving.
- D. Herbicide Treatment: Apply chemical weed control agent in strict compliance with manufacturer's recommended dosages and application instructions. Apply to compacted, dry sub grade.
 1. Allow to dry until at proper condition to receive paving.

3.2 PLACING MIX

- A. General: Place asphalt concrete mixture on prepared surface, spread and strike-off. Spread mixture at minimum temperature of 225 degrees Fahrenheit. Place inaccessible and small areas by hand. Place each course to required grade, cross-section and compact thickness.
- B. Paver Placing: Place in strips not less than 10' wide, unless otherwise acceptable to Architect. After first strip has been placed and rolled, place succeeding strips and extend rolling to overlap previous strips.
- C. Joints: Make joints between old and new pavements, or between successive days' work, to ensure continuous bond between adjoining work. Construct joints to have same texture, density and smoothness as other sections of asphalt concrete course. Clean contact surfaces and apply tack coat.

3.3 ROLLING

- A. General: Begin rolling when mixture will bear roller weight without excessive displacement.
- B. Compact mixture with hot hand tampers or vibrating plate compactors in areas inaccessible to rollers.
- C. Breakdown Rolling: Accomplish breakdown or initial rolling immediately following rolling of joints and outside edge. Check surface after breakdown rolling, and repair displaced areas by loosening and filling, if required, with hot material.
- D. Second Rolling: Follow breakdown rolling as soon as possible warm enough for removal of roller marks. Continue rolling until roller marks are eliminated and course has attained maximum density.
- E. Patching: Remove and replace paving areas mixed with foreign materials and defective areas. Cut-out such areas and fill with fresh, hot asphalt concrete. Compact by rolling to maximum surface density and smoothness.
- F. Protection: After final rolling, do not permit vehicular traffic on pavement until it has cooled and hardened.
- G. Erect barricades to protect paving from traffic until mixture has cooled enough not to become marked.

3.4 TRAFFIC AND LANE MARKINGS

- A. Cleaning: Sweep and clean surface to eliminate loose material and dust.

Renovations of the Arts Center To
Goshen High School for the
Pike County Schools
Troy, Alabama

ASPHALTIC CONCRETE PAVING
02513-2

- B. Lane / Parking Marking Paint: Paint Stripes shall be equal to KRYLON INDUSTRIAL LINE-UP PAINT SB Pavement Striping Paint for Parking Lots - Solvent-Based Pavement Striping alkyd paint or equal. Color: White at typical spaces, Blue at handicapped spaces and symbol.
- C. Apply paint with mechanical equipment to produce uniform straight edges. Apply in 2 coats at manufacturer's recommended rates.

3.5 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 1/4" from required thickness.
- C. Surface Smoothness: Test finished surface of each asphalt concrete course for smoothness, using 10' straight-edge 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. Base Course Surface: 1/4".
 - 2. Wearing Course Surface: 3/16"
- D. Check surface areas at intervals as directed by Architect.

3.6 TESTING

- 1. To be performed by independent lab paid by Owner, approved by Architect.
- 2. Before delivery Bituminous Binder and Wearing Course Materials shall be tested by Lab at Suppliers production plant.
- 3. Testing shall verify that all samples meet ALDOT specifications.
- 4. Test reports sent to Architect, Owner, Contractor.

END OF SECTION

SECTION 02660 - WATER DISTRIBUTION SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract including General and Supplementary Conditions and Division 1 Specification Sections apply to work of this section.

1.2 SCOPE OF WORK

- A. The work includes construction of the water distribution system including fire lines as shown on the Drawings.
- B. Testing and disinfection of the installed system shall be incidental to the work.

1.3 QUALITY ASSURANCE

- A. Requirements of Regulatory Agencies: Comply with applicable codes, ordinances, rules, regulations, and laws of local, municipal, state or federal authorities having jurisdiction.
- B. Meet all requirements of the Local Water Authority and be subject to review by System inspectors.

1.4 SITE CONDITIONS

- A. Coordinate water distribution system with pavement construction.
- B. Install water mains when grade is within 6 in. of final grade.
- C. Coordinate the Work with the Local Water Authority and pay all tap fees assessed (to include valves, backflow preventers, vaults, etc.) for portions of the Work completed by the Utility Provider.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Water Main Piping:
 - 1. Water Service Piping: Ductile iron pipe or PVC pipe.
 - 2. Ductile Iron Pipe:
 - a. Manufactured in accordance with AWWA C-151, latest revision, Class 50, min.
 - b. Standard cement-lined and seal-coated with an approved bituminous seal coat in accordance with AWWA C-104, latest revision.
 - c. Approved push-on, conforming to AWWA C-111, latest revision.
- B. PVC Pipe:
 - 1. Constructed to meet the requirements of U. S. Department of Commerce Product Standard PS 22-70, and bear the National Sanitation Foundation Testing Laboratories, Inc., seal for potable water.
 - 2. For PVC piping less than 4" - Schedule 40, PVC, minimum; 150 psi minimum working pressure
 - 3. 4" or greater shall be C900 PVC piping.
- C. Fire Line:
 - 1. Fire line shall be C900 PVC piping. Encasement shall be used under drive areas.
 - 2. Connection to Main: Each hydrant shall be connected to the main pipe with a 6-inch ductile iron branch. Each hydrant shall be controlled by an independent 6-inch gate valve.
- D. Fire Hydrants:

1. All hydrants shall be Mueller Company, M & H, or an approved equal. Fire hydrants shall be equipped with traffic break away feature. Hydrants shall be painted in accordance with the requirements of AWWA C502.

E. Water Main Fittings:

1. Ductile iron fittings shall be provided in locations as shown on the plans or in locations deemed necessary by the Engineer. Ductile iron fittings 12" and smaller shall be rated for 350 psi working pressure. Fittings shall be manufactured in accordance with AWWA C153 and provided with mechanical joints. All fittings shall be provided with a thin cement lining in accordance with AWWA C104.
2. PVC Fittings: Fittings For PVC Water Mains Smaller Than 6 In. In. Dia.: As recommended by the manufacturer of the pipe furnished, suitable for use under the conditions specified for the pipe, with ring-tite or fluid-tite bells or spigots at all ends for jointing.

F. Valves and Boxes:

1. Cast Iron Valve Boxes shall be provided for all valves installed vertically and shall consist of a base covering the operating nut and head of the valve, a vertical shaft of at least 5 1/4" in diameter and a top section extending to a point even with the finish ground surface, provided with a cast iron cover marked "WATER." The valve box shall be placed concentrically over the operating nut. Precast concrete collars shall be provided around each valve box.
2. Valves 2" and Larger: Cast iron gate valves, AWWA type, the standard product of a recognized valve manufacturer such as Mueller, Iowa or M & H, constructed with an interchangeable parts system, with parts readily available, to meet the following requirements:
 - a. Iron body, bronze-mounted.
 - b. Double disc, parallel seat "O" ring seal.
 - c. 150 psi, min., working pressure.
 - d. Counterclockwise (left) opening.
 - e. 2 in. operating nut.
 - f. Non-rising stem.
 - g. Joints to be as required for pipe to be connected to.
3. Valves 2" and Smaller: Brass or bronze gate valves, conforming to Federal Specification WW-V-76.
4. Underground Valves: Two-piece, screw type, adjustable to suit the depth of bury and type of valve, with a min. shaft dia. of 5-1/4 in.
5. All mechanical joint valves and fittings shall be restrained by MEGALUG series 1100 restraint devices.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Line and Grade: Lay and maintain to the required lines and grades; with fittings, valves and hydrants at the required locations; and with joints centered and spigots plumb; and with all valve and hydrant stems plumb.
- B. Encasement: Piping under paved drive shall be encased with welded steel pipe casing.
- C. Laying Pipe:
 1. General: Before lowering pipe into trenches, grade the bottom of the ditch so that when pipe is in the ditch it will have a bearing for its entire length. Examine the pipe for defects and clean the inside. After placing pipe in ditch, wipe the bell, gasket, and spigot free from all dirt, sand and foreign material. Apply a film of lubricant to the gasket and spigot. Enter the plain

end into the socket after which force the pipe into the socket until it makes contact with the bottom of the socket.

2. A minimum of five (5) feet horizontal separation shall be used when installing water main or piping within areas of sanitary sewer lines. When the proposed water main or piping is required to cross sewer mains, the contractor shall encase the water main carrier pipe with a continuous pipe (sleeve or casing) of sufficient length, located such that a minimum five (5) foot horizontal separation exists between each end of the casing pipe and the sewer main. Where possible, water main shall be a minimum of 18 inches above the top elevation of the sewer main.
3. No. 12 THW copper locator wire shall be placed in the trench, 12 inches above the water mains and all service piping.
4. Trench Water: At times when pipe laying is not in progress, close the open ends of pipe by approved means, and permit no trench water to enter the pipe.
- D. Cutting Pipe: Cut pipe for inserting valves, fittings or closure pieces in a neat and workmanlike manner without damage to the pipe.
- E. Direction of Laying: Unless otherwise directed, lay pipe with bell ends facing in the direction of laying. For lines on an appreciable slope, face bells upgrade.
- F. Permissible Deflections: Wherever necessary to deflect pipe from a straight line, either in the vertical or horizontal plane, to avoid obstructing, to plumb stems, or where long radius curves are permitted, deflect as recommended by the manufacturer of the pipe.
- G. Unsuitable Conditions: Lay no pipe in water or when the trench conditions or weather is unsuitable for such work.
- H. Provide ground cover of 3 ft. min.
- I. Setting Appurtenances:
 1. Valves and Fittings: Set gate valves and pipe fittings to new pipe in the manner previously specified for cleaning, laying and jointing pipe.
 2. Valve Boxes: Firmly support cast iron valve boxes and maintain centered and plumb over the wrench nut of the gate valve, with box cover flush with the surface of the finished pavement or at such other level as may be directed.

3.2 FIELD QUALITY CONTROL

- A. Hydrostatic Tests: Pressure During Test: After the pipe has been laid and partially backfilled as specified, pressure test all newly laid pipe, or any valved section of it, in accordance with Local required procedures.

3.3 CLEANING AND DISINFECTION

- A. Clean out and thoroughly flush the water distribution system piping and leave free from foreign materials of any sort prior to sterilization.
- B. Disinfect in accordance with Local required procedures and AWWA Standard C-651, latest edition.

END OF SECTION

SECTION 02830 - TEMPORARY CHAIN LINK FENCING & GATES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes: Erection and maintenance of temporary chain link fencing and gates.
- B. Refer to Section 01010, contractor to provide temporary fence layout and location of fence and gates.

1.2 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.

1.3 SUBMITTALS

- A. Action Submittals:
 - 1. Shop Drawings:
 - a. Product Data: Include construction details, material descriptions, dimensions of individual components, and finishes for chain link fences and gates.
 - i. Fence, gate posts, rails, and fittings.
 - ii. Chain link fabric.
 - iii. Gates and hardware.
 - 2. Test Reports: Field test result for compliance of installation of chain link fence and gates.
- B. Informational Submittals:
 - 1. Manufacturer's recommended installation instructions.
 - 2. Evidence of Supplier and installer qualifications.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to Site in undamaged condition. Store materials off the ground to provide protection against oxidation caused by ground contact.

1.5 SCHEDULING AND SEQUENCING

- A. Install temporary fence and gates prior to beginning demolition work and/or new construction work
- B. Complete necessary Site preparation and grading before installing chain link fence and gates.

PART 2 - PRODUCTS

2.1 MANUFACTURERE - Galvanized Steel Fencing: The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function:

- A. Master Halco
- B. Merchants Metal
- C. Stephens Pipe and Steel, LLC.
- D. Eagle Fences
- E. Equal products of other manufacturers may be used in the work provided, such products have been approved, by the Architect, not less than Ten (10) days prior to scheduled bid opening.

2.2 TEMPORARY CHAIN LINK FENCING

- A. Unless otherwise indicated, type of temporary chain link fencing shall be as follows:
 - 1. New materials or previously used salvaged chain link fencing in good condition.

2. Height: 8'-0" (minimum) unless otherwise indicated on drawings.
3. Posts: 2" min. galvanized steel pipe of diameter to provide rigidity. Post shall be suitable for setting in concrete footings.
4. Fencing Fabric: 2" diamond woven galvanized steel wire mesh. Provide in continuous lengths to be wire tied to fence posts or prefabricated into modular pipe-framed fence panels.
5. Privacy Fabric: Temporary fencing shall be outfitted with privacy fabric.
 - a. Color: Green
 - b. Material Requirement: Polyethylene, 4.9 oz/sq. yd., Burst Strength: 210 psi
- B. Gates: Provide personnel and vehicle gates of the quantity and size indicated on the Drawings or required for functional access to site.
 1. Fabricate of same material as used for fencing.
 2. Vehicle gates:
 - a. Minimum width: 20 feet to allow access for emergency vehicles.
 - b. Capable of manual operation by one person.

PART 3 - EXECUTION

3.1 GENERAL- TEMPORARY CHAIN LINK FENCING

- A. Installation of temporary fencing shall not deter or hinder access to existing and new hose connections and fire hydrants.
 1. Maintain 3 feet diameter clear space around fire hydrants.
 2. Where fire hydrant or hose connection is blocked by fencing, provide access gate.
- B. Access: Provide gates for personnel, delivery of materials, and access by emergency vehicles.
- C. Field verify gate locations with Architect.

3.2 INSTALLATION - FENCE

- A. Chain link posts:
 1. Post spacing shall be 12' maximum if using prefabricated panels and 10' maximum if wire tying mesh to posts.
 2. End, Corner and Line posts shall be **set in concrete OR post driven.**
 3. Gate posts: Use concrete footings and brace to provide rigidity for accommodating size of gate. **Gate posts MUST be set in concrete.**
- B. Fabric: Leave approximately 2" between finish grade and bottom selvage, unless otherwise indicated. Pull fabric taut and tie to posts. Install fabric on security side of fence, and anchor to framework so that fabric remains in tension after pulling force is released.
- C. Gates: Install with required hardware.
- D. Wire Ties: 11 gage galvanized steel.
- E. Tension Wire: 7 gage, galvanized coated coil spring wire, metal and finish to match fabric.
- F. Concrete: Provide concrete consisting of portland cement, ASTM C 150, aggregates ASTM C 33, and clean water. Mix materials to obtain concrete with a minimum 28 day compressive strength of 3,000 psi using at least 4 sacks of cement per cu. yd., 1" maximum size aggregate, maximum 3" slump.

3.3 INSTALLATION - GATES

- A. Chain link gates:

1. Fabricate perimeter frames of gates from metal and finish to match fence framework. Assemble gate frames by welding or with special fittings and rivets for rigid connections, providing security against removal or breakage connections. Provide horizontal and vertical members to ensure proper gate operation and attachment of fabric, hardware and accessories. Space frame members maximum of 8' apart unless otherwise indicated.
 2. Provide same fabric as for fence, unless otherwise indicated. Install fabric with stretcher bars at vertical edges and at top and bottom edges. Attach stretcher bars to gate frame at not more than 15" o.c.
 3. Install diagonal cross-bracing consisting of 3/8" diameter adjustable length truss rods on gates to ensure frame rigidity without sag or twist.
- B. Gate Hardware: Provide hardware and accessories for each gate, galvanized per ASMT A 153, and in accordance with the following.
1. Hinges: Size and material to suit gate size, non-lift off type, offset to permit 180 degree gate opening. Provide 1½ pair hinges for each leaf over 6' nominal height.
 2. Latch: Forked type or plunger-bar type to permit operation from either side of gate, with padlock eye as integral part of latch.
 3. Keeper: Provide keeper for vehicle gates, which automatically engages gate leaf and holds it in open position until manually released.
 4. Double Gates: Provide gate stops for double gates, consisting of mushroom type flush plate with anchors, set in concrete, and designed to engage center drop rod or plunger bar. Include locking device and padlock eyes as integral part of latch, permitting both gate leaves to be locked with single padlock.

3.4 MAINTENANCE

- A. Maintain fencing in good condition. If damaged, Contractor shall immediately repair at no additional cost to owner.

3.5 FIELD QUALITY CONTROL

- A. Post and Fabric Testing: Test fabric tension and line post rigidity according to ASTM F1916.
- B. Gate Tests:
1. Prior to acceptance of installed gates, demonstrate proper operation of gates under each possible open and close condition specified.
 2. Adjust gate to operate smoothly, easily, and quietly, free of binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range.
 3. Confirm that latches and locks engage accurately and securely without forcing and binding.

3.6 CLEANUP

- A. Remove excess fencing materials, soil, concrete and any other debris from Site which resulted from installation of fences and/or gates.

END OF SECTION

SECTION 03310 – CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract including General and Supplementary Conditions and Division 1 Specification Sections apply to work of this section.

B. See Section 07260, Under Slab Vapor Barrier

1.2 DESCRIPTION OF WORK

- A. Extent of concrete work is shown on drawings.

1.3 QUALITY ASSURANCE

- A. Codes and Standards: Comply with provisions of following codes, specifications and standards, except where more stringent requirements are shown or specified:
 - 1. ACL 301 "Specifications for Structural Concrete for Buildings".
 - 2. ACI 318 "Building Code Requirements for Reinforced Concrete"
 - 3. Concrete Reinforcing Steel Institute, "Manual of Standard Practice".
- B. Concrete Testing Service: The **Owner** will engage and pay a testing laboratory to perform material evaluation tests.
- C. Materials and installed work may require retesting, as directed by Architect, at anytime during progress of work. Provide free access to material stockpiles and facilities. Retesting of rejected materials and installed work, shall be done at Contractor's expense.

1.4 SUBMITTALS

- A. Product Data: Submit data for proprietary materials and items, including reinforcement and forming accessories, admixtures, patching compounds, joints systems, curing compounds, dry-shake finish materials and others as requested by Architect.
- B. Shop Drawings Reinforcements: Submit shop drawings for fabrication, bending and placement of concrete reinforcement. Comply with ACI 315 "Manual of Standard Practice for Detailing Reinforced Concrete Structures" showing bar schedules, stirrup spacing, diagrams of bent bars, arrangement of concrete reinforcement.
- C. Material Certificates: Provide materials certificates in lieu of materials laboratory test reports when permitted by Architect. Material certificates shall be signed by manufacturer and Contractor, certifying that each material item complies with, or exceeds, specified requirements.

PART 2 - PRODUCTS

2.1 FORM MATERIALS

- A. Forms for Exposed Finish Concrete: Unless otherwise indicated, construct formwork for exposed concrete surfaces with plywood, metal, metal-framed plywood faced or other acceptable panel-type surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings. Provide form material with sufficient thickness to withstand pressure of newly-placed concrete without bow or deflection.
- B. Use plywood complying with U. S. Product Standard PS-1 "B-B (Concrete Form) Plywood", Class I, Exterior Grade or better, mill-oiled and edge-sealed, with each piece bearing legible inspection trademark.
- C. Forms for Unexposed Finish Concrete: Form concrete surfaces which will be unexposed in finished structure with plywood, lumber, metal, or other acceptable material. Provide lumber dressed on at least two (2) edges and one (1) side for tight fit.

- D. Form Coatings: Provide commercial formulation form-coating compounds that will not bond with, stain nor adversely affect concrete surfaces, and will not impair subsequent treatments of concrete surfaces.

2.2 REINFORCING MATERIALS

- A. Reinforcing Bars: ASTM A 615, Grade 60, deformed, unless otherwise noted.
- B. Steel Wire: ASTM A 82, plain, cold-drawn, steel.
- C. Welded Wire Fabric: ASTM A 185, welded steel wire fabric.
- D. Supports for Reinforcement: Provide supports for reinforcement including bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place. Use wire bar type supports complying with CRSI specifications, unless otherwise acceptable.
 - 1. For slabs-on-grade, use supports with sand plates or horizontal runners where base material will not support chair legs.
 - 2. For exposed to view concrete surfaces, where legs of supports are in contact with forms, provide support with legs which are plastic protected (CRSI, Class I) or stainless steel protected (CRSI, Class 3).

2.3 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type 1, unless otherwise acceptable to Architect.
 - 1. Use one brand of cement throughout project, unless otherwise acceptable to Architect.
- B. Normal Weight Aggregate: ASTM C 33, and as herein specified. Provide aggregate from a single source for all concrete.
 - 1. Do not use fine or coarse aggregates containing spalling-causing deleterious substances.
- C. Water: Drinkable.
- D. Air-Entraining Admixture: ASTM C 260.
 - 1. MANUFACTURERS: The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function:
 - a. Air-Mix, Euclid Chemical Co.
 - b. Sika-Ai", Sika Corp.
 - c. Darex AEA, W. R. Grace
 - d. Equal products of other manufacturers may be used in the work, provide such products have been approved, by the Architect, not less than Ten (10) days prior to scheduled bid opening.
- E. Water-Reducing, Non-Chloride Accelerator Admixture: ASTM C 494, Type E, and containing not more than 0.1% chloride ions.
 - 1. MANUFACTURERS: The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function:
 - a. Accelguard 80; Euclid Chemical Company
 - b. Pozzolith High Gally; Master Builders
 - c. Equal products of other manufacturers may be used in the work, provide such products have been approved, by the Architect, not less than Ten (10) days prior to scheduled bid opening.
- F. Water-Reducing, Retarding Admixture: ASTM C 494, Type D, and contain not more than 0.1% chloride ions.
 - 1. MANUFACTURERS: The following manufacturers' products have been used to establish

minimum standards for materials, workmanship and function:

- a. Edoco 20006; Edoco Technical Products
 - b. Pozzolith 300-R; Master Builders
 - c. Eucon Retarder 75; Euclid Chemical Company
 - d. Daratard; W. R. Grace
 - e. Plastiment; Sika Chemical Company
 - f. Equal products of other manufacturers may be used in the work, provide such products have been approved, by the Architect, not less than Ten (10) days prior to scheduled bid opening.
- G. Certification: Provide admixture manufacturer's written certification that chloride ion content complies with specified requirements.
- H. Calcium chloride or admixtures containing more than 0.1% chloride ions are not permitted.

2.4 RELATED MATERIALS

- A. Moisture Barrier: Provide moisture barrier cover over prepared base material where indicated. Use only materials which are resistant to decay when tested in accordance with ASTM E 154, as follows:
1. Polyethylene sheet not less than 10 mils thick.
- B. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M 182, Class 2.
- C. Moisture-Retaining Cover: One of the following, complying with ASTM C 171.
1. Waterproof paper
 2. Polyethylene film.
 3. Polyethylene-coated burlap.
- D. Liquid Membrane Forming Curing Compound: Liquid type membrane forming curing compound complying with ASTM C 309, Type 1-D, Class A unless other type acceptable to Architect. Moisture loss not more than 0.055 gr./sq. cm. when applied at 200 sq. ft./gal. Equal to "Kure-N-Seal" - 30; Sonneborn-Contech
1. MANUFACTURERS: The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function:
 - a. Master Builders
 - b. Euclid Chemical Company
 - c. A.C. Horn
 - d. The Burke Company
 - e. Equal products of other manufacturers may be used in the work, provide such products have been approved, by the Architect, not less than Ten (10) days prior to scheduled bid opening.
- E. Bonding Compound: Polyvinyl acetate or acrylic base, re-wettable type.
1. MANUFACTURERS: The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function:
 - a. Welcrete; Larsen Products
 - b. EucoWeld; Euclid Chemical Company
 - c. Hornweld; A. C. Horn
 - d. Sonocrete; Sonneborn-Contech

- e. Acrylic Bondcrete; The Burke Company
 - f. Equal products of other manufacturers may be used in the work, provide such products have been approved, by the Architect, not less than Ten (10) days prior to scheduled bid opening.
- F. Epoxy Adhesive: ASTM C 881, two component material suitable for use on dry or damp surfaces. Provide material "Type", "Grade", and "Class" to suit project requirements.
- 1. MANUFACTURERS: The following manufacturers' products have been used establish minimum standards for materials, workmanship and function:
 - a. Epoxitite; A. C. Horn
 - b. Sikadur Hi-Mod; Sika Chemical Corporation
 - c. Euco Epoxy 463 or 615; Euclid Chemical Company
 - d. Patch and Bond Epoxy; The Burke Company
 - e. Sure-Poxy; Kaufman Products, Inc.
 - f. Equal products of other manufacturers may be used in the work, provide such products have been approved, by the Architect, not less than Ten (10) days prior to scheduled bid opening.
- G. Subfloor Patching and Leveling: The following manufacturers' products have been used establish minimum standards for materials, workmanship and function:
- 1. MANUFACTURERS: The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function:
 - a. Ardex K-15; Ardex Engineered Cements 400 Ardex Park Drive Aliquippa, PA 15001; (724) 203-5000
 - b. Equal products of other manufacturers may be used in the work, provide such products have been approved, by the Architect, not less than Ten (10) days prior to scheduled bid opening.

PART 3 - EXECUTION

3.1 PROPORTIONING AND DESIGN OF MIXES

- A. Prepare design mixes for each type and strength of concrete by either laboratory trial batch or field experience methods as specified in ACI 301. If trial batch method used, use an independent testing facility acceptable to Architect for preparing and reporting proposed mix designs. The testing facility shall not be the same as used for field quality control testing unless otherwise acceptable to Architect.
- B. Submit written reports to Architect of each proposed mix for each class of concrete at least 15 days prior to start of work. Do not begin concrete production until mixes have been reviewed by Architect.
- C. Design mixes to provide normal weight concrete as indicated on drawings and schedules.
- D. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, job conditions, weather, test results, or other circumstances warrant; at no additional cost to Owner and as accepted by Architect. Laboratory test data for revised mix design and strength results must be submitted to and accepted by Architect before using in work.
- E. Admixtures:
 - 1. Use water-reducing admixture in all concrete for ease of placement and workability.
 - 2. Use non-chloride accelerating admixture in concrete slabs placed at ambient temperatures below 50 degrees F.

3. Use air-entraining admixture in all concrete, unless otherwise indicated. Add air-entraining admixture at manufacturer's prescribed rate to result in concrete at point of placement having total air content of 6% with a tolerance of plus-or-minus 1-1/2%.
- F. Slump Limits: Proportion and design mixes to result in concrete slump at point of placement as follows:
1. Ramps, slabs and sloping surfaces: 3" to 5".
 2. Reinforced foundation systems: 2" to 5".
 3. Other concrete: 3" to 5".

3.2 CONCRETE MIXES

- A. Ready-Mix Concrete: Comply with requirements of ASTM C 94, and as herein specified.
1. During hot weather, or under conditions contributing to rapid setting of concrete, a shorter mixing time than specified in ASTM C 94 may be required.
 2. When air temperature is between 85 degrees F and 90 degrees, reduce mixing and delivery time from 1-1/2 hours to 75 minutes, and when air temperature is above 90 degrees F, reduce mixing and delivery time to 60 minutes.

3.3 FORMS

- A. Design, erect, support, brace and maintain formwork to support vertical and lateral loads that might be applied until such loads can be supported by concrete structure. Construct formwork so concrete members and structures are of correct size, shape, alignment, elevation and position.
- B. Design formwork to be readily removable without impact, shock or damage to cast-in-place concrete surfaces and adjacent materials.
- C. Construct forms to sizes, shapes, lines and dimensions shown and to obtain accurate alignment, location, grades, level and plumb work in finished structures. Provide for openings, off-sets, sinkages, keyways, recesses, moldings, rustications, reglets, chamfers, blocking, screeds, bulkheads, anchorages and inserts and other features required in work. Use selected materials to obtain required finishes. Solidly butt joints and provide back-up at joints to prevent leakage of cement paste.
- D. Fabricate forms for easy removal without hammering or prying against concrete surfaces. Provide crush plates or wrecking plates where stripping may damage cast concrete surfaces. Provide top forms for inclined surfaces where slope is too steep to place concrete with bottom forms only. Kerf wood inserts for forming keyways, reglets, recesses and the like, to prevent swelling and for easy removal.
- E. Provide temporary openings where interior area of formwork is inaccessible for cleanout, for inspection before concrete placement, and for placement of concrete. Securely brace temporary openings and set time to forms to prevent loss of concrete mortar. Locate temporary openings on forms at inconspicuous locations.
- F. Chamfer exposed corners and edges as indicated, using wood, metal, PVC or rubber chamfer strips fabricated to produce uniform smooth lines and tight edge joints.
- G. Form Ties: Factory-fabricated, adjustable-length, removable, or snap-off metal form ties, designed to prevent form deflection, and to prevent spalling concrete surfaces upon removal.
1. Unless otherwise indicated, provide ties so portion remaining within concrete after removal is 1" inside concrete and will not leave holes larger than 1" diameter in concrete surface.
- H. Provisions for Other Trades: Provide openings in concrete formwork to accommodate work of other trades. Determine size and location of openings, recesses and chases from trades providing such items. Accurately place and securely support items built into forms.
- I. Cleaning and Tightening: Thoroughly clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt or other debris just before concrete is placed. Retighten

forms and bracing after concrete placement is required to eliminate mortar leaks and maintain proper alignment.

3.4 PLACING REINFORCEMENT

- A. Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars" for details and methods of reinforcement placement and supports, and as herein specified.
- B. Clean reinforcement of loose rust and mill scale, earth, ice and other materials which reduce or destroy bond with concrete.
- C. Accurately position, support and secure reinforcement against displacement by formwork, construction or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers and hangers as required.
- D. Place reinforcement to obtain at least minimum coverages for concrete protection. Arrange, space and securely tie bars and bar supports to hold reinforcement in position during concrete placement operations. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces.
- E. Install welded wire fabric in as long lengths as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset end laps in adjacent widths to prevent continuous laps in either direction.

3.5 JOINTS

- A. Construction Joints: Locate and install construction joints as indicated, or if not indicated, locate so as not to impair strength and appearance of the structure, as acceptable to Architect.
 - 1. Place construction joints perpendicular to main reinforcement. Continue reinforcement across construction joints.
- B. Isolation Joints in Slabs-On-Ground: Construct isolation joints in slabs-on-ground at points of contact between slabs on ground and vertical surfaces, such as column pedestals, and elsewhere as indicated.
 - 1. Joint filler and sealant materials are specified in Division-7 sections of these specifications.
- C. Construction Joints in Slabs-On-Ground: Construct construction joints in slabs-on-ground to form panels of patterns no larger than 600 square feet and as shown and as detailed. An alternative control joint detail may be inserts 1/8" to 1/4" wide x 1/4 of slab depth.
 - 1. Form contraction joints by inserting premolded plastic, hardboard strip into fresh concrete until top surface of strip is flush with slab surface. Tool slab edges round on each side of insert. After concrete has cured, remove inserts and clean groove of loose debris, fill groove with joint sealant.
 - 2. Joint sealant material is specified in Division-7 sections of these specifications.

3.6 INSTALLATION OF EMBEDDED ITEMS

- A. General: Set and build into work anchorage devices and other embedded items required for other work that is attached to, or supported by, cast-in-place concrete. Use setting drawings, diagrams, instructions and directions provided by suppliers of items to be attached thereto.
- B. Edge Forms and Screed Strips for Slabs: Set edge forms or bulkheads and intermediate screed strips for slabs to obtain required elevations and contours in finished slab surface.
 - 1. Provide and secure units sufficiently strong to support types of screed strips by use of strike-off templates or accepted compacting type screeds.

3.7 PREPARATION OF FORM SURFACES

- A. Clean re-used forms of concrete matrix residue, repair and patch as required to return forms to acceptable surface condition.

- B. Coat contact surfaces of forms with a form-coating compound before reinforcement is placed.
- C. Thin form-coating compounds only with thinning agent of type, and in amount, and under conditions of form-coating compound manufacturer's directions. Do not allow excess form-coating material to accumulate in forms or to come into contact with in-place concrete surfaces against which fresh concrete will be placed. Apply in compliance with manufacturer's instructions.

3.8 CONCRETE PLACEMENT

- A. Replacement Inspection: Before placing concrete, inspect and complete formwork installation, reinforcing steel, and items to be embedded or cast-in. Notify other crafts to permit installation of their work; cooperate with other trades in setting such work. Moisten wood forms immediately before placing concrete where form coatings are not used.
 - 1. Coordinate the installation of joint materials and moisture barriers with placement of forms and reinforcing steel.
- B. General: Comply with ACI 304 "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete", and as herein specified.
 - 1. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation.
- C. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 24" and in a manner to avoid inclined construction joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.
 - 1. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI recommended practices.
 - 2. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer at least 6" into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.
- D. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.
 - 1. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 - 2. Bring slab surfaces to correct level with straightedge and strike-off. Use bull floats or darbies to smooth surface, free of humps or hollows. Do not disturb slab surfaces prior to beginning finishing operations.
 - 3. Maintain reinforcing in proper position during concrete placement operations.
- E. Cold Weather Placing: Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as herein specified.
 - 1. When air temperature has fallen to or is expected to fall below 40 degrees F uniformly heat water and aggregates before mixing to obtain a concrete mixture temperature of not less than 50 degrees F. and not more than 80 degrees F 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 place concrete when air temperature has fallen to or is expected to fall below 35 °F. Do not use calcium chloride, salt and other materials containing antifreeze agents or chemical accelerators, unless otherwise accepted in mix designs.

F. Hot Weather Placing:

1. When hot weather conditions exist that would seriously impair quality and strength of concrete, place concrete in compliance with ACE 305 and as herein specified.
2. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 degrees F. Mixing water may be chilled, or chopped ice may be used to control temperature provided water equivalent of ice is calculated to total amount of mixing water. Use of liquid nitrogen to cool concrete is Contractor's option.
3. Cover reinforcing steel with water-soaked burlap if it becomes too hot, so that steel temperature will not exceed the ambient air temperature immediately before embedment in concrete.
4. Fog spray forms, reinforcing steel and subgrade just before concrete is placed.
5. Use water-reducing retarding admixture (Type D) when required by high temperatures, low humidity, or other adverse placing conditions.

3.9 FINISH OF FORMED SURFACES

- A. Rough Form Finish: For formed concrete surfaces not exposed-to-view in the finish work or by other construction, unless otherwise indicated. This is the concrete surface having texture imparted by form facing material used, with tie holes and defective areas repaired and patched and fins and other projections exceeding 1/4" in height rubbed down or chipped off.
- B. Smooth Form Finish: For formed concrete surfaces or that are to be covered with a coating material applied directly to concrete, or a covering material applied directly to concrete such as waterproofing, dampproofing. This is as-cast concrete surface obtained with selected form facing material, arranged orderly and symmetrically with a minimum of seams. Repair and patch defective areas with fins or other projections completely removed and smoothed.
- C. Smooth Rubbed Finish: For formed concrete surfaces exposed to view provide smooth rubbed finish, not later than one day after form removal.
 1. Moisten concrete surfaces and rub with carborundum brick or other abrasive until a uniform color and texture is produced. Do not apply cement grout other than that created by the rubbing process.
- D. Related Unformed Surfaces: At tops of walls, horizontal offsets, and similar unformed surfaces occurring 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.

3.10 MONOLITHIC SLAB FINISHES

- A. Finish surfaces to the following tolerances, measured within 24 hours according to ASTM E 1155/E 1155M for randomly trafficked floor surfaces:
 1. Specified overall values of flatness, F(F) 38: and levelness, F(L) 25: with minimum local values of flatness, F(F) 19: levelness, F(L) 13: for slabs on grade.
- B. Scratch Finish: Apply scratch finish to monolithic slab surfaces that are to receive concrete floor topping or mortar setting beds for tile, portland cement terrazzo and other bonded applied cementitious finish flooring material, and as otherwise indicated.
- C. Slope surface uniformly to drains where required. After leveling, roughen surfaces before final set, with stiff brushes, brooms or rakes.
- D. Float Finish: Apply float finish to monolithic slab surfaces to receive trowel finish and other

finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing membrane or elastic roofing, or sand-bend terrazzo, and as otherwise indicated.

1. After screeding consolidating, and leveling concrete slabs, do not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats or by hand-floating if area is small or inaccessible to power units. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, refloat surface to a uniform, smooth, granular texture.
- E. Trowel Finish: Apply trowel finish to monolithic slab surfaces to be exposed-to-view and slab surfaces to be covered with resilient flooring, carpet, ceramic or quarry tile, paint or other thin film finish coating system.
 1. After floating, begin first trowel finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free of trowel marks, uniform in texture and appearance. Grind smooth surface defects which would telegraph through applied floor covering system.
- F. Non-Slip Broom Finish: Apply non-slip broom finish to exterior concrete platforms, steps and ramps and elsewhere as indicated.
 1. Immediately after trowel finishing, slightly roughen concrete surface by brooming with fiber bristle broom perpendicular to main traffic route. Coordinate required final finish with Architect before application.

3.11 CONCRETE CURING AND PROTECTION

- A. General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
 1. Start initial curing as soon as free water has disappeared from concrete surface after placing and finishing. Keep continuously moist for not less than 7 days.
 2. Begin final curing procedures immediately following initial curing and before concrete has dried. Continue final curing for at least seven (7) days in accordance with ACI 301 procedures. Avoid rapid drying at end of final curing period.
- B. Curing Methods: Perform curing of concrete by curing and sealing compound, by moist curing, by moisture-retaining cover curing, and by combinations thereof, as herein specified.
 1. Provide moisture curing by one of the following methods or by a combination of the following methods:
 - a. Keep concrete surface continuously wet by covering with water.
 - b. Continuous water-fog spray.
 - c. Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.
- C. Provide moisture-cover curing as follows:
 1. Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
- D. Provide curing and sealing compound to interior slabs with resilient flooring, carpet over cushion, or left exposed; and to exterior slabs, walks, and curbs as follows:
 1. Apply specified curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within two hours). Apply uniformly in continuous operation by power-spray or roller in accordance with manufacturer's directions. Recoat areas subjected

to heavy rainfall within three (3) hours after initial application. Maintain continuity of coating and repair damage during curing period.

- E. Do not use membrane curing compounds on surface which are to be covered with coating material applied directly to concrete, liquid floor hardener, waterproofing, damp-proofing, membrane roofing, flooring (such as ceramic or quarry tile, glue-down carpet), painting and other coatings and finish materials, unless otherwise acceptable to Architect.
- F. Curing Formed Surfaces: Cure formed concrete surfaces, by moist curing with forms in place for full curing period or until forms are removed. If forms are removed, continue curing by methods specified above, as applicable.
- G. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by application of appropriate curing method.
- H. Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moisture-retaining cover, unless otherwise directed.
- I. Sealer and Dust-proofer: Apply a second coat of specified curing and sealing compound only to surfaces given a first coat.

3.12 REMOVAL OF FORMS

- A. Formwork not supporting weight of concrete, such as sides of walls, and similar parts of the work, may be removed after cumulatively curing at not less than 50 degrees F for twenty-four (24) hours after placing concrete, provided concrete is sufficiently hard to not be damaged by form removal operations, and provided cutting and protection operations are maintained.
- B. Formwork supporting weight of concrete, may not be removed in less than fourteen (14) days and until concrete has attained design minimum compressive strength of in place concrete by testing field-cured specimens representative of concrete location in members.
- C. Form facing material may be removed four (4) days after placement, only if shores and other vertical supports have been arranged to permit removal of form facing material without loosening or disturbing shores and supports.

3.13 RE-USE OF FORMS

- A. Clean and repair surfaces of forms to be re-used in work. Split, frayed, delaminated or otherwise damaged form facing material will not be acceptable for exposed surfaces. Apply new form coating compound as specified for new formwork.
- B. When forms are extended for successive concrete placement, thoroughly clean surfaces, remove fins and laitance, and tighten forms to close joints. Align and secure joint to avoid offsets. Do not use "patched" forms for exposed concrete surfaces, except as acceptable to Architect.

3.14 MISCELLANEOUS CONCRETE ITEMS

- A. Filling-In: Fill-in holes and openings left in concrete structures for passage of work by other trades, unless otherwise shown or directed, after work of other trades is in place. Mix, place and cure concrete as herein specified, to blend with in-place construction. Provide other miscellaneous concrete filling shown or required to complete work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and steel-troweling surfaces to a hard, dense finish with corners, intersections and terminations slightly rounded.
- C. Equipment Bases and Foundations: Provide machine and equipment bases and foundations, as shown on drawings. Set anchor bolts for machines and equipment to template at correct elevations, complying with certified diagrams or templates of manufacturer furnishing machines and equipment.
- D. Reinforced Masonry: Provide concrete grout for reinforced masonry, masonry lintels and bond beams where indicated on drawings and as scheduled. Maintain accurate location of reinforcing steel during concrete placement.

3.15 CONCRETE SURFACE REPAIRS

Renovations of the Arts Center To
Goshen High School for the
Pike County Schools
Troy, Alabama

CAST-IN-PLACE CONCRETE
03310-10

- A. Patching Defective Areas: Repair and patch defective areas with cement mortar immediately after removal of forms when acceptable to Architect.
1. Cut out honeycomb, rock pockets, voids over 1/4" in any dimension, and holes left by tie rods and bolts, down to solid concrete but, in no case to a depth of less than 1". Make edges of cuts perpendicular to the concrete surface. Thoroughly clean, dampen with water and brush-coat the area to be patched with specified bonding agent. Place patching mortar after bonding compound has dried.
 2. For exposed to view surfaces, blend white portland cement and standard portland cement so that when dry, patching mortar will match color surrounding. Provide test areas at inconspicuous location to verify mixture and color match before proceeding with patching. Compact mortar in place and strike-off slightly higher than surrounding surface.
- B. Repair of Formed Surfaces: Remove and replace concrete having defective surfaces if defects cannot be repaired to satisfaction of Architect. Surface defects, as such, include color and texture irregularities, cracks, spalls, air bubbles, honeycomb, rock pockets; fins and other projections on surface; and stains and other discolorations that cannot be removed by cleaning. Flush out form tie holes, fill with dry pack mortar, or precast cement cone plugs secured in place with bonding agent.
1. Repair concealed formed surfaces, where possible, that contain defects that affect the durability of concrete. If defects cannot be repaired, remove and replace concrete.
- C. Repair of Unformed Surfaces: Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness using a template having required slope.
1. Repair finished unformed surfaces that contain defects which affect durability of concrete. Surface defects, as such, include crazing, cracks in excess of 0.01" wide or which penetrate to reinforcement or completely through non-reinforced sections regardless of width, spalling, popouts, honeycomb, rock pockets and other objectionable conditions.
 2. Correct high areas in unformed surfaces by grinding, after concrete has cured at least 14 days.
 3. Correct low areas in unformed surfaces during, or immediately after, completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend into adjacent concrete. Proprietary patching compounds may be used when acceptable to Architect.
 4. Repair defective areas, except random cracks and single holes not exceeding 1" diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and exposed reinforcing steel with at least 3/4" clearance all around.
 5. Dampen concrete surfaces in contact with patching concrete and apply bonding compound. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
 6. Repair isolated random cracks and single holes not over 1" in diameter by dry-pack method. Groove top of cracks and cut-out holes to sound concrete and clean of dust, dirt and loose particles. Dampen cleaned concrete surfaces and apply bonding compound. Mix dry-pack, consisting of one part portland cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Place dry pack after bonding compound has dried. Compact dry-pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than seventy-two (72) hours.
 7. Perform structural repairs with prior approval of Architect for method and procedure, using specified epoxy adhesive and mortar.
 8. Repair methods not specified above may be used, subject to acceptance of Architect.

3.16 QUALITY CONTROL TESTING DURING CONSTRUCTION

- A. The Owner will employ and pay for a testing laboratory to perform tests and to submit test reports. The Contractor shall notify testing agency 24 hours in advance of requirements.
- B. Sampling and testing for quality control during placement of concrete may include the following, as directed by Architect.
- C. The Owner shall maintain equipment on site to cast cylinders, perform slump and air tests, and field cure specimens. Should the project testing agency be absent from the site, the Contractor will be responsible for performing the field tests below.
- D. Sampling Fresh Concrete: ASTM C 172, except as modified for slump to comply with ASTM C 94.
 - 1. Slump: ASTM C 143; one test at point of discharge for each day's pour of each type of concrete; additional tests when concrete consistency seems to have changed.
 - 2. Concrete Temperature: Test hourly when air temperature is 40 degrees F. and below, and when 80 degrees F. and above; and each time a set of compression test specimens made.
 - 3. Compression Test Specimen: ASTM C 31; one set of four (4) standard cylinders for each compressive strength test, unless otherwise directed. Mold and store cylinders for laboratory cured test specimens except when field-cure test specimens are required.
- E. Compressive Strength Tests: ASTM C 39; one set for each day's pour plus additional sets for each 50 cu. yds. over and above the first 25 cu. yds. of each concrete class placed in any one day; one specimen tested at seven (7) days, two specimen tested at twenty-eight (28) days, and one specimen retained in reserve for later testing if required. Minimum compressive strength of concrete shall be 3,000 psi at 28 days unless otherwise indicated.
 - 1. When frequency of testing will provide less than five (5) strength tests for a given class of concrete, conduct testing from at least five (5) randomly selected batches or from each batch if fewer than five (5) are used.
 - 2. When total quantity of a given class of concrete is less than 50 cu. yds., strength test may be waived by Architect if, in his judgment, adequate evidence of satisfactory strength is provided.
 - 3. When strength of field-cured cylinders is less than 85% of companion laboratory-cured cylinders, evaluate current operations and provide corrective procedures for protecting and curing the in-place concrete.
 - 4. Test results shall be reported in writing to Architect and Contractor within twenty-four (24) hours that tests are made. Reports of compressive strength tests shall contain the project identification name and number, date of concrete placement, name of concrete testing service, concrete type and class, location of concrete batch in structure, design compressive strength at twenty-eight (28) days, concrete mix proportions and materials; compressive breaking strength and type of break for both 7-day tests and 28-day tests.
- F. Nondestructive Testing: Impact hammer, sonoscope, or other non- destructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.
- G. Additional Tests: The testing service will make additional tests of in-place concrete when test results indicate specified concrete strengths and other characteristics have not been attained in the structure, as directed by Architect. Testing service may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.
 - 1. Contractor shall pay for such tests conducted, and any other additional testing as may be required, when unacceptable concrete is verified.

END OF SECTION

SECTION 03950 - CONCRETE SEALER

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Exposed concrete slabs where concrete sealer is indicated.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples: Submit four samples of concrete sealer over concrete, 6 by 6 inches sample.
- C. Manufacturer Certificates: Signed by manufacturers certifying that concrete sealer comply with requirements.
- D. Qualification Data: For Installer.
- E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for assemblies.
- F. Warranty: Special warranty specified in this Section.
- G. Maintenance data.

1.3 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer with minimum five years documented experience.

1.4 PROJECT CONDITIONS

- A. Limitations: Proceed with application only when the following existing substrate conditions permit sealer to be applied according to manufacturers' written instructions and warranty requirements:
 - 1. Ambient temperature is above 40 deg F.
 - 2. Concrete surfaces and mortar have cured for more than 28 days.

1.5 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer and Applicator agree to repair or replace materials that fail to maintain water repellency within specified warranty period.
 - 1. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CONCRETE SEALER

- A. Penetrating Liquid Floor Treatment: Clear, chemically reactive, waterborne solution of inorganic silicate or silicate materials and proprietary components; odorless; colorless; that penetrates, hardens, and densifies concrete surfaces.
 - 1. Products:
 - a. Curecrete Distribution Inc.; Ashford Formula.
 - b. Burke by Edoco; Titan Hard.
 - c. ChemMasters; Chemisil Plus.

03950 - CONCRETE SEALER

Renovation to Arts Center For
Goshen High School For The
Pike County Schools BOE
Troy, Alabama

MCKEE PROJECT NO. 20.119

- d. Euclid Chemical Company (The); Euco Diamond Hard.
- 2. Flammability: Self extinguishing.
- 3. Finish: Non slip finish. Coefficient of friction: 0.6 wet, 0.8 dry.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean substrate of substances that might interfere with penetration or performance of concrete sealer.
 - 1. Concrete: Remove oil, curing compounds, laitance, and other substances that could prevent adhesion or penetration of concrete sealer.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLICATION

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect the substrate before application of concrete sealer and to instruct Applicator on the product and application method to be used.
- B. Concrete Sealer: Prepare, apply, and finish penetrating liquid floor treatment according to manufacturer's written instructions.
 - 1. Do not apply to concrete that is less than number of days' old recommended by sealer manufacturer in writing.
 - 2. 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.
- C. Apply on horizontal surfaces of indicated interior exposed concrete slabs not receiving other finishes.

3.3 CLEANING

- A. Immediately clean concrete sealer from adjoining surfaces and surfaces soiled or damaged by concrete sealer application as work progresses. Repair damage caused by concrete sealer application. Comply with manufacturer's written cleaning instructions.

END OF SECTION

SECTION 04200 - UNIT MASONRY

PART 1 - GENERAL

1.1 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.

1.2 DESCRIPTION OF WORK

- A. Extent of each type of masonry work is indicated on drawings and schedule.
- B. Types of masonry work required include.
 - 1. Concrete unit masonry.
 - 2. Brick masonry.

1.3 QUALITY ASSURANCE

- A. Fire Performance Characteristics: Where indicated, provide materials and construction which are identical to those of assemblies whose fire endurance has been determined by testing in compliance with ASTM E 119 by a recognized testing and inspecting organization or by another means, as acceptable to authority having jurisdiction.
- B. Single Source Responsibility for Masonry Units: Obtain exposed masonry units of uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from one manufacturer for each different product required for each continuous surface or visually related surfaces.
- C. Single Source Responsibility for Mortar Materials: Obtain mortar ingredients of uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source and producer for each aggregate.
- D. Samples: Submit the following samples:
 - 1. Unit masonry samples for each type of exposed masonry unit required; include in each set the full range of exposed color and texture to be expected in completed work.
 - 2. Include size variation data verifying that actual range of sizes for brick falls within ASTM C652 dimension tolerances for brick where modular dimensioning is indicated. The grade shall be SW and the type HBS.
- E. Field Constructed Mock-Up Panel: Prepare mock-up panel for the following types of masonry. Purpose of mock-up is further verification of selections made for color and finish under sample submittals and establishing standard of quality for aesthetic effects expected in completed work. Build mock-up panel to comply with the following requirements:
 - 1. Locate mock-up panel on site where directed by the Architect.
 - 2. Build mock-up panel of typical exterior masonry wall, approximately 4'-0" long by 4'-0" high, showing all typical components, connections, attachments to building structure and methods of installation.
 - 3. Retain mock-up panel during construction as standard for judging completed masonry work. When directed, demolish mock-up panel and remove from site.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver masonry materials to project in undamaged condition.
- B. Store and handle masonry units to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion or other causes. Store masonry units off the ground.
- C. Store cementitious materials off the ground, under cover and in dry location.
- D. Store aggregates where grading and other required characteristics can be maintained.

- E. Store masonry accessories including metal items to prevent deterioration by corrosion and accumulation of dirt.

1.5 PROJECT CONDITIONS

- A. Protection of Work: During erection, cover top of walls with waterproof sheeting at end of each day's work. Cover partially completed structures when work is not in progress.
- B. Extend cover a minimum of 24 inches down both sides and hold cover securely in place.
- C. Do not apply uniform floor or roof loading for at least 24 hours after building masonry walls or columns.
- D. Staining: Prevent grout or mortar or soil from staining the face of masonry to be left exposed or painted. Remove immediately grout or mortar in contact with such masonry.
- E. Protect base of walls from rain-splashed mud and mortar splatter by means of coverings spread on ground and over wall surface.
- F. Protect sills, ledges and projections from droppings of mortar.
- G. Environmental Protection:
 - 1. Maintain air temperature and materials to a minimum of 40 degrees F and a maximum of 90 degrees F prior to and during masonry work
 - 2. Do not lay masonry units which are wet or frozen.
 - 3. Remove masonry damaged by freezing conditions.
- H. For clay masonry units with initial rates of absorption (suction) which require them to be wetted before laying, comply with the following requirements.
 - 1. For units with surface temperatures above 32°F wet with water heated to above 70°F.
 - 2. For units with surface temperatures below 32°F wet with water heated to above 130°F.

PART 2 - PRODUCTS

2.1 CONCRETE MASONRY UNITS

- A. General: Comply with referenced standards and other requirements indicated below applicable to each form of concrete masonry unit required.
 - 1. Provide special shapes where required for lintels, corners, jambs, sash, control joints, headers, bonding and other special conditions.
 - 2. Provide bullnose units for outside corners, except where indicated as square-edged.
- B. Concrete Block: Provide units complying with characteristics indicated below for Grade, Type, face size, exposed face and under each form of block included, for weight classification.
 - 1. Grade N
 - 2. Size: Manufacturer's standard units with nominal face dimensions of 16" long x 8" high x thickness indicated.
 - 3. Type I: moisture-controlled units.
 - 4. Exposed Faces: Manufacturer's standard color and texture, unless otherwise indicated.
 - 5. Hollow Loadbearing Block: ASTM C 90 and as follows:
 - a. Weight Classification: Lightweight
 - 6. All CMU sills shall be bullnose concrete block, unless another material is indicated on the drawings. If the sills are indicated to receive another material (ie: Solid Surface fabrication, wood, etc.) placed on top of the CMU sill, the CMU sill shall be straight edged concrete block units.

2.2 BRICK MADE FROM CLAY OR SHALE

- A. MANUFACTURERES: The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function:
 - 1. ACME Brick Company, Montgomery, AL
 - 2. Boral Bricks, Phenix City, AL
 - 3. Henry Brick Company, Selma, AL
 - 4. Equal products of other manufacturers may be used in the work provided such products have been approved by the Architect, not less than Ten (10) days prior to scheduled bid opening.
- B. General: Comply with referenced standards and other requirements indicated below applicable to each form of brick required.
- C. Provide special molded shapes where indicated and for application requiring brick of form, size and finish on exposed surfaces which cannot be produced from standard brick sizes by sawing.
- D. For sills, caps and similar applications resulting in exposure of brick surfaces which otherwise would be concealed from view, provide uncured or unfroged units with all exposed surfaces finished.
- E. Facing Brick: Submit samples for approval of equals prior to bids. Eased edge brick shall not be allowed.
- F. BRICK ALLOWANCES
 - 1. *Face Brick* shall have a value of **\$600.00 dollars per thousand** (Allowances shall be for material only, based on actual number of bricks purchased for the project. Installation, profit, overhead, shipping and taxes shall be included in the Contractors Bid Proposal). If Architect chooses brick of lesser value after Bid Process, Contractor shall issue a deductive Change Order for the difference.
 - 2. *Accent Brick* shall have a value of **\$600.00 dollars per thousand** (Allowances shall be for material only, based on actual number of bricks purchased for the project. Installation, profit, overhead, shipping and taxes shall be included in the Contractors Bid Proposal). If Architect chooses brick of lesser value after Bid Process, Contractor shall issue a deductive Change Order for the difference.

2.3 MORTAR AND GROUT MATERIALS

- A. MANUFACTURERS: The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function:
 - 1. Atlas
 - 2. Citadel
 - 3. Lone Star
 - 4. Magnolia
 - 5. Equal products of other manufacturers may be used in the work provided such products have been approved by the Architect, not less than Ten (10) days prior to scheduled bid opening.
- B. Masonry Cement: ASTM C 91.
 - 1. Type S for CMU walls
 - 2. Type N for Exterior Face and Accent brick – color pigment.
 - 3. **Type N for Architectural Stone Veneer – color pigment.**
- C. ALLOWANCES:
 - 1. *Face and Accent Brick* to have a value of **\$26.00 dollars per bag**. (Allowances shall be for material only, based on actual number of bags purchased for the project. Installation, profit, overhead, shipping and taxes shall be included in the Contractors Bid Proposal). If Architect

chooses mortar of lesser value after Bid Process, Contractor shall issue a deductive Change Order for the difference.

2. **Architectural Stone Veneer** to have a value of **\$26.00 dollars per bag**. (Allowances shall be for material only, based on actual number of bags purchased for the project. Installation, profit, overhead, shipping and taxes shall be included in the Contractors Bid Proposal). If Architect chooses mortar of lesser value after Bid Process, Contractor shall issue a deductive Change Order for the difference.

D. Hydrated Lime: ASTM C 207, Type S.

E. Aggregate for Mortar: ASTM C 144, except for joints less than 1/4" use aggregate graded with 100% passing the No. 16 sieve.

F. Water: Clean and potable.

2.4 JOINT REINFORCEMENT, TIES AND ANCHORING DEVICES

A. MANUFACTURERS: The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function:

1. Dur-O-Wall, Inc.
2. Heckman Building Products, Inc.
3. Masonry Reinforcing Corp. of America.
4. National Wire Products Corp.
5. Equal products of other manufacturers may be used in the work provided such products have been approved by the Architect, not less than Ten (10) days prior to scheduled bid opening.

B. Materials: Comply with requirements indicated below for basic materials and with requirements indicated under each form of joint reinforcement, tie and anchor for size and other characteristics.

C. Use individual galvanized steel metal ties installed in horizontal joints to bond wythes together

only where wood or metal stud backup occurs. Provide ties as shown, but not less than one metal tie for 4 sq. ft. of wall area spaced not to exceed 24" o.c. horizontally and vertically. Stagger ties in alternate courses. Provide additional ties within 1'-0" of all openings and space not more than 3'-0" apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24" o.c. vertically.

D. Hot-Dip Galvanized Steel Wire: ASTM A 82 for uncoated wire and with ASTM A 123, Class B-2 (1.5 oz. per sq. ft. of wire surface) for zinc coating applied after prefabrication into units.

E. Application: Use where indicated.

F. Joint Reinforcement: Provide ladder type, welded-wire units prefabricated with deformed continuous side rods and plain cross rods into straight lengths of not less than 10', with prefabricated corner and tee units, and complying with requirements indicated below:

1. Width: Fabricate joint reinforcement in units with widths of approximately 2" less than nominal width of walls and partitions as required to provide mortar coverage of not less than 5/8" on joint faces exposed to exterior and 1/2" else- where.

2.5 EMBEDDED FLASHING MATERIALS

A. Metal Flashing: Provide metal flashing, where flashing is exposed or partly exposed and where indicated, complying with SMACNA's "Architectural Sheet Metal Manual" and as follows:

1. Fabricate continuous flashings in sections 96 inches long minimum, but not exceeding 12 feet.
2. Provide splice plates at joints of formed, smooth metal flashing.
3. Fabricate through-wall metal flashing embedded in masonry from, with ribs at 3-inch intervals along length of flashing to provide an integral mortar bond.

4. Fabricate through-wall flashing with snaplock receiver on exterior face where indicated to receive counterflashing.
 5. Fabricate through-wall flashing with drip edge where indicated. Fabricate by extending flashing 1/2 inch out from wall, with outer edge bent down 30 degrees.
 6. Fabricate through-wall flashing with sealant stop unless otherwise indicated. Fabricate by bending metal back on itself 3/4 inch at exterior face of wall and down into joint 3/8 inch to form a stop for retaining sealant backer rod.
 7. Fabricate metal drip edges and sealant stops for ribbed metal flashing from plain metal flashing of same metal as ribbed flashing and extending at least 3 inches into wall with hemmed inner edge to receive ribbed flashing and form a hooked seam. Form hem on upper surface of metal so that completed seam will shed water.
 8. Metal Drip Edges: Fabricate from stainless steel. Extend at least 3 inches into wall and 1/2 inch out from wall, with outer edge bent down 30 degrees.
 9. Metal Flashing Terminations: Fabricate from stainless steel. Extend at least 3 inches into wall and out to exterior face of wall. At exterior face of wall, bend metal back on itself for 3/4 inch and down into joint 3/8 inch to form a stop for retaining sealant backer rod.
 10. Metal Expansion-Joint Strips: Fabricate from stainless steel to shapes indicated.
- B. Flexible Flashing: For flashing not exposed to the exterior, use one of the following, unless otherwise indicated:
1. Elastomeric Thermoplastic Flashing: Composite flashing product consisting of a polyester-reinforced ethylene interpolymer alloy as follows:
 - a. Monolithic Sheet: Elastomeric thermoplastic flashing, 0.040 inch thick.
 - b. Self-Adhesive Sheet: Elastomeric thermoplastic flashing, 0.025 inch thick, with a 0.015-inch thick coating of rubberized-asphalt adhesive.
 - c. Self-Adhesive Sheet with Drip Edge: Elastomeric thermoplastic flashing, 0.025 inch thick, with a 0.015-inch thick coating of rubberized-asphalt adhesive. Where flashing extends to face of masonry, rubberized-asphalt coating is held back approximately 1-1/2 inches from edge.
 - d. Accessories: Provide preformed corners, end dams, other special shapes, and seaming materials produced by flashing manufacturer.
 2. EPDM Flashing: Sheet flashing product made from ethylene-propylene-dieneterpolymer, complying with ASTM D 4637, 0.040 inch thick.
- C. Adhesives, Primers, and Seam Tapes for Flashings: Flashing manufacturer's standard products or products recommended by flashing manufacturer for bonding flashing sheets to each other and to substrates.
- D. MANUFACTURERS: The following manufacturers' products have been used to establish minimum standards for materials, workmanship, and function:
1. Vinyl Sheet Flashing: (Thickness: 20 mils)
 - a. Vi-Seal Plastic Flashing; Afco Products, Inc.
 - b. BFG Vinyl Water Barrier; B.F. Goodrich Co.
 - c. Nuflex; Sandell Manufacturing Co., Inc.
 - d. Wascosea"; York Manufacturing, Inc.
 - e. Equal products of other manufacturers may be used in the work, provided such products have been approved by the Architect, not less than Ten (10) days prior to scheduled bid opening.

2.6 MISCELLANEOUS MASONRY ACCESSORIES

A. See drawings for locations of all required control joints.

Renovations of the Arts Center To
Goshen High School for the
Pike County Schools
Troy, Alabama

UNIT MASONRY
04200-5

- B. Non-Metallic Expansion Joint Strips: Pre-molded, flexible cellular neoprene rubber filler strips complying with ASTM D 1056, Grade RE41E1, capable of compression up to 35%, of width and thickness indicated.
- C. Premolded Control Joint Strips: Material as indicated below designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
 - 1. Polyvinyl chloride complying with ASTM D 2287, General Purpose Grade, Designation PVC-63506.
- D. Bond Breaker Strips: Asphalt-saturated organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).
- E. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.
 - 1. Basis-of-Design Product: Subject to compliance with requirements, provide Mortar Net Solutions; Mortar Net with Insect Barrier or comparable product by one of the following:
 - a. Advanced Building Products Inc.
 - b. Heckmann Building Products, Inc.
 - c. Wire-Bond.
 - 2. Configuration: Provide one of the following:
 - a. Strips, full depth of cavity and 10 inches (250 mm) high, with dovetail-shaped notches 7 inches (175 mm) deep that prevent clogging with mortar droppings.

2.7 MASONRY CLEANERS

- A. Job-Mixed Detergent Solution: Solution of trisodium phosphate (1/2 cup dry measure) and laundry detergent (1/2 cup dry measure) dissolved in one gallon of water.

2.8 MORTAR AND GROUT MIXES

- A. General: Do not add admixtures including air-entraining agents, accelerators, retarders, water repellent agents, anti-freeze compounds or other admixtures, unless otherwise indicated.
 - 1. Do not use calcium chloride in mortar or grout.
- B. Mixing: Combine and thoroughly mix cementitious, water and aggregates in a mechanical batch mixer; comply with referenced ASTM standards for mixing time and water content.
- C. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion Specification, for types of mortar required, unless otherwise indicated.
 - 1. For Exterior Brick, use Type N mortar, equal to Flamingo, Blue Circle or Lehigh.
 - 2. For Other Masonry Units use Type S mortar without coloring pigment.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Wetting Clay Brick: Wet brick made from clay or shale which have ASTM C 67 initial rates of absorption (suction) of more than 30 grams per 30 sq. in. per minute. Use wetting methods which ensure each clay masonry unit being nearly saturated but surface dry when laid.
- B. Do not wet concrete masonry units.
- C. Cleaning Reinforcing: Before placing, remove loose rust, ice and other coatings from reinforcing.
- D. Thickness: Build cavity and composite walls, floors and other masonry construction to the full thickness shown. Build single wythe walls (if any) to the actual thickness of the masonry units, using units of nominal thickness indicated.

- E. Build chases and recesses as shown or required for the work of other trades. Provide not less than 8" of masonry between chase or recess and jamb of openings, and between adjacent chases and recesses.
- F. Leave openings for equipment to be installed before completion of masonry work. After installation of equipment, complete masonry work to match work immediately adjacent to the opening.
- G. Cut masonry units using motor-driven saws to provide clean, sharp, unchipped edges. Cut units as required to provide continuous pattern and to fit adjoining work. Use full-size units without cutting where possible.
 - 1. Use wet cutting saws to cut concrete masonry units.

3.2 LAYING MASONRY WALLS

- A. Layout walls in advance for accurate spacing of surface bond patterns with uniform joint widths and to accurately locate openings, movement-type joints, returns and offsets. Avoid the use of less-than-half-size units at corners, jambs and wherever possible at other locations.
- B. Coursing and Bonding:
 - 1. **All CMU shall be Running Bond.**
- C. Stopping and Resuming Work: Rack back 1/2-unit length in each course; do not tooth. Clean exposed surfaces of set masonry, wet units lightly (if required) and remove loose masonry units and mortar prior to laying fresh masonry.
- D. Built-in Work: As the work progresses, build-in items specified under this and other sections of these specifications. Fill in solidly with masonry around built-in items.
 - 1. Fill space between hollow metal frames and masonry solidly with mortar, unless otherwise indicated.

3.3 MORTAR BEDDING AND JOINTING

- A. Lay masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not slush head joints.
- B. Lay hollow concrete masonry units with full mortar coverage on horizontal and vertical face shells. Bed webs in mortar in starting course on footings and in all courses of piers, columns and pilasters, and where adjacent to cells or cavities to be reinforced or filled with concrete or grout. For starting course on footings where cells are not grouted, spread out full mortar bed including areas under cells.
- C. Maintain joint width shown, except for minor variations required to maintain bond alignment. If not shown, lay walls with 3/8" joints.
- D. Cut joints flush for masonry walls which are to be concealed or to be covered by other materials, unless otherwise indicated.
- E. Tool all exposed joints, except where otherwise indicated, slightly concave using a jointer larger than joint thickness, unless otherwise indicated.
- F. Remove masonry units disturbed after laying; clean and reset in fresh mortar. Do not pound corners or jambs to shift adjacent stretcher units which have been set in position. If adjustments are required, remove units, clean off mortar and reset in fresh mortar.

3.4 STRUCTURAL BONDING OF MULTI-WYTHE MASONRY

- A. Use continuous horizontal joint reinforcement installed in horizontal mortar joints for bond tie between wythes. Install at not more than 16" o.c. vertically.
- B. Corners: Provide interlocking masonry unit bond in each course at corners, unless otherwise shown.
 - 1. For horizontally reinforced masonry, provide continuity at corners with prefabricated "L" units, in addition to masonry bonding.

- C. Intersecting and Abutting Walls: Unless vertical expansion or control joints are shown at juncture, provide same type of bonding specified for structural bonding between wythes and space as shown below:
 - 1. At juncture of interior partitions and exterior walls, rake and caulk vertical joint.
 - 2. Provide metal ties as shown below.
 - 3. Provide individual metal ties at not more than 16" o.c. vertically.
 - 4. Provide continuity with horizontal joint reinforcement using prefabricated "T" units.
- D. Intersecting Load-bearing Walls: If carried up separately, block or tooth vertical joint with 8" maximum offsets and provide rigid steel anchors spaced not more than 4'-0" o.c. vertically, or omit blocking and provide rigid steel anchors at not more than 2'-0" o.c. vertically. Form anchors of galvanized steel not less than 1-1/2" x 1/4" x 2'-0" long with ends turned up not less than 2" or with cross-pins. If used with hollow masonry units, embed ends in mortar-filled cores.
- E. Non-bearing Interior Partitions: Build full height of story to underside of roof structure above, unless otherwise shown.

3.5 CAVITY WALLS

- A. Keep cavity clean of mortar droppings and other materials during construction. Strike joints facing cavity flush.
- B. Tie exterior wythe to new back-up with continuous horizontal joint reinforcing, installed in mortar joints at not more than 16" o.c. vertically.
- C. Provide weep holes (Open Head Joints) in exterior wythe of cavity wall located as directed on the drawings, spaced 32" o.c., unless otherwise indicated.

3.6 CAVITY WALL INSULATION

- A. On units of plastic insulation, install small pads of adhesive spaced approximately 1'-0" o.c. both ways on inside face. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.
 - 1. Fill all cracks and open gaps in insulation with crack sealer compatible with insulation and masonry.

3.7 HORIZONTAL JOINT REINFORCEMENT

- A. General: Provide continuous horizontal joint reinforcement as indicated. Install longitudinal side rods in mortar for their entire length with a minimum cover of 5/8" on exterior side of walls, 1/2" elsewhere. Lap reinforcing a minimum of 6".
- B. Cut or interrupt joint reinforcement at control and expansion joints, unless otherwise indicated.
- C. Reinforce walls with continuous horizontal joint reinforcing unless specifically noted to be omitted.
- D. Reinforce masonry openings greater than 1'-0" wide, with horizontal joint reinforcement placed in 2 horizontal joints approximately 8" apart, immediately above the lintel and immediately below the sill. Extend reinforcement a minimum of 2'-0" beyond jambs of the opening except at control joints.
 - 1. In addition to wall reinforcement, provide additional reinforcement at openings as required to comply with the above.

3.8 CONTROL AND EXPANSION JOINTS

- A. General: Provide vertical and horizontal expansion, control and isolation joints in masonry where shown. Build-in related items as the masonry work progresses.

3.9 LINTELS

- A. Install steel lintels where indicated.
- B. Provide masonry lintels where shown and wherever openings of more than 1'-0" for brick size units and 2'-0" for block size units are shown without structural steel or other supporting lintels. Provide formed-in-place masonry lintels. Temporarily support formed-in-place lintels.
- C. Provide minimum bearing of 8" at each jamb, unless otherwise indicated.

3.10 FLASHING OF MASONRY WORK

- A. General: Provide concealed flashing in masonry work at, or above shelf angles, lintels, ledges and other obstructions to the down-ward flow of water in the wall so as to divert such water to the exterior. Prepare masonry surfaces smooth and free from projections which could puncture flashing. Place through-wall flashing on sloping bed of mortar and cover with mortar. Seal penetrations in flashing with mastic before covering with mortar. Extend flashings through exterior face of masonry and turn down to form drip.
- B. Extend flashing the full length of lintels and shelf angles and minimum of 4" into masonry each end. Extend flashing from exterior face of outer wythe of masonry, through the outer wythe, turned up a minimum of 4", and through the inner wythe to within 1/2" of the interior face of the wall in exposed work. Where interior surface of inner wythe is concealed by furring, carry flashing completely through the inner wythe and turn up approximately 2". At heads and sills turn up ends not less than 2" to form a pan.
- C. Interlock end joints of deformed metal flashings by over-lapping deformations not less than 1-1/2" and seal lap with elastic sealant.
- D. Install flashing to comply with manufacturer's instructions.
- E. Provide weep holes (open head joints) in the head joints of the first course of masonry immediately above concealed flashings. Space weep holes 32" o.c., unless otherwise indicated.

3.11 REPAIR, POINTING AND CLEANING

- A. Remove and replace masonry units which are loose, chipped, broken, stained or otherwise damaged, or if units do not match adjoining units as intended. Provide new units to match adjoining units and install in fresh mortar or grout, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge any voids or holes, except weep holes, and completely fill with mortar. Point- up all joints including corners, openings and adjacent work to provide a neat, uniform appearance, prepared for application of sealants.
- C. Final Cleaning: After mortar is thoroughly set and cured, clean masonry as follows:
 - 1. Remove large mortar particles by hand with wooden paddles and non-metallic scrape hoes or chisels.
 - 2. Test cleaning methods on sample wall panel; leave 1/2 panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
 - 3. Protect adjacent non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film or waterproof masking tape.
 - 4. Saturate wall surfaces with water prior to application of cleaners; remove cleaners promptly by rinsing thoroughly with clean water.
 - 5. Use bucket and brush hand cleaning method described in BIA "Technical Note No. 10 Revised" to clean brick masonry made from clay or shale, except use masonry cleaner indicated below.
 - a. Detergent
 - 6. Clean concrete unit masonry to comply with masonry manufacturer's directions and applicable NCMA "Tek" bulletins.

END OF SECTION

SECTION 05310 - STEEL DECKING

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Composite floor deck.
- B. Metal form deck.
- C. Bearing plates and angles.
- D. Stud shear connectors.

1.2 RELATED REQUIREMENTS

- A. Section 05120 - Structural Steel Framing: Support framing for openings larger than 18 inches and shear stud connectors.
- B. Section 05210 - Steel Joist Framing: Placement of embedded steel anchors for bearing plates and joist seats in cast-in-place concrete.

1.3 REFERENCE STANDARDS

- A. ASTM A36/A36M - Standard Specification for Carbon Structural Steel; 2014.
- B. ASTM A108 - Standard Specification for Steel Bar, Carbon and Alloy, Cold Finished; 2013.
- C. ASTM A510/A510M - Standard Specification for General Requirements for Wire Rods and Coarse Round Wire, Carbon Steel, and Alloy Steel; 2013.
- D. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process; 2017.
- E. ASTM B633 - Standard Specification for Electrodeposited Coatings of Zinc on Iron and Steel; 2015.
- F. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2015, with Errata (2016).
- G. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2018.
- H. IAS AC172 - Accreditation Criteria for Fabricator Inspection Programs for Structural Steel; 2017.
- I. ICC-ES AC43 - Acceptance Criteria for Steel Deck Roof and Floor Systems; 2016.
- J. ICC-ES AC70 - Acceptance Criteria for Fasteners Power Driven into Concrete, Steel and Masonry Elements; 2016.
- K. SDI (DM) - Publication No.30, Design Manual for Composite Decks, Form Decks, and Roof Decks; 2007.
- L. SSPC-Paint 20 - Zinc-Rich Primers (Type I, "Inorganic," and Type II, "Organic"); 2002 (Ed. 2004).
- M. UL (FRD) - Fire Resistance Directory; Current Edition.

1.4 QUALITY ASSURANCE

- A. Design deck layout, spans, fastening, and joints under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State in which the Project is located.
- B. Field Quality Control:
 - 1. Testing Agency: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
 - 2. Field welds will be subject to inspection.
 - 3. Testing agency will report inspection results promptly and in writing to Contractor and Architect.
 - 4. Remove and replace work that does not comply with specified requirements.

5. Additional inspecting, at Contractor's expense, will be performed to determine compliance of corrected work with specified requirements.

1.5 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

2.1 MANUFACTURERS

- A. Steel Deck:
 1. Canam Steel Corporation/United Steel Deck; www.canam-construction.com/en/construction-products/steel-deck/
 2. Cordeck, Inc; www.cordeck.com
 3. Nucor-Vulcraft Group; www.vulcraft.com/#sle.
 4. CSI; www.versa-roof.com
 5. Epic Metals Corporation; www.epicmetals.com
 6. Substitutions: See Section 01600 - Product Requirements.

2.2 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 Lateral Deflection of Diaphragms: 1/500 of the height of the wall.
- B. Composite Floor Deck: Fluted steel sheet embossed to interlock with concrete:
 1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 33/230, with G90/Z275 galvanized coating.
 2. Primer: Shop coat of manufacturer's standard primer paint over cleaned and phosphatized substrate.
 3. Span Design: Double.
 4. Minimum Base Metal Thickness: As indicated on drawings. Otherwise, 22 gage, 0.0299 inch (0.76 mm).
 5. Nominal Height: As indicated on drawings. Otherwise, 1-1/2 inches (38 mm).
 6. Profile: Fluted; SDI NR.
 7. Formed Sheet Width: As indicated on drawings. Otherwise, 24 inch (600 mm).
 8. Side Joints: Lock seam.
 9. End Joints: Lapped, welded.
 10. Fire Resistance Classification Comply with UL (FRD) Assembly Number if fire rated assembly is required.
- C. Metal Form Deck: Corrugated Steel Sheet, with provision for ventilation of concrete:
 1. Galvanized Steel Sheet: ASTM A653/A653M, Structural Steel (SS) Grade 33/230, with G90/Z275 galvanized coating.
 2. Primer: Shop coat of manufacturer's standard primer paint over cleaned and phosphatized substrate.
 3. Minimum Base Metal Thickness: As indicated on drawings. Otherwise, 22 gage, 0.0299 inch (0.76 mm).
 4. Nominal Height: As indicated on drawings. Otherwise 1-1/2 inch. (38 mm).

5. Formed Sheet Width: As Indicated on drawings.
6. Side Joints: Lapped, welded.
7. End Joints: Lapped, welded.

2.3 ACCESSORY MATERIALS

- A. Bearing Plates and Angles: ASTM A36/A36M steel, galvanized per ASTM A123/A123M.
- B. Stud Shear Connectors: Made from ASTM A108 Grade 1015 bars.
- C. Welding Materials: AWS D1.1/D1.1M.
- D. Fasteners: Galvanized hardened steel, self tapping.
- E. Powder Actuated Mechanical Fasteners: Steel; with knurled shank and forged ballistic point. Comply with applicable requirements of ICC-ES AC70.
 1. Design Requirements: Provide number and type of fasteners that comply with the applicable requirements of SDI (DM) design method for roof deck and floor deck applications and ICC-ES AC43.
 2. Material: Steel; ASTM A510/A510M, Grade 1077.
 - a. Hardness: Rockwell C 54.5, minimum.
 - b. Tensile Strength: 285 kips per square inch, minimum.
 - c. Shear Strength: 175 kips per square inch, minimum.
 - d. Washers:
 - i. Steel Bar Joist Framing Applications: 0.472 inch diameter, minimum.
 - ii. Exposed Roof Deck Applications: 0.591 inch diameter, minimum.
 - e. Corrosion Resistance:
 - i. Steel Bar Joist Framing Applications: ASTM B633, SC1, Type III zinc electroplate.
- F. Mechanical Fasteners: Steel; hex washer head, self-drilling, self-tapping.
 1. Design Requirements for Sidelap Connections: Provide number and type of fasteners that comply with the applicable requirements of SDI (DM)SDI design method for roof deck and floor deck applications and ICC-ES AC43.
 2. Fasteners for Steel Roof Decks Protected with Waterproofing Membrane: ASTM B633, SC1, Type III zinc electroplate.
 3. Fasteners for Exposed Steel Roof Deck Application: Manufacturer's standard stainless steel with bonded neoprene washer.
- G. Weld Washers: Mild steel, uncoated, 3/4 inch outside diameter, 1/8 inch thick.
- H. Touch-Up Primer for Galvanized Surfaces: SSPC-Paint 20, complying with VOC limitations of authorities having jurisdiction.
- I. Flute Closures: Closed cell foam rubber, 1 inch thick; profiled to fit tight to the deck.

2.4 FABRICATED DECK ACCESSORIES

- A. Sheet Metal Deck Accessories: Metal closure strips, wet concrete stops, and cover plates, 22 gage, 0.0299 inch (0.76 mm) thick sheet steel; of profile and size as indicated; finished same as deck.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify existing conditions prior to beginning work.

3.2 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 4inch (100 mm) bearing.
- C. On Steel supports provide minimum 1-1/2 inch (38 mm) bearing.
- D. Fasten deck to steel support members at ends and intermediate supports at 12 inches 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.
- F. At mechanically fastened male/female side laps fasten at 24 inches on center maximum.
- D. Drive mechanical sidelap connectors completely through adjacent lapped sheets; positively engage adjacent sheets with minimum three-thread penetration.
- E. At welded male/female side laps weld at 18 inches on center maximum.
- F. Weld deck in accordance with AWS D1.3/D1.3M.
- G. At deck openings from 6 inches to 18 inches in size, provide 2 by 2 by 1/4 inch 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.
- K. At deck openings greater than 18 inches in size, provide steel angle reinforcement. as specified in Section 05500.
- L. Where deck (other than cellular deck electrical raceway) changes direction, install 6 inch minimum wide sheet steel cover plates, of same thickness as deck. Fusion weld 12 inches on center maximum.
- M. 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.
- N. At openings between deck and walls, columns, and openings, provide sheet steel closures and angle flashings to close openings.
- O. Close openings above walls and partitions perpendicular to deck flutes with single row of foam cell closures.
- P. Place metal cant strips in position and fusion weld.
- Q. Position roof drain pans with flange bearing on top surface of deck. Fusion weld at each deck flute.
- R. Position floor drain pans with flange bearing on top surface of deck. Fusion weld at each deck flute.
- S. Weld stud shear connectors through steel deck to structural members below.
- T. 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 05450 - PRE-ENGINEERED LIGHT GAUGE STEEL TRUSSES

PART 1 – GENERAL

1.1 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.

1.2 DESCRIPTION OF WORK

- A. Section Includes all work and supplementary items required to complete the proper installation of the Pre-Engineered Light Gauge Steel Roof Trusses as shown on the Contract Documents and specified herein including headers, outriggers, supplemental rafters and incidental framing for a complete assembly within the extent shown on the drawings.
- B. Pre-Engineered Light Gauge Steel Trusses include planar structural units consisting of welded, screwed or bolted connected members which are fabricated, cut and assembled prior to delivery to the job site.
- C. Types of Pre-Engineered Light Gauge Steel Trusses Include:
 - 1. Gable Trusses
 - 2. Monopitch Trusses
 - 3. Irregular Shaped Trusses

1.3 RELATED SECTIONS

- A. Section 05120, Structural Steel.
- B. Section 05310, Steel Deck.
- C. Section 05500, Miscellaneous Steel Fabrications.
- D. Section 06100, Rough Carpentry for Curbs, Wood Nailers and other required Carpentry.

1.4 REFERENCE STANDARDS

- A. American Iron and Steel Institute: Specification for the Design of Cold-Formed Steel Structural Members.
- B. American Society of Testing Materials: ASTM A 446: "Specification for Sheet Steel, Zinc Coated (Galvanized) by the Hot-Dip Process, Physical (Structural) Quality."
 - 1. Grade A, $F_y = 33$ ksi: 18 gauge and lighter
 - 2. Grade D, $F_y = 50$ ksi: 16 gauge and heavier
 - 3. Galvanizing: G-60 Coating Class
- C. American Welding Society:
 - 1. AWS D1.0 "Code for welding in Building Construction"
 - 2. ANSI Z49.1 "Safety in welding and Cutting"

1.5 QUALIFICATIONS

- A. The light gauge steel subcontractor shall have experience in fabrication and erection of light gauge steel truss and framing systems of scope and design similar to the required work.

1.6 FABRICATOR'S QUALIFICATIONS

- A. Trusses shall be designed, fabricated, and erected by a firm which has a record including a minimum of five years of successfully designing, fabricating and erecting trussed assemblies similar to scope required and which practices a quality control program which includes inspection by an independent inspection and testing agency acceptable to architect and authorities having jurisdiction.

- B. Fabricators who wish to qualify for approval under this Section of the specification shall submit evidence of compliance with this specification no later than ten (10) days prior to the bid date. Only those fabricators approved in writing by the Architect prior to the bid date will be accepted.

1.7 SUBMITTALS

- A. Requirements: Submit in exact accordance with Section -Shop Drawings,- Product Data and Samples.
- B. Product data: Submit fabricator's technical data covering materials, shapes, hardware, fabrication process, handling and erection.
- C. Submit certificate, signed by an officer of subcontractor or fabricating firm, indicating that trusses to be supplied' for project comply with indicated requirements.
- D. Shop Drawings: Submit shop drawings showing shapes and dimensions of members to be used including pitch, span, camber configuration and spacing for each type or configuration of truss required. Show all bearing and anchorage details. Specify and detail all supplemental strapping bracing clips and other accessories required for proper installation. Shop drawings shall include all placement sequences and instructions.
- E. To the extent engineering design considerations are indicated as fabricator's responsibility submit design analysis and test reports indicating loading, section properties, allowable stress, stress diagrams and calculations, and similar information needed for analysis and to insure trusses comply with requirements.
- F. All designs shall bear the name and seal of a Structural Engineer licensed to practice in the state where the trusses are to be erected.
- G. Basis of Design: Basis of Design is indicated on drawings.

1.8 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle products in exact accordance with the manufacturer's latest published requirements and specifications to avoid damage from bending, overturning, or other cause for which truss is not designed to resist or endure. Storage shall be off-ground in a dry ventilated space or protect with waterproof coverings.
- B. Time the fabrication and erection of trusses to avoid extended on-site storage and to avoid delaying work of other trades whose work must follow erection of trusses.

PART 2 - PRODUCTS

2.1 ACCEPTABLE ASSEMBLY

A. MANUFACTURER

- 1. The specific pre-engineered truss system described in this section shall be the Metalite Pre-Engineered Truss System as provided by SRD, Inc; P.O. Drawer 579; 1510 5 Acre Road; Pleasant Grove, Al. 35127; (205) 744-6110; (205) 744-9958 Fax
- 2. Manufacturer's requesting approval of assemblies shall submit evidence of compliance with the specified require-merits at least ten (10) days prior to bid date.

2.2 ASSEMBLY PERFORMANCE REQUIREMENTS

- A. The pre-engineered light gauge steel truss system shall exhibit the following performance characteristics:

Uniform Total Load Capacity	120 lbs./linear foot
Truss Spacing	as shown on drawings
Assembly Weight	10.0 lbs./sf. Maximum
Wind Uplift Rating	115 mph
Fire Classification	Non-combustible

Renovations of the Arts Center To
Goshen High School for the
Pike County Schools
Troy, Alabama

PRE-ENGINEERED LIGHT GAUGE STEEL TRUSSES
05450-2

Factory Mutual Classification	FM Class I
Diaphragm Shear Strength	as shown on drawings
Screwed Connections	Yes
Interior Bearing	Yes at panel points only

2.3 COMPONENTS

- A. Available Supplier: Subject to compliance with requirements framing shapes and components for pre-engineered light gauge prefabricated steel trusses shall be as provided by Advantage Construction Systems, Inc. or prior approved equal.
- B. All calculations and procedures pertaining to design, analysis, and computation of section properties shall be in accordance with the Specification for the Design of Cold-Formed Steel Structural Members of the American Iron and Steel Institute.
- C. All Structural components shall be galvanized with a zinc coating conforming to Coating Class G-60 and shall be manufactured from steel that conforms to the requirements of ASTM A-446, Grade A (33 ksi mm. yield) for 18 gauge and lighter and ASTM A 446, Grade D (50 ksi mm. yield) for 16 gauge and heavier.

2.4 FASTENERS

- A. Framing components shall be field or shop fabricated and joined to one another by means of welding or through the use of screws as recommended by the component provider.

PART 3 -EXECUTION

3.1 EXAMINATION

- A. Visually examine and verify that receiving surfaces of the substructure have no apparent defects or errors which would result in substandard workmanship. Additionally, the following items shall be installed and inspected prior to roof truss installation.
 - 1. Conditions of Surfaces:
 - a. Exterior bearing plates:
 - 2. Properly positioned within Bond Beam.
 - 3. Installed so as to allow complete and adequate contact with truss connection member.
 - a. Interior bearing plates:
 - 4. Properly positioned within Bond Beam.
 - 5. Installed so as to allow complete and adequate contact with truss connection member.
 - a. Exterior and Interior Bearing Plates installed in proper elevations so as to permit the installation of the truss system without the use of shims or adjustability.
- B. Report any unsatisfactory conditions to the Architect.

3.2 PREPARATION

- A. Structural Adequacy: Contractor shall prepare the structure to insure proper and adequate structural support for the materials specified.

3.3 FABRICATION

- A. Light gauge steel trusses may be fabricated either on the jobsite or at the fabricator's shop.
- B. All trusses shall be fabricated and erected in strict accordance with the current printed instructions of the approved subcontractor or fabricator.
- C. All truss components shall be straight and true prior to fabrication. Flattening or straightening of components, when necessary, shall be accomplished in a manner so as to not damage the

component.

- D. All truss components shall be cut neatly to fit snugly against adjacent members.
- E. No splices will be allowed in trusses except as authorized in writing by the Architect or as shown on the approved shop drawings.
- F. Provide all clips, angles, henways and other miscellaneous pieces necessary to attach light gauge steel trusses to the substructure or to attach other components within this section to one another.
- G. All trusses shall be erected true and plumb and properly bridged and braced in accordance with the approved shop drawings.
- H. All truss components shall be connected to one another by means of screw attachment or by welding.
- I. Completed trusses shall be free from twists, bends, or open joints with all members straight and true to line.
- J. If the truss components have been welded to one another then all welds must be thoroughly cleaned and wire brushed and primed and painted with a high zinc content paint capable of providing an equal or greater degree of protection than the original G-60 galvanized coating.

3.4 ERECTION

- A. Prefabricated trusses shall be braced against racking. Lifting of trusses shall be done so-as to not cause local distortion in any member.
- B. All light gauge steel framing shall be erected by approved methods using equipment of adequate capacity to safely perform the work.
- C. The contractor is responsible for checking the dimensions and assuring the fit of all members and trusses before erection begins.
- D. All work shall be erected plumb and level and to dimensions, spacings indicated on the drawings.
- E. Components shall be of the size and spacing shown on the approved shop drawings.
- F. Provide web stiffeners and reinforcement at reaction points where required by analysis or to suit details.
- G. Hoist units in place by means of lifting equipment suited to sizes and types of trusses required, applied at designated lift points as recommended by fabricator, exercising care not to damage truss members.
- H. Provide temporary bracing as required to maintain trusses plumb, parallel and in location indicated, until permanent bracing is installed.
- I. Anchor trusses securely at all bearing points to comply with methods and details indicated.
- J. Install permanent bracing and related components to enable trusses to maintain design spacing, withstand live and dead loads, and comply with other indicated requirements.
- K. Do not cut or remove truss members.

END OF SECTION

SECTION 05500 - MISCELLANEOUS STEEL AND METAL FABRICATIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract including General and Supplementary Conditions and Division 1 Specification Sections apply to work of this section.

1.2 DESCRIPTION OF WORK

- A. Definition: Metal fabrications include items made from iron and steel shapes, plates bars, strips, tubes, pipes and castings which are not a part of structural steel or other metal systems specified elsewhere.
- B. Extent of metal fabrications is indicated on drawings and schedules.
- C. Types of work in this section include metal fabrications for:
 - 1. Rough hardware.
 - 2. Nosing.
 - 3. Loose bearing and leveling plates.
 - 4. Loose steel lintels.
 - 5. Miscellaneous framing and supports.
 - 6. Miscellaneous steel trim.
 - 7. Shelf angles.
 - 8. Steel railings.

1.3 QUALITY ASSURANCE

- A. Shop Assembly: Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's specifications, anchor details and installation instructions for products used in miscellaneous metal fabrications, including paint products and grout.
- B. Shop Drawings: Submit shop drawings for fabrication and erection of metal fabrications. Include plans, elevations and details of sections and connections. Show anchorage and accessory items. Provide templates for anchor and bolt installation by others.
 - 1. Where materials or fabrications are indicated to comply with certain requirements for design loadings, include structural computations, material properties and other information needed for structural analysis.
- C. Samples: Submit 2 sets of representative samples of materials and finished products as may be requested by Architect.

PART 2 - PRODUCTS

2.1 MATERIALS

A. FERROUS METALS

- 1. Metal Surfaces, General: For fabrication of miscellaneous metal work which will be exposed to view, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.
- 2. Steel Structural, Shapes and Bars: ASTM A 36, wide flange, ASTM A572, fy=50ks.
- 3. Steel Tubing: Hot-rolled, ASTM A 500. FY=46KSI

4. Structural Steel Sheet: Hot-rolled, ASTM A 570; or cold-rolled ASTM A 611, Class 1; of grade required for design loading.
5. Galvanized Structural Steel Sheet: ASTM A 446, of grade required for design loading. Coating designation as indicated, or if not indicated, G90.
6. Steel Pipe: ASTM A 53; Type and grade (if applicable) as selected by fabricator and as required for design loading; black finish unless galvanizing is indicated; standard weight (schedule 40), unless otherwise indicated.
7. Gray Iron Castings: ASTM A 48, Class 30.
8. Malleable Iron Castings: ASTM A 47, grade as selected by fabricator.
9. Brackets, Flanges and Anchors: Cast or formed metal of the same type material and finish as supported rails, unless otherwise indicated.
10. Concrete Inserts: Threaded or wedge type; galvanized ferrous castings, either malleable iron, ASTM A 47, or cast steel, ASTM A 27. Provide bolts, washers and shims as required, hot-dip galvanized, ASTM A 153.
11. Non-Shrink Non-Metallic Grout: Pre-mixed, factory-packaged, non-staining, non-corrosive, non-gaseous grout complying with CE CRD-C621. Provide grout specifically recommended by manufacturer for interior and exterior applications of type specified in this section.

B. FASTENERS

1. General: Provide zinc-coated fasteners for exterior use or where built into exterior walls. Select fasteners for the type, grade and class required.
2. Bolts and Nuts: Regular hexagon head type, ASTM A 307, Grade A.
3. Lag Bolts: Square head type, FS FF-B-561.
4. Machine Screws: Cadmium plated steel, FS FF-S-92.
5. Wood Screws: Flat head carbon steel, FS FF-S-111.
6. Plain Washers: Round, carbon steel, FS FF-W-92.
7. Masonry Anchorage Devices: Expansion shields, FS FF-S-325.
8. Toggle Bolts: Tumble-wing type, FS FF-B-588, type, class and style as required.
9. Lock Washers: Helical spring type carbon steel, FS FF-W-84.

C. PAINT:

1. Shop Primer for Ferrous Metal: Manufacturer's or Fabricator's standard, fast-curing, lead-free, "universal" primer; selected for good resistance to normal atmospheric corrosion, for compatibility with finish paint systems indicated and for capability to provide a sound foundation for field-applied topcoats despite prolonged exposure; complying with performance requirements of FS TT-P-645.
2. Galvanizing Repair Paint: High zinc dust content paint for regalvanizing welds in galvanized steel, complying with the Military Specifications MIL-P-21035 (Ships) or SSPC-Paint-20.

D. CONCRETE FILL:

1. Concrete Materials and Properties: Comply with requirements of Division-3 section "Concrete Work" for normal weight, ready-mix concrete with minimum 28-day compressive strength of 3000 psi, and W/C ratio of 0.58 maximum, unless higher strengths indicated.
2. Non-Slip Aggregate Finish: Factory-graded, packaged material containing fused aluminum oxide grits or crushed emery as abrasive aggregate; rust-proof and non-glazing; unaffected by freezing, moisture or cleaning materials.

2.2 FABRICATION - GENERAL

- A. Workmanship: Use materials of size and thickness indicated, or if not indicated, as required to produce strength and durability in finished product for use intended. Work to dimensions

indicated or accepted on shop drawings, using proven details of fabrication and support. Use type of materials indicated or specified for various components of work.

- B. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32" unless otherwise indicated. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- C. Weld corners and seams continuously, complying with AWS recommendations. At exposed connections, grind exposed welds smooth and flush to match and blend with adjoining surfaces.
- D. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners wherever possible. Use exposed fasteners of type indicated or, if not indicated, Phillips flat-head (countersunk) screws or bolts.
- E. Provide for anchorage of type indicated, coordinated with supporting structure. Fabricate and space anchoring devices to provide adequate support for intended use.
- F. Cut, reinforce, drill and tap miscellaneous metal work as indicated to receive finish hardware and similar items.
- G. Galvanizing: Provide a zinc coating for those items indicated or specified to be galvanized, as follows:
 - 1. ASTM A_ 153 for galvanizing iron and steel hardware.
 - 2. ASTM A 123 for galvanizing rolled, pressed and forged steel shapes, plates, bars and strip 1/8" thick and heavier.
 - 3. ASTM A_ 386 for galvanizing assembled steel products.
- H. Fabricate joints which will be exposed to weather in a manner to exclude water or provide weep holes where water may accumulate.
- I. Shop Painting:
 - 1. Apply shop primer to surfaces of metal fabrications except those which are galvanized or as indicated to be embedded in concrete or masonry, unless otherwise indicated, and in compliance with requirements of SSPC-PA1 "Paint Application Specification No. 1" for shop painting.
 - a. Stripe paint all edges, corners, crevices, bolts, welds and sharp edges.
- J. Surface Preparation: Prepare ferrous metal surfaces to comply with minimum requirements indicated below for SSPC surface preparation specifications and environmental exposure conditions of installed metal fabrications:
 - 1. Exteriors (SSPC Zone 1B): SSPC-SP6 "Commercial Blast cleaning".
 - 2. Interior (SSPC Zone 1A): SSPC-SP3 "Power Tool Cleaning".

2.3 ROUGH HARDWARE

- A. Furnish bent or otherwise custom fabricated bolts, plates, anchors, hangers, dowels and other miscellaneous steel and iron shapes as required for framing and supporting woodwork, and for anchoring or securing woodwork to concrete or other structures. Straight bolts and other stock rough hardware items are specified in Division-6 sections.
- B. Fabricate items to sizes, shapes and dimensions required. Furnish malleable-iron washers for heads and nuts which bear on wood structural connections; elsewhere, furnish steel washers.

2.4 LOOSE STEEL LINTELS

- A. Provide loose structural steel lintels for openings and recesses in masonry walls and partitions as shown and scheduled. Weld adjoining members together to form a single unit where indicated. Provide not less than 8" bearing at each side of openings, unless otherwise indicated. All steel lintels shall be hot-dipped galvanized steel.

2.5 MISCELLANEOUS FRAMING AND SUPPORTS

- A. Provide miscellaneous steel framing and supports which are not a part of structural steel framework, as required to complete work.
- B. Fabricate miscellaneous units to sizes, shapes and profiles indicated or, if not indicated, of required dimensions to receive adjacent other work to be retained by framing. Except as otherwise indicated, fabricate from structural steel shapes, plates and steel bars of welded construction using mitered joints for field connection. Cut, drill and tap units to receive hardware and similar items.
- C. Equip units with integrally welded anchors for casting into concrete or building into masonry. Furnish inserts if units must be installed after concrete is placed.
 - 1. Except as otherwise indicated, space anchors 24" o.c. and provide minimum anchor units of 1-1/4" x 1/4" x 8" steel straps.

2.6 FABRICATION - STEEL RAILINGS AND HANDRAILS

- A. Structural Performances: Provide assemblies which, when installed, comply with the following minimum requirements for structural performance, unless otherwise indicated.
 - 1. Handrails and Toprails: Capable of withstanding the following loads applied as indicated when tested per ASTM E 935.
 - 2. Concentrated Load: of 200lb applied at any point and any direction.
 - 3. Uniform load of 50 lb per linear ft. applied in any direction.
 - 4. Concentrated and uniform loads above need not be assumed to act concurrently.
 - 5. Guards: Intermediate rails, balusters and panel fillers capable of withstanding a uniform load of 25 lb per sq. ft. of gross area of guard, including any open areas, of which they are a part.
- B. Fabricate steel railings and handrails to design, dimensions, and details indicated. Provide railings and handrails members formed of steel tubing of shapes, sizes and wall thickness indicated, but not less than that required to support design loading.
- C. Interconnect railing and handrail members by butt-welding or welding with internal connectors, at fabricator's option, unless otherwise indicated.
 - 1. At tee and cross intersections provide coped joints.
 - 2. At bends interconnect tubing by means of prefabricated elbow fittings or flush radius bends, as applicable, or radiuses indicated.
 - 3. At elbow bends provide mitered joints.
 - 4. Form bends by use of prefabricated elbow fittings and radius bends or by bending pipe, at fabricator's option.
- D. Form simple and compound curves by bending tubing in jigs to produce uniform curvature for each repetitive configuration required; maintain cylindrical cross-section of pipe throughout entire bend without buckling, twisting or otherwise deforming exposed surfaces of pipe.
- E. Provide wall returns at ends of wall-mounted handrails, except where otherwise indicated.
- F. Close exposed ends of pipe by welding 3/16" thick steel plate in place or by use of prefabricated fittings.
- G. Toe Boards: Where indicated, provide toeboards at railings around openings and at the edge of open-sided floors and platforms. Fabricate to dimensions and details indicated, or if not indicated, use a 4" high x 1/8" plate welded to, and centered between, each railing post.
- H. Brackets, Flanges, Fittings and Anchors: Provide wall brackets, end closures, flanges, miscellaneous fittings and anchors for interconnections of pipe and attachment of railings and handrails to other work. Furnish inserts and other anchorage devices for connecting railings and handrails to concrete or masonry work.

1. For railing posts sets in concrete provide sleeves of galvanized steel pipe not less than 6" long and with an inside diameter not less than 1/2" greater than the outside dimensions of tubing. Provide steel plate closure welded to bottom of sleeve and of width and length not less than 1" greater than outside diameter of sleeve.
- I. Stair Railings and Handrails: Comply with applicable requirements specified elsewhere in this section for steel railings and handrails, and as follows:
 1. Railings may be bent at corners, rail returns and wall returns, instead of using prefabricated fittings.
 2. Connect railing posts to stair framing by direct welding, unless otherwise indicated.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication, where possible. Do not delay job progress; allow for trimming and fitting where taking field measurements before fabrication might delay work.
- B. Coordinate and furnish anchorages, setting drawings, diagrams, templates, instructions, and directions for installation of anchorages, such as concrete inserts, sleeves, anchor bolts and miscellaneous items having integral anchors, which are to be embedded in concrete or masonry construction. Coordinate delivery of such items to project site.

3.2 INSTALLATION - GENERAL

- A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing miscellaneous metal fabrications to in-place construction; including, threaded fasteners for concrete and masonry inserts, toggle bolts, through-bolts, lag bolts, wood screws and other connectors as required.
- B. Cutting, Fitting and Placement: Perform cutting, drilling and fitting required for installation of miscellaneous metal fabrications. Set work accurately in location, alignment and elevation, plus, level, true and free of rack, measured from established lines and levels. Provide temporary bracing or anchors in formwork for items which are to be built into concrete masonry or similar construction.
 1. Fit exposed connections accurately together to form tight hairline joints. Weld connections which are not to be left as exposed joints, but cannot be shop welded because of shipping size limitations. Grind exposed joints smooth and touch-up shop paint coat. Do not weld, cut or abrade the surfaces of exterior units which have been hot-dip galvanized after fabrication, and are intended for bolted or screwed field connections.
- C. Field Welding: Comply with AWS Code for procedures of manual shielded metal-arc welding, appearance and quality of welds made, and methods used in correcting welding work.
- D. Setting Loose Plates: Clean concrete and masonry bearing surfaces of any bond-reducing materials and roughen to improve bond to surfaces. Clean bottom surface of bearing plates.
 1. Set loose leveling and bearing plates on wedges, or other adjustable devices. After the bearing members have been positioned and plumbed, tighten the anchor bolts. Do not remove wedges or shims, but if protruding, cut-off flush with the edge of the bearing plate before packing with grout. Use metallic non-shrink grout in concealed locations where not exposed to moisture; use non-metallic non-shrink grout in exposed locations, unless otherwise indicated.

3.3 INSTALLATION - STEEL RAILINGS AND HANDRAILS

- A. Adjust railing prior to anchoring to ensure matching alignment at abutting joints. Space posts at spacing indicated, or if not indicated, as required by design loadings. Plumb posts in each direction. Secure posts and railing ends to building construction as follows:

1. Anchor posts in concrete by means of sleeves preset and anchored into concrete. After posts have been inserted into sleeves, fill annular space between post and sleeve solid with non-shrink, non-metallic grout, mixed and placed to comply with grout manufacturer's directions.
 2. Leave anchorage joint exposed; wipe off excess grout and level 1/8" build-up, sloped away from post. For installation exposed on exterior or to flow of water, seal grout to comply with grout manufacturer's directions.
- B. Secure handrails to wall with wall brackets and end fittings. Provide bracket with not less than 1-1/2" clearance from inside face of handrail and finished wall surface. Locate brackets as indicated, or if not indicated, at spacing required for design loading. Secure wall brackets and wall return fittings to building construction as follows:
1. Use type of bracket with pre-drilled hole for exposed bolt anchorage.
 2. For concrete and solid masonry anchorage, use drilled-in expansion shield and either concealed hanger bolt or exposed lag bolt, as applicable.
 3. For hollow masonry anchorage, use toggle bolts having square heads.
 4. For stud partitions use lag bolts set into wood backing between studs. Coordinate with stud installations for accurate location of backing members.
- C. Expansion Joints: Provide expansion joints at locations indicated, or if not indicated, at intervals not to exceed 40 feet. Provide slip joint with internal sleeve extending 2" beyond joint on either side; fasten internal sleeve securely to one side; locate joint within 6" of posts.
- D. Cast Treads and Thresholds: Install cast treads and thresholds with anchorage system indicated to comply with manufacturer's recommendations. Seal units exposed to exterior mastic to provide a watertight installation.

3.4 ADJUST AND CLEAN

- A. Touch-Up Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting.
- B. Apply by brush or spray to provide a minimum dry film thickness of 2.0 mils.
- C. For galvanized surfaces: Clean field welds, bolted connections and abraded areas and apply galvanizing repair paint to comply with ASTM A 780.

END OF SECTION

SECTION 05510 (METAL STAIRS)
PREFABRICATED STEEL STAIR SYSTEMS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Prefabricated design-build steel stairs and landings including the following:
 - 1. Standard stair and rail assemblies.
 - 2. Steel framed stairs with steel treads.
 - 3. Steel framed landings.
 - 4. Stair railings.
 - 5. Wall rails.
 - 6. Exit control gates.
 - 7. Preassembled stacking stair systems.
 - 8. Luminous egress path marking system.
 - 9. Related supports and connections.

1.2 RELATED SECTIONS

- A. Section 03 30 00 - Cast-in-Place Concrete.
- B. Section 05 12 13 - Architecturally-Exposed Structural Steel Framing.
- C. Section 05 50 00 - Metal Fabrications.
- D. Section 09 90 00 - Painting and Coating.
- E. Section 09 21 16.33 - Gypsum Board Area Separation Wall Assemblies.

1.3 REFERENCES

- A. ADAAG - Americans with Disabilities Act.
- B. American Institute of Steel Construction (AISC): AISC Manual of Practice.
- C. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
- D. ASCE 7 - Minimum Design Loads for Buildings and Other Structures.
- E. ATM International (ASTM):
 - 1. ASTM A6/A6M - Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes and Sheet Piling.
 - 2. ASTM A36/A36M - Standard Specification for Carbon Structural Steel.
 - 3. ASTM A53/A53M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - 4. ASTM A153/A153M - Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless.
 - 5. ASTM A307 - Standard Specification for Common Steel Bolts.
 - 6. ASTM A325/A325M - Standard Specification for Structural Bolts, Steel, Heat Treated.
 - 7. ASTM A500/A500M - Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes.

Renovation to Arts Center For
Goshen High School For The
Pike County Schools BOE
Troy, Alabama

05510-Metal Stairs

8. ASTM A501 - Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.
 9. ASTM A513 - Standard Specification for Electric-Resistance-Welded Carbon and Alloy Steel Mechanical Tubing.
 10. ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.
 11. ASTM A786 Standard Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy and Alloy Steel Floor Plates.
 12. ASTM A1008 Standard Specification for Steel, Sheet, Cold-Rolled, Carbon, Structural, High-Strength Low-Alloy, High-Strength Low-Alloy with Improved Formability, Solution Hardened and Bake harden able.
 13. 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.
 14. ASTM A1044/A1044M - Standard Specification for Steel Stud Assemblies for Shear Reinforcement of Concrete.
 15. ASTM E985 - Standard Specification for Permanent Metal Railing Systems and Rails for Buildings.
- F. American Welding Society (AWS):
1. AWS A2.4 - Standard Welding Symbols for Welding, Brazing, and Nondestructive Examination.
 2. AWS D1.1/D 1.1M - Structural Welding Code - Steel.
 3. AWS D1.3 - Structural Welding Code - Sheet Steel.
- G. Federal Specification RR-G-1602D - Grating, Metal, Other than Bar Type (Floor, Except for Naval Vessels).
- H. ICC International Building Code: Chapter 10: Means of Egress.
- I. International Code Council - International Building Code (IBC).
- J. National Association of Architectural Metal Manufacturers (NAAMM):
1. SSPC-SP3 Power Tool Cleaning.
 2. SSPC-SP2 Hand Tool Cleaning.
- K. National Ornamental and Miscellaneous Metals Association: Weld Finish Type(s).
- L. Steel Structures Painting Council (SSPC):
1. Paint 15 - Steel Joist Shop Primer.
 2. SP 2 - Hand Tool Cleaning.
- M. UL 1994 Luminous Egress Path Marking Systems.
- N. New York City Reference Standard for Photoluminescent Exit Path Markings:
1. RS6-1
 2. RS6-1A

1.4 DESIGN REQUIREMENTS

- A. Stair systems are designed and fabricated to support a uniform live load of 100 lb/sf (4.8 kN/sq.m) and a concentrated load of 300 lbf (1.33 kN) with a deflection of stringer or landing framing not to exceed L/240 or 1/4 inch (6 mm) whichever is less.

- B. Handrail and guardrail systems are designed and fabricated to the following specifications:

Renovation to Arts Center For 05510-Metal Stairs
 Goshen High School For The
 Pike County Schools BOE
 Troy, Alabama

1. Uniform load of 50 lbf/ft. (0.73 kN/m) applied in any direction.
 2. Concentrated load of 200 lbf (0.89 kN) Applied in any direction.
 3. Uniform and concentrated loads are not assumed to act concurrently.
- C. Infills of guards are designed to withstand a load of 50 lbf/ft. (0.73 kN/m) applied horizontally on an area of one square foot. Infill loads and other loads are not assumed to act concurrently.
- D. Seismic Performance Stair Systems: Stair systems shall be designed, tested and fabricated to resist seismic events in compliance with ASCE 7-02, Section 9.5.2.8, and IBC Section 1617.3 allowable story drift.
- E. Accessibility: Requirements: Comply with ADAAG and ANSI A117.1 in accordance with authority having jurisdiction.

1.5 SUBMITTALS

- A. Submit under provisions of Section 01 30 00 - Administrative Requirements.
- B. Product data: Submit specified products as follows:
1. Manufacturer's product data.
 2. Manufacturer's installation instructions.
- C. Shop Drawings: Indicate information on shop drawings as follows:
1. Stair plans, elevations, details, methods of installation and anchoring.
 - a. Show members, sizes and thickness, anchorage locations and accessory items.
 - b. Furnish setting diagrams for anchorage installation as required.
 - c. Include calculations stamped by a structural engineer registered in the jurisdiction where the project the project is located.
- D. Samples: Submit as follows:
1. Two samples of factory tread system 3 inches wide. "IF" tread specified is a manufacturer's System and not otherwise a common "Field Poured Concrete Pan or Common Checker / Smooth plate.
 2. If Photoluminescent Nosing is specified submit integral sample of complete nosing and tread system (3" wide) regardless of tread type.
- E. Submit manufacturer's Storage and Installation Instructions.
- F. Submit documentation verifying that components and materials specified in this section are from a single source manufacture approved by this specification.
- G. Qualification Statements: Submit Certificate that manufacturer is a Certified Fabricator with the American Institute of Steel Construction (AISC).

1.6 QUALITY ASSURANCE

- A. Manufacturer to have experience in the design, engineering and fabrication of products specified.
1. American Institute of Steel Construction (AISC) Certified Fabricator, having a minimum of 10 years' experience manufacturing components similar to or exceeding requirements specified in scope of project.
 2. Having sufficient capacity to produce and deliver required materials without causing delay in work.

Renovation to Arts Center For
Goshen High School For The
Pike County Schools BOE
Troy, Alabama

05510-Metal Stairs

3. Installer: Acceptable and approved by Stair Manufacturer.
 - B. Welding: Embedded weld connections to be welded by certified welders, and inspected by an independent testing laboratory.
- 1.7 DELIVERY, STORAGE, AND HANDLING
- A. Delivery and Acceptance Requirements:
 1. Deliver material in accordance projects schedule and in accordance with manufacturer's instructions.
 2. Deliver materials in full truckload quantities in manufacturer's pre-bundled and banded lots with identification labels intact and in sizes to suit project hoisting equipment.
 - B. Storage and Handling Requirements:
 1. Store materials on skids or appropriate planks so material is not in direct contact with the ground and at least 4" above grade. Ensure rain or snow runoff freely flows under material making no contact with product(s).
 2. Protect material from adverse conditions. If not stored under roof, tarp accordingly to keep material dry. Inspect material regularly to ensure water is not pooling in stair tread or landing pans, frames, railing, hardware or packaging, etc.
 - C. Packaging Waste Management:
 1. Separate waste materials for refuse and recycling.
 2. Remove packaging materials from site and dispose of at appropriate facilities.
 3. Collect and separate for disposal paper, plastic, polystyrene, cardboard packing material in appropriate onsite bins for recycling.
 4. Fold metal and plastic banding; flatten and place in designated area for recycling.

1.8 PROJECT SITE CONDITIONS

- A. Field Measurements: Field verify floor to floor and horizontal dimensions of spaces where stairs will be installed prior to fabrication of stairs under this section.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Pacific Stair Corporation, which is located at:
8690 Stair Way N. E.
Salem, OR 97305-9623
Toll Free Tel: 888-477-8247
Tel: 503-390-8305
Fax: 503-390-3864
Email: [request info \(sales@pacificstair.com\);](mailto:request info (sales@pacificstair.com);) Web: <https://pacificstair.com>
- B. Substitutions: As approved per architect prior to bid date.
- C. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00 - Product Requirements.

2.2 STANDARD STAIR AND RAIL ASSEMBLIES

- A. Standard Stair and Rail System:
 1. Manufacturer's standard prefabricated, pre-engineered straight run stair and landing system, consisting of hot rolled steel sheet risers, treads, landings and structural

Renovation to Arts Center For
Goshen High School For The
Pike County Schools BOE
Troy, Alabama

05510-Metal Stairs

plate, channel or angle frames, stringers or connection devices with fasteners/supports and railings.

- a. Stringers:
 - 1) Steel plate or channel with side mounted and/or top mounted railing frame attachment as detailed on drawings and/or in accordance with manufactures system recommendations.
 - 2) Minimum thickness or weight as determined by structural design calculations, structural grade steel plate or channel.
2. Risers: Closed riser, minimum 14 gage (1.9mm) hot rolled mild steel sheet, sloped maximum 1-1/2 inches (38.1mm) and conforming to Americans with Disabilities Act (ADA) nosing requirements.
3. Treads: Manufacturer's standard tread system, 14 gage (1.9mm) minimum hot rolled mild steel sheet or as determined by structural design calculations. All welds on the underside of tread assemblies to be exposed for proper inspection during the service life and/or after seismic, fire, flood, or potentially damaging event. Provide treads as indicated and noted on drawings for each stair scheduled.
4. Landings: A combination of structural plate, channel and angles for the frame with 1-1/2 inches B-36 Composite Floor Decking x 20 gage and 10 gage (minimum) bent sheet lateral pour stops. Decking to be attached to frame by plug welding or other mechanical means provided recommended and engineered by the stair manufacturer.
 - a. Flight and landing assemblies fabricated by the stair manufacturer shall be connected by splined "Twist-Off" tension control bolts, grade to be A325 & A490 as engineered and specified by the stair manufacturer.
 - b. All pre-tensioning methods are to be conformant to the AISC Steel Construction Manual, Chapter 16; Section #3 Bolted Parts. Subsection 3.2.1 "pre-tensioned joints and related sections noted thereafter".
5. Additional Fastener and Supports: Sized by the manufacturer to meet structural design criteria. If hanger rod connections are applicable to any of the landing connections, they shall be threaded rod type, size and grade as determined by stair manufacturer's structural design calculations.
6. Railings: Design style as shown on drawings for each stair, selected from manufacturer's standard pre-fabricated, pre-engineered rail styles.
7. Stringer Rail Mounting:
 - a. Structural Plate Stringer: Railings to be Side Mounted. Rail Frame: In-Line or Side assembly, see drawings.
 - b. Structural Channel: Railing to be Top Mounted to channel flange or Side Mounted with railing post knife-blade steel plate connection extender to be received inside the channel flanges below the top flange. Rail Frame: In-Line or Side Assembly.
8. Materials:
 - a. Steel Shapes and Plates: To ASTM A36.
 - b. Steel Pipe: To ASTM A53 Type E or S, Grade B.
 - c. Steel Tubing:
 - 1) Structural Use: To ASTM A500, Grade B or C.
 - 2) Non-Structural Use: To ASTM A513, hot rolled or coiled rolled (mill option).
 - d. Steel Sheet:
 - 1) Structural Use: To ASTM A1011 (hot rolled), Checker Plate ASTM A786.
 - 2) Non-Structural Use: To ASTM A786, ASTM A1008.
 - e. Fasteners: As recommended by manufacturer.
 - f. Welding Rods: In accordance with AWS code and AWS filler metal specifications.
9. Fabrication:

Renovation to Arts Center For
Goshen High School For The
Pike County Schools BOE
Troy, Alabama

05510-Metal Stairs

- a. Use same material finish as parts being joined. Use stainless steel between dissimilar metals and non-corrosive fasteners at exterior connections or joints.
 - b. Provide fasteners of sufficient strength to support connected members and loads, and to develop full strength of parts fastened or connected.
 - c. Construct stair and rails with all components necessary for support and anchorage, and for a complete installation.
- 10. Finishes:
 - a. Rails, flights, landings and other stair components: Remove oil, grease, dirt, mill scale, rust, corrosion products, oxides, paint or other foreign matter from steel surface in accordance with SSPC-SP2 and/or SSPC-SP3.
 - b. Shop Primer: Immediately after fabrication and cleaning, spray apply primer to dry film thickness recommended by the primer manufacturer, but not less than 2.0 mil thickness. Apply one coat High Solids Red Oxide Anticorrosive Primer meeting SSPC-15 Paint.
 - c. Post Delivery: Primer coating offers minimal protection against rust and corrosion during transport and while stored at project site. Proper handling and care before during and after installation shall be taken to maintain effectiveness of primer coating prior to receiving final coats of finish paint.
- B. Stair assemblies shall include the following; metal framing, hangers, struts, railings, clips, brackets, bearing plates and other components necessary to support and anchor stairs and platforms to the supporting structure.
 - 1. Components will be joined by welding unless otherwise indicated.
 - 2. Connections will be used to maintain the structural value of joined pieces.
 - 3. Stairs will be assembled to the greatest possible extent.
 - 4. Cutting, drilling and punching to be done cleanly and accurately. Burrs and rough edges to be removed.
 - 5. Exposed connections shall be made with hairline joints, flush and smooth. Locate joints where least conspicuous.
- C. Embedded Weld Connections:
 - 1. Steel angle: Standard sizes, 3 inches by 2 inches by 1/4 inch (76 mm by 51 mm by 6 mm) , 4 inches by 4 inches by 1/4 inch (102 mm by 102 mm by 6 mm).
 - 2. Steel plate: Standard sizes, 4 inches by 10 inches by 1/4 inch (102 mm by 254 mm by 6 mm), 12 inches by 12 inches by 1/4 inch (305 mm by 305 mm by 6 mm).
 - 3. Headed weld studs: .500 inch diameter, by 4 inches (13 mm diameter by 102 mm).
 - 4. Attachment of studs to angle or plate: Specialized arc welding equipment.
 - 5. Embeds: All embeds are 100% Tested and Certified by independent third party inspection.
- D. Fasteners For Standard Applications:
 - 1. Concrete Anchor: Hilti Kwik Bolt TZ; 5/8 inch (16 mm) diameter by 6 inch (152 mm).
 - 2. CMU Anchor: Hilti Kwik Bolt KB3; 5/8 inch (16 mm) diameter by 6 inch (152 mm).
 - 3. Tension Control Bolts: 5/8 inch (16 mm) diameter by 1-1/2 inch (38 mm), in accordance with ASTM A325.
 - 4. Steel Bolts for Posts: 5/8 inch (16 mm) diameter by 4-1/2 inch (114 mm), in accordance with ASTM A307.

2.3 STEEL FRAMED STAIRS WITH STEEL TREADS

- A. Risers are closed.
- B. Anchorage to stringers: Treads and Risers shall be welded to stringers to eliminate buckling.

C. 100 Series Concrete Filled Stair System:

1. Standard Stringers:
 - a. Plate 1/4x10.
 - b. Plate 1/4x12.
 - c. Plate 3/8x10.
 - d. Plate 3/8x12.
 - e. MC10x8.4.
 - f. MC12x10.6.
 - g. C12x20.7.
2. Standard Treads:
 - a. 12 Gauge.
 - b. 14 Gauge.
3. Standard Finishes:
 - a. Grey Primer.
 - b. Red Primer.

D. 200 Series Checker Plate Stair System:

1. Standard Stringers:
 - a. Plate 1/4x10.
 - b. Plate 1/4x12.
 - c. Plate 3/8x10.
 - d. Plate 3/8x12.
 - e. MC10x8.4.
 - f. MC12x10.6.
 - g. C12x20.7.
2. Standard Treads:
 - a. 12 Gauge.
 - b. 14 Gauge.
3. Standard Finishes:
 - a. Galvanized at landing.
 - b. Grey Primer.
 - c. Red Primer.

E. 300 Series Quiet Tread Stair System:

1. Standard Stringers:
 - a. Plate 1/4x10.
 - b. Plate 1/4x12.
 - c. Plate 3/8x10.
 - d. Plate 3/8x12.
 - e. MC10x8.4.
 - f. MC12x10.6.
 - g. C12x20.7.
2. Standard Treads:
 - a. 11 Gauge.
 - b. 12 Gauge.
 - c. 14 Gauge.
3. Standard Finishes:
 - a. Grey Primer.
 - b. Red Primer.

F. 400 Series Precast Stair System:

1. Standard Stringers:
 - a. Plate 1/4x10.

Renovation to Arts Center For
Goshen High School For The
Pike County Schools BOE
Troy, Alabama

05510-Metal Stairs

- b. Plate 1/4x12.
 - c. Plate 3/8x10.
 - d. Plate 3/8x12.
 - e. MC10x8.4.
 - f. MC12x10.6.
 - g. C12x20.7.
 - 2. Standard Finishes:
 - a. Galvanized.
 - b. Grey Primer.
 - c. Red Primer.
- G. 500 Series Smooth Plate Stair System:
- 1. Standard Stringers:
 - a. Plate 1/4x10.
 - b. Plate 1/4x12.
 - c. Plate 3/8x10.
 - d. Plate 3/8x12.
 - e. MC10x8.4.
 - f. MC12x10.6.
 - g. C12x20.7.
 - 2. Standard Treads:
 - a. 11 Gauge.
 - b. 12 Gauge.
 - c. 14 Gauge.
 - 3. Standard Finishes:
 - a. Grey Primer.
 - b. Red Primer.
- H. 600 Series Grating Stair System:
- 1. Refer to drawings for bar grate construction scheduled.

2.4 STEEL FRAMED LANDINGS

- A. 100 Series Concrete Filled Landings:
 - 1. Structural framing supports: C6 by 8.2# channel with 1-1/2 inch (38 mm) BR decking and 10 ga. (3.4 mm) bent plate outside framing or greater as determined by structural design and/or calculations.
 - 2. Surfacing: Concrete fill as specified in other section.
- B. 200 Series Checker Plate Landings:
 - 1. Structural framing supports: C6 by 8.2# channel with 14 ga. (2 mm) bent plate supporting members or greater as determined by structural design and/or calculations.
 - 2. Surfacing: 1/8 inch (3 mm) checker plate sheeting with medium pattern.
- C. 300 Series Quiet Tread Landings:
- D. 400 Series Precast Landings:
- E. 500 Series Smooth Plate Landings:
 - 1. Thickness: 14 ga. standard minimum thickness (.075 inch) (2 mm) or as determined by structural design and/or calculations.
- F. 600 Series Grating Landings:

2.5 STAIR RAILINGS

A. SERIES 100 - TWO LINE (2-line):

1. Stair Rail: (2) Lines of 1-1/4 inches (32 mm), 1.66 inches (42 mm) O.D. with mandrel bent hoop ends.
2. Guards: (3) Lines of 1-1/4 inches (32 mm), 1.66 inches (42 mm) O.D. with 1/4 inch (6 mm) by 4 inches (102 mm) kick plate.
3. Posts: Offset 1-1/4 inches (32 mm) pipe (side mount).

B. SERIES 200 - PIPE (6-line):

1. Stair Rail: 1.5 inches (38 mm) by .120 inch (3 mm) wall square tube steel top cap and posts.
2. Guardrail: 1.5 inches (38 mm) by .120 inch (3 mm) wall square tube steel top cap and posts.
3. Hand Grab: Continuous 1-1/4 inches (32 mm), 1.66 inches (42 mm) O.D. offset by 1-1/2 inches (38 mm) with 3/16 inch (4.8 mm) by 1-1/4 inches (32 mm) bent brackets.
4. Infill: Offset 1-1/4 inches (32 mm), 1.66 inches (42 mm) O.D. with dome caps both ends.
5. Spacing: Minimum of 3.875 inches (98 mm).
6. Mounting of rails: To side of plate stringer, top of channel stringer or embed by welding.

C. SERIES 300 - TUBE (7-line):

1. Stair Rail: 1.5 inches (38 mm) by .120 inch (3 mm) wall square tube steel top cap and posts.
2. Guardrail: 1.5 inches (38 mm) by .120 inch (3 mm) wall square tube steel top cap and posts.
3. Hand Grab: Continuous 1-1/4 inches (32 mm), 1.66 inches (42 mm) O.D. offset by 1-1/2 inches (38 mm) with 3/16 inch (4.8 mm) by 1-1/4 inches (32 mm) bent brackets.
4. Infill: Inline 3/4 inch (19 mm) by 1-1/2 inches (38 mm) rectangular tube steel.
5. Spacing: Minimum of 3.875 inches (98 mm).
6. Mounting of rails: To side of plate stringer, top of channel stringer or embed by welding.

D. SERIES 400 - PICKET (3-line):

1. Stair Rail: 1.5 inches (38 mm) by .120 inch (3 mm) wall square tube steel top cap, bottom cap and posts.
2. Guardrail: 1.5 inches (38 mm) by .120 inch (3 mm) wall square tube steel top cap and posts.
3. Hand Grab: Continuous 1-1/4 inches (32 mm), 1.66 inches (42 mm) O.D. offset by 1-1/2 inches (38 mm) with 3/16 inch (4.8 mm) by 1-1/4 inches (32 mm) bent brackets.
4. Infill: 1/2 inch (13 mm) square bar picket.
5. Spacing: Minimum of 3.875 inches (98 mm).
6. Mounting of rails: To side of plate stringer, top of channel stringer or embed by welding.

E. SERIES 400a - MODIFIED PICKET (4-line):

1. Stair Rail: 1.5 inches (38 mm) by .120 inch (3 mm) wall square tube steel top cap and posts.
2. Guardrail: 1.5 inches (38 mm) by .120 inch (3 mm) wall square tube steel top cap and posts.
3. Hand Grab: Continuous 1-1/4 inches (32 mm), 1.66 inches (42 mm) O.D. offset by 1-1/2 inches (38 mm) with 3/16 inch (4.8 mm) by 1-1/4 inches (32 mm) bent brackets.
4. Infill: Offset 1-1/4 inches (32 mm), 1.66 inches (42 mm) O.D. with 1/2 inch (13 mm)

Renovation to Arts Center For
Goshen High School For The
Pike County Schools BOE
Troy, Alabama

05510-Metal Stairs

- square bar pickets.
5. Spacing: Minimum of 3.875 inches (98 mm).
 6. Mounting of rails: To side of plate stringer, top of channel stringer or embed by welding.
- F. SERIES 500 - WIRE MESH (Inset Panels):
1. Stair Rail: 1.5 inches (38 mm) by .120 inch (3 mm) wall square tube steel top cap, bottom cap and posts.
 2. Guardrail: 1.5 inches (38 mm) by .120 inch (3 mm) wall square tube steel top cap and posts.
 3. Hand Grab: Continuous 1-1/4 inches (32 mm), 1.66 inches (42 mm) O.D. offset by 1-1/2 inches (38 mm) with 3/16 inch (4.8 mm) by 1-1/4 inches (32 mm) bent brackets.
 4. Infill: 2 inches (51 mm) Intercrip wire mesh inside 1 inch (25 mm) U-clip frame insert.
 5. Spacing: Minimum of 3.875 inches (98 mm) (Rail), 2 inches (51 mm) (Mesh).
 6. Mounting of rails: To side of plate stringer, top of channel stringer or embed by welding.
- G. SERIES 600 - CABLE (8-line):
1. Stair Rail: 1 inch (25 mm) by 2 inches (51 mm) C.D. bar topcap with 3/4 inch (19 mm) by 2 inches (51 mm) C.D. bar posts.
 2. Guardrail: 1 inch (25 mm) by 2 inches (51 mm) C.D. bar topcap with 3/4 inch (19 mm) by 2 inches (51 mm) C.D. bar posts.
 3. Hand Grab: Continuous 1-1/4 inches (32 mm) pipe, 1.66 inches (42 mm) O.D., offset by 1-1/2 inches (38 mm) with 3/16 inch (4.8 mm) by 1-1/4 inches (32 mm) bent brackets.
 4. Infill: .187 inch (5 mm) Stainless Steel cable with polished Stainless Steel hardware.
 5. Spacing: Minimum of 3.875 inches (98 mm).
 6. Mounting of rails: To side of plate stringer, top of channel stringer or embed by welding.
- H. SERIES 700 - ROD (9-line):
1. Stair Rail: 1 inch (25 mm) by 2 inches (51 mm) C.D. bar topcap with 3/4 inch (19 mm) by 2 inches (51 mm) C.D. bar posts.
 2. Guardrail: 1 inch (25 mm) by 2 inches (51 mm) C.D. bar topcap with 3/4 inch (19 mm) by 2 inches (51 mm) C.D. bar posts.
 3. Hand Grab: Continuous 1-1/4 inches (32 mm) pipe, 1.66 inches (42 mm) O.D. offset by 1-1/2 inches (38 mm) with 3/16 inch (4.8 mm) by 1-1/4 inches (32 mm) bent brackets.
 4. Infill: 1/2 inch (13 mm) Minimum C.D. round rod.
 5. Spacing: Minimum of 3.875 inches (98 mm).
 6. Mounting of rails: To side of plate stringer, top of channel stringer or embed by welding.
- I. SERIES 800 - GLASS (Inset Panels):
1. Stair Rail: 1.5 inches (38 mm) by .120 inch (3 mm) wall tube steel top cap, bottom cap and posts.
 2. Guardrail: 1.5 inches (38 mm) by .120 inch (3 mm) wall tube steel top cap and posts.
 3. Hand Grab: Continuous 1-1/2 inches (38 mm) O.D. Stainless Steel Tubing, offset by 1-1/2 inches (38 mm) with Stainless Steel Brackets.
 4. Infill: 3/8 inch (9.5 mm) tempered glass panels with Stainless Steel hardware.
 5. Spacing: Minimum of 1.5 inches (38 mm).
 6. Mounting of rails: To side of plate stringer, top of channel stringer or embed by welding.

2.6 WALL RAILS

- A. Wall Rail: 1.25 inches I.D. pipe with pressed steel wall rail bracket with giving proper distance between face of wall and inside face of wall rail assembly.
- B. Hand Grabs: 1.25 inches I.D. pipe Code Conforming 34 inches to 38 inches above plane of nosings and wrapped continuously past space between flights with pre-formed bend(s) which shall be field fitted with weld prep to equal NOMMA #1.
- C. Mandrel bent 1-1/4 inches (32 mm) pipe (1.66 inches (42 mm) O.D.), with minimum 12 inches (305 mm) level-offs returning to wall.
- D. Offset 1-1/2 inches (38 mm) wall brackets evenly spaced with three mounting holes.

2.7 EXIT CONTROL GATES

- A. Design: Overlapping stop with bumper prevents opening in opposite direction of egress.
 - 1. Single swing.
 - 2. Double swing.
 - 3. Barrier Gates: Manufacturers standard swing gate assembly with steel spring hinges and rubber bumper between space that barrier gate and rail post termination intersect. Fabricated from Hollow Structural Steel (HSS) or pipe stock.
- B. Material: 1-1/4 inches (32 mm) schedule 40 pipe.

2.8 PRE-ASSEMBLED STACKING STAIR SYSTEM

- A. Stack-A-Shaft stacking stair system:
- B. General Fabrication:
 - 1. Steel shall be ASTM A-36.
 - 2. Steel pipe material shall be ASTM A 53 Grade B.
 - 3. Open holes shall be 11/16 inch (17 mm) diameter U.N.O.
 - 4. Burrs shall be removed and edges ground smooth.
 - 5. Shop primer painting shall be accomplished after fabrication.
 - 6. Remove 2 inches (52 mm) from full height of angles and tubes after structure is in its final configuration and before shoring has been removed.
 - 7. Remove short section of bolt-on angle after structure is in final configuration and before shoring has been removed.
- C. Type: SAS-LG Light Gauge Steel Structures.
 - 1. Designed to connect directly to light gauge members.
 - 2. Self Supporting, no need for additional steel for stair openings or support.
- D. Type: SAS-WF Wood Framed Structures.
 - 1. SAS come with connections for wood joists or beams.
- E. Type: SAS-PT Concrete Post Tension Slab Structures.
 - 1. Installed BEFORE slab is poured, helps to confirm elevations.
- F. Type: SAS-HS Heavy Structural Steel Structures.
 - 1. Multiple attachments available, bolting or welding as required.
 - 2. Ability to set stairs without the need to have all decking in place.

2.9 LUMINOUS EGRESS PATH MARKING SYSTEM

Renovation to Arts Center For
Goshen High School For The
Pike County Schools BOE
Troy, Alabama

05510-Metal Stairs

- A. Safe-T-Nose Retrofit (STNR):
 - 1. Safe-T-Nose Retrofit (STNR): Photo-luminescent "Glow-in-the-dark" nosing, applied to existing stairways.
 - 2. Safe-T-Nose: reduces tripping hazards and illuminates the walkway in the event of an emergency. Extruded from premium aluminum, Safe-T-Nose shall be durable and slip resistant.
- B. Safe-T-Nose Cast-In Place (STNC):
 - 1. Safe-T-Nose Cast-In Place (STNC): Photo-luminescent "Glow-in-the-Dark" nosing designed to be pushed into any style of cast concrete at the time of forming. STNC embeds quickly and easily. A proprietary design forms the edge and fastens the nosing when setting in place.
 - 2. Safe-T-Nose reduces tripping hazards and illuminates the walkway in the event of an emergency. Extruded from premium aluminum, Safe-T-Nose is durable and slip resistant. Our glow-in-the-dark material is at the cutting edge of chemical phosphorescent technology and provides the brightest, longest lasting non-toxic glow that is available.
 - 3. Safe-T-Nose For Steel Stair Manufacturers (STNS): Safe-T-Nose For Steel Stair Manufacturers (STNS) is a photo-luminescent "Glow-in-the-Dark" nosing designed for stair fabricators. With proper design planning, STNS can be attached to a variety of tread types and materials at the time of manufacturing. STNS offers a simple solution when stairs must be fabricated with safety nosing incorporated into the design.
- C. Safe-T-Nose Photoluminescent Handrail Strips (STNH):
 - 1. Cut with scissors, an easy peel and stick application that requires no end caps. Activated by natural artificial light, Safe-T-Nose Handrail strips provide a steady glow to guide people in all lighting conditions. Glows for many hours after the lights go out. Unlimited recharging. The Brightest, Longest Lasting, Nontoxic, Nonradioactive Glow available. UV Light and Oxidation resistant. Smooth easy cleanable surface. Abrasion resistant. High-Impact plastic.
- D. Safe-T-Nose Photoluminescent Perimeter Strips (STNF):

2.10 SHOP CLEANING AND FINISHING

- A. Rails and Stair Components: Remove all sharp edges and burrs. Clean surface of rust, scale, grease and all foreign material prior to finishing in accordance with "SP 2 - Hand Tool Cleaning."
- B. Shop Primer: Immediately after shop fabrication and cleaning, spray apply primer to a minimum dry film thickness as recommended by primer manufacture, but not less than 1.0 mils DFT. Do not prime surfaces in direct contact with concrete or where field welding shall occur.
- C. Prime Paint: Rodda Low HAP Shopcoat Primer: VOC Compliant Red Oxide #33954.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates and adjacent construction have been properly constructed. Verify structural framing, enclosures, weld plates, blocking, and size and location of pockets.

- B. If unsatisfactory conditions are encountered, notify Architect in writing. Do not proceed until unsatisfactory conditions have been corrected.
- C. Notify Manufacturer of any detail, design or tolerance deviations as noted or drawn on stair shop drawing.

3.2 STAIR INSTALLATION

- A. Install stair components in accordance with manufacturer's recommendations, approved submittals, and in proper relationship with adjacent construction.
- B. Install stair components plumb, level and accurately, free from distortion or defects.
- C. Provide hardware, hangers, fasteners and struts required to connect stairs to parent structure.
- D. Provide temporary bracing to maintain alignment until installation has been completed and connections are deemed permanent.
- E. Field welding shall be done in accordance with AWS D1.1.
- F. Field welding and bolting shall match shop work. Use concealed fasteners wherever possible.
- G. Joints shall be butted tight flush, with hairline joints. Welds shall be ground smooth and flush.
- H. Touch up paint after welding and grinding.

3.3 RAIL INSTALLATION

- A. Railing to be installed plumb, and straight.
- B. Welded connections shall be used for permanent connections. All splices to be ground smooth, free from grinder marks and irregularities.
- C. Railing shall be welded to stair stringers per plans and specifications. Welds shall be clean and have good conformance to acceptable standards.

3.4 ERECTION TOLERANCES

- A. Maximum Variation from Plumb: 1/4 inch (6 mm) per story.
- B. Maximum Offset from True Alignment: 1/4 inch (6 mm).
- C. Maximum Out of Position: 1/4 inch (6 mm).

3.5 ADJUSTING AND CLEANING

- A. Touch-up field welds and abraded areas by application of same coating used for shop primer.
- B. Repair or replace damaged components.
- C. After stairs are completely installed, remove all construction debris and rubbish from area. Clean surface of exposed rail and stairs. Leave stair system ready for finish painting.

END OF SECTION

SECTION 05540 - METAL STUDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract including General and Supplementary Conditions and Division 1 Specification Sections apply to work of this section.

1.2 DESCRIPTION OF WORK

- A. Types of work include:
 - 1. Light-gage metal support system for installation of gypsum and other materials.

1.3 QUALITY ASSURANCE

- A. Fire-Resistance Ratings: Where gypsum drywall systems with fire- resistance ratings are indicated, provide materials and installations which are identical with those of applicable assemblies tested per ASTM E 119 by fire testing laboratories acceptable to authorities having jurisdiction.
 - 1. Provide fire-resistance rated assemblies identical to those indicated by reference to GA File No.'s. in GA "Fire Resistance Design Manual" or to design designations in UL "Fire Resistance Directory" or in listing of other testing and agencies acceptable to authorities having jurisdiction.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's product specifications and installation instructions, including other data as may be required to show compliance with these specifications.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store material inside under cover and in manner to keep them dry, protected from weather, direct sunlight, surface contamination, corrosion and damage from construction traffic and other causes. Neatly stack gypsum boards flat to prevent sagging.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function:
 - 1. Alabama Metal Industries Corp.
 - 2. Bostick Steel Framing Co.
 - 3. Ceco Corp.
 - 4. Dale Industries, Inc.
 - 5. Marinoware, Inc.
- B. Equal products of other manufacturers may be used in the work, provided such products have been approved by the Architect not less than Ten (10) days prior to scheduled bid opening.

2.2 METAL FRAMING

- A. Fabrication: Fabricate metal framing components of commercial quality steel sheet with a minimum yield paint of 33,000 psi; ASTM A446, A570 or A611.
- B. Finish: Provide galvanized finish to metal framing components complying with ASTM A525 for minimum G60 coating.

- C. "C"-Shape Studs and Resilient Channels. Provide as follows:
 - 1. Manufacturer's standard 22 gauge at all interior gypsum board locations, size to be as noted on the drawings.
 - 2. Gauge at all exterior locations to be 18 gauge at exterior walls or as noted on the Structural Drawings, size to be as noted on the drawings.
 - 3. Resilient hat channels, 18 gauge, size as noted on the drawings.
- D. "C"H-Shape Studs: Provide manufacturer's standard 20 gauge unless otherwise noted on the Structural Drawings, size to be as noted on the drawings.
- E. Fastenings: Attach components by welding, bolting, or screw fastenings, as standard with manufacturers.

2.3 INSTALLATION

- A. Manufacturer's Instructions: Install metal framing systems in accordance with manufacturer's printed or written instructions and recommendations, unless otherwise indicated.
- B. Runner Tracks: Install continuous tracks sized to match studs. Align tracks accurately to layout at base and tops of studs. Secure tracks as recommended by stud manufacturer for type of construction involved, except do not exceed 24" o.c. spacing for nail or power-driven fasteners, or 16" o.c. for other types of attachment. Provide fasteners at corners and ends of tracks.
 - 1. Set studs plumb, except as needed for diagonal bracing or required for non-plumb walls or warped surfaces and similar requirements.
 - 2. Where stud system abuts structural columns or walls, including masonry walls, anchor ends of stiffeners to supporting structure.
 - 3. Install supplementary framing, blocking and bracing in metal framing system wherever walls or partitions are indicated to support fixtures, equipment, services, casework, heavy trim and furnishings, and similar work requiring attachment to the wall or partition. Where type of supplementary support is not otherwise indicated, comply with stud manufacturer's recommendations and industry standards in each case, considering weight or loading resulting from item supported.
- C. Installation of Wall Stud System: Secure studs to top and bottom runner tracks by either welding or screw fastening at both inside and outside flanges.
 - 1. Frame wall openings larger than 2'-0" square with double stud at each jamb of frame except where more than 2 are either shown or indicated in manufacturer's instructions. Install runner tracks and jack studs above and below wall openings. Anchor tracks to jamb studs with stud shoes or by welding, and space jack studs same as full-height studs of wall. Secure stud system wall opening frame in manner indicated.
 - 2. Frame both sides of expansion and control joints, with separate studs; do not bridge the joint with components of stud system.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Space framing member 24" o.c., unless noted otherwise on the drawings or by UL Classification.
- B. Install auxiliary framing at termination of drywall work, and at openings for light fixtures and similar work, as required for support of both the drywall construction and other work indicated for support thereon.
- C. Supplementary Supports:
 - 1. Install supplementary framing, blocking and bracing at terminations in the work and for support of fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, and similar work to comply with details indicated or if not otherwise indicated, to comply with applicable published recommendations of gypsum board manufacturer, or if not available, of

- "Gypsum Construction Handbook" published by United States Gypsum Co.
2. Isolate stud system from transfer of structural loading to system, both horizontally and vertically. Provide slip or cushioned type joints to attain lateral support and avoid axial loading.
 3. Extend supplementary supports to the structural support system.
 4. Frame openings to comply with details indicated or if not otherwise indicated, to comply with applicable published recommendations of gypsum board manufacturer, or if not available, of "Gypsum Construction Handbook" published by United States Gypsum Co. Attach vertical studs at jambs directly to frames; install runner track section (for jack studs) at head and secure to jamb studs.
 5. Erect thermal insulation vertically. Until gypsum board is installed hold insulation in place with 18-gage tie wire or by an equally acceptable method.

END OF SECTION

06121 – STRUCTURAL PANEL CONCRETE SUBFLOOR

PART 1 - GENERAL

1.1 SUMMARY

- A. Description of Work: Work of this Section includes, but is not limited to, the following:
 - 1. Framing.
 - 2. Fasteners.
 - 3. Underlayment and floor coverings.
 - 4. Sound attenuation materials.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. See Section 05 20 00, Metal Joists
- B. See Section 05 40 00, Cold-Formed Metal Framing
- C. See Section 06 10 00, Rough Carpentry
- D. See Section 09 30 00, Tiling
- E. See Section 09 60 00, Flooring
- F. See Section 13 40 00, Integrated Construction

1.3 SYSTEM DESCRIPTION

- A. Structural Panel floor system consists of steel joists, trusses or framing members and Structural Panel Concrete Subfloor installed with mechanical fasteners. Structural Panel Concrete Subfloor is a high-strength reinforced concrete panel typically for use in noncombustible construction, as required by the applicable building codes. Adhesives are not recommended, nor required.

1.4 REFERENCES

- A. ICC-ES AC318 – Acceptance Criteria for Structural Cementitious Floor and Roof Sheathing Panels
- B. ICC-ES AC319 – Acceptance Criteria for Horizontal Diaphragms Consisting of Structural Cementitious Floor Sheathing Panels Attached to Cold-Formed Steel Framing
- C. ASTM A588/A588M – Standard Specification for High-Strength Low-Alloy Structural Steel, up to 50 ksi [345 MPa] Minimum Yield Point, with Atmospheric Corrosion Resistance
- D. ANSI/AISI S100 – North American Specification for the Design of Cold-Formed Steel Structural Members
- E. ANSI/AISI S210 – North American Specification for Cold-Formed Steel Framing – Floor and Roof System Design
- F. ANSI/AISI S214 – North American Specification for Cold-Formed Steel Framing – Truss Design
- G. ANSI/AISI S230 – Standard for Cold-Formed Steel Framing – Prescriptive Method for One and Two Family Dwellings
- H. ASTM E84 – Standard Test Method for Surface Burning Characteristics of Building Materials
- I. ASTM E119 – Standard Test Method for Fire Tests of Building Construction and Materials
- J. ASTM E136 – Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750° C

1.5 SYSTEM REQUIREMENTS

- A. Performance Requirements: Fabricate and install systems as indicated:
 - 1. Floor Framing:

- a. Standard systems:
 - i. Floor framing shall be designed with a minimum deflection of L/360, where the Uniform Floor Load is 120 PSF (5.7 kPa) (Allowable) for framing spaced at 24" (610 mm) on center.
 - ii. Floor framing shall be designed with a minimum deflection of L/360, where the Uniform Floor Load is 283 PSF (13.5 kPa) (Allowable) for framing spaced at 16" (406 mm) on center.
- 2. Fasteners:
 - a. Follow the selected fastener layout for Screw Patterns, for the design Diaphragm Loads as described in the current Progressive Engineering, Inc.'s Evaluation Report PER-13067. Available at www.per13067.com.
- 3. Panel Layout:
 - a. Follow the USG Structural Panel Concrete Subfloor application described in the current Progressive Engineering, Inc.'s Evaluation Report PER-13067.
- B. Fire Resistance Ratings: Where fire resistance classifications are indicated, provide materials and application procedures identical to those listed by UL or tested according to ASTM E119 for type of construction shown.
Note: *Fire-resistance ratings may require lighter gauge framing than that required for Shear- or Uniform-Loading. In this case, the gauge and joist depth must be selected by the strongest governing factor.*
- C. Noncombustible Ratings: Where noncombustible assemblies are required, provide materials and application procedures identical to those tested according to ASTM E136, "Standard Test Method for Behavior of Materials in a Vertical Tube Furnace at 750 °C."
Note: *Materials with modified ASTM E136-16 evaluations are not acceptable.*
- D. **Acoustical Ratings:** Where sound ratings are indicated, provide materials and application procedures identical to those tested by manufacturer to achieve Sound Transmission Class (STC) in accordance with ASTM E90 and/or Impact Insulation Class (IIC) in accordance with ASTM E492 specified. Refer to USG Structural Panel Fire & Acoustic Manual - SCP100 for specific acoustical assemblies and performance ratings.

1.6 DELIVERY, STORAGE AND HANDLING

- A. Delivery:
 - 1. Deliver material to site promptly without undue exposure to weather.
 - 2. Deliver in manufacturer's unopened containers, pallets, or panels fully identified with name, brand, type and grade.
- B. Storage:
 - 1. Store above ground in dry, ventilated space.
 - 2. Protect materials from soiling, exposure, and damage.
 - 3. If stored outside, material shall be covered with waterproof tarps.
Note: *If USG Structural Panels are frozen while stored outdoors, allow to thaw-out naturally. Do not use salts or fertilizers to defrost the panels or attempt to pry them apart.*
 - 4. Panels must be stored over stable soil or other surface. Soil or surface must be able to carry the load of the stored pallet(s). Each 20-piece pallet weighs 3500 lbs (1542 kg). It is recommended that the load carrying capacity of the floor or surface be verified before storing panels.
 - 5. Pallets must not be stacked out of alignment by more than +/- 1/2" (13 mm) , measured on any side of the pallet.

1.7 PROJECT CONDITIONS

A. Environmental Requirements:

1. When mechanically fastened, do not install USG Structural Panel Concrete Subfloor when ambient or conditioned temperature is below 0 °F (-18 °C).
2. Prior to the application of finished flooring, USG Structural Panel Concrete Subfloor must be conditioned at the same temperature as required for the finished flooring for at least 48 hours.
3. Do not apply finished flooring over USG Structural Panel Concrete Subfloor when wet, frozen or with surface frost.

Note: If installed panels have snow or ice, do not use salts or defrosting agents, sand is recommended over slippery surfaces.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. Structural Concrete Panel: Listed products establish standard of quality and are manufactured by United States Gypsum Company (USG), Chicago, IL.
- B. Equal products of other manufacturers may be used in the work provided such products have been approved by the Architect, not less than Ten (10) days prior to scheduled bid opening.

2.2 MATERIALS

A. Structural Concrete Panel:

1. USG Structural Panel Concrete Subfloor, A noncombustible structural subfloor panel manufactured in accordance with Acceptance Criteria AC318.
 - a. Panel Dimensions:
 - i. Thickness: **3/4" (19 mm)**
 - ii. Width: **4' (1220 mm)**
 - iii. Lengths: **[8' (2440 mm)]**
 - iv. Long Edges: Tongue **and Groove**
 - b. Panel Properties:
 - i. Density: **78.6 lb/ft³ (1259 kg/m³)** tested in accordance with ASTM C1185
 - ii. Weight: **5.3 lbs/ft² (26 kg/m²)** tested in accordance with ASTM D1037 at a thickness of 3/4 inch (19 mm)
 - iii. Noncombustibility: **Pass** tested in accordance to ASTM E136
 - iv. Surface Burning Characteristics: **0 – Flame Spread / 0 Smoke Developed** tested in accordance with ASTM E84
 - v. Mold Resistance: **10** tested in accordance with ASTM D3273
0 tested in accordance with G21.

B. USG Structural Panel Concrete Subfloor Recommended Fasteners:

- a. In accordance with PER-13067 (Subfloor) and PER-14076 (Roof Deck), PER-15092 (Foundation Wall), and ESR-1792 (Subfloor).
- b. Use only fasteners recommended by USG. Go to www.USGSCP95.com for the current list of recommended fasteners.
- c. Install using the recommended spacing and distance from the Ends (square cut) and Edges (tongue & groove) of the panel.
- d. Any length of USG recommended fasteners may be used but do not use a larger size fastener unless specified by the structural engineer.

- C. Floor Coverings and Underlayment:
 - 1. Follow floor covering manufacturers' installation procedures.
- D. Sound Attenuation:
 - 1. Consult with USG for sound system design and products.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine substrates, adjoining construction and conditions under which Work is to be installed. Do not proceed with Work until unsatisfactory conditions are corrected.
- C. Steel framing to receive the USG Structural Panel Concrete Subfloor shall be structurally sound, free from bows, twists or other malformations and in general compliance with local building code requirements. Damaged framing shall be replaced before installation of USG Structural Panel Concrete Subfloor.

3.2 GENERAL INSTALLATION REQUIREMENTS

- A. Cold-Formed Steel Framing:
 - 1. The floor joists and other floor framing components must be designed to meet the strength and deflection criteria specified in the contract documents.
 - 2. The attachment flange or bearing edge for cold-formed steel must be a minimum 1-5/8" (41 mm) wide, 2" preferred, with at least 3/4" (19 mm) of the panel bearing on the supporting flange.
 - 3. The size of the cold-formed steel framing flange required will vary based on the specified mil thickness/gauge and fastener selected.
 - 4. Cold-formed steel framing thickness and size is always based on diaphragm capacity but must be a minimum 43 mil (18 gauge) and spaced no greater than 24" (610 mm) o.c. for up to 450 plf. When significant diaphragm capacity is required, 54 mil (16 gauge) may be required.
 - 5. Joist bearing shall be provided at the foundation that is uniform and level.
 - 6. Cold-formed steel joists shall be located directly over bearing studs or a header installed at the top of the bearing wall to distribute the load.
 - 7. Joist framing must be perpendicular to rim joists.
 - 8. On steel framing, a web stiffener shall be provided at reaction points and/or concentrated loads as specified in the contract documents. End blocking shall be provided where joist ends are not otherwise restrained from rotation.
 - 9. Additional joists shall be provided under parallel partitions and around all floor openings that interrupt one or more spanning members. Framing must be properly fastened to the supporting walls or structure.
 - 10. All blocking or bridging must be installed prior to the installation of USG Structural Panel Concrete Subfloor.
 - 11. Framing must be of good quality, free of bows, twists or other malformations.
- B. Hot-Rolled Steel Framing:
 - 1. The floor joists and other floor framing components must be designed to meet the strength and deflection criteria specified in the contract documents.
 - 2. Framing shape and size is always based on diaphragm capacity.
 - 3. Hot-rolled steel framing shall have a 3" (76 mm) or larger bearing surface suitable for fastener insertion and panels must bear a minimum of 1 1/4" (32 mm) on the framing member.
 - 4. Framing bearing shall be provided at the foundation that is uniform and level.

5. Joist framing must be perpendicular to support beams.
6. Additional framing members shall be provided under parallel partitions and around all floor openings that interrupt one or more spanning members. Framing must be properly fastened to the supporting walls or structure.
7. All blocking or bridging must be installed prior to the installation of USG Structural Panel Concrete Subfloor.
8. Framing must be of good quality, free of bows, twists or other malformations.

C. USG Structural Panel Concrete Subfloor:

1. This product may contain respirable crystalline silica. Refer to OSHA Rule 29 CFR 1926.1153 for specific details about limiting worker exposure to respirable silica.
2. The panels shall be cut to size with a circular saw equipped with carbide-tipped cutting blade and a dry dust industrial HEPA vacuum collection device .for control of dust and silica. Wear safety glasses and a NIOSH-approved dust mask when cutting the panel. Collected dust shall be disposed in a safe manner and in compliance with local, state and federal ordinances.
3. USG Structural Panel Concrete Subfloor shall be installed with the long edges (tongue & groove) perpendicular to the framing.
4. The fire, sound and structural ratings listed in the USG Structural Panel Fire and Acoustic Manual - SCP100 for the USG Structural Panel Concrete Subfloor system are based on fastener attachment only, no adhesives. www.USGSCP100.com.
5. Begin panel installation by snapping a line across the joists parallel to the rim joist at a distance equal to the width of the first panel being placed. Given that panel width is 48" (1220 mm), plan the layout so the first and last panel row width is a minimum of 24" (610 mm) wide. In the case where the row width is less than 24" (610 mm) wide, panels shall be blocked on all edges by framing (strapping is not sufficient).
6. Ensure that all supporting members are free of debris before placing panels. Place the cut edge or tongue along the rim joist. Place each panel across three or more supports [minimum two-span condition]. Less than full length panels at the end of a row may span a single framing opening. Cut panels to length as needed to ensure that the butt end of the panel is centered on the framing member. Install panels in a direction that ensures that the butt end falls over the open side of the joist. This will help keep adjacent ends in the same place.
7. USG Structural Panel Concrete Subfloor shall be fastened following the fastening schedule listed in the contract documents. Begin fastening at one end and fan out across the panel. Do not fasten all the corners first. After the installation of one complete row, begin the next row. Slide panels together so that the tongue of the panel being installed fits into the groove of the installed panel. If there is construction debris lodged inside the groove, do not force the tongue into the clogged groove. Clean the plugged groove with a stiff bristle brush to dislodge the trapped debris. Do not gap the panels. Install the second panel and all subsequent panels in a similar manner to complete the row. Install all rows in a running bond pattern so that end joints fall over the center of the framing members and are staggered by at least two supports from where the end joints fall in the adjacent rows. Less than full length panels at the end of a row may be staggered by a single support.
8. Penetrations in the panels should be made before installing the panel whenever possible. If a penetration is required after the panel is installed, set the depth of the saw blade to ensure that the framing is not scored. Support the ends and edges of any penetrations with framing if they are greater than 6" (153 mm) in any direction (refer to SCP14 Installation Guidelines).
9. Ensure panel is flush with supporting member, drive fasteners so the heads are flush with the surface of the board. Go to www.USGSCP95.com for the current list of recommended fasteners.
10. Construction Traffic Protection – prior to floor finishing, place minimum 3/8" (9.525 mm) thick plywood sheathing materials on the floor in high traffic areas over newly installed USG

Structural Panel Concrete Subfloor (i.e. additional USG Structural Panels or plywood). ¼" plywood may be used in lieu of 3/8" material provided it is fastened at all four corners to prevent shifting and curling. Thicker protecting material may be required if heavier loads are expected or work is to be performed that may damage USG Structural Subfloor.

D. Sound Mat and Underlayments

1. Sound Mat:

- a. Refer to USG Structural Panel Fire & Acoustic Manual - SCP100 for specific acoustical assemblies and performance ratings. www.USGSCP100.com.
- b. Refer to USG Performance Flooring Portfolio – IG2013, along with USG's submittal and SDS pages at USG.com/floor for the most recent product data and installation procedures for USG Levelrock® Brand, Durock™ Brand, and USG Fiberock® Brand Underlayment products.
- c. Install sound mat over USG Structural Panel Concrete Subfloor according to sound mat manufacturer's recommendations.
- d. USG Fiberock® Underlayment over Sound Mat:
 - 1) Lay cut edges of USG Fiberock® Underlayment base layer against the wall; only factory edges should be joined. Begin laying panels at one corner. Maintain 1/4" (6.35 mm) space between panels and perimeter walls. Stagger joints of surface layer a minimum of 16" (406 mm) so that four panel corners never meet, and offset end and edge joints of panels a minimum of 12" - 16" (305 mm - 406 mm) from subfloor panel joints. Adjoin panel edges and ends lightly together. A maximum 1/32" (0.76 mm) gap is allowed.
 - 2) The base and surface layers of USG Fiberock® Underlayment panels must be bonded together with modified thin set mortar and will 'float' on sound mat.
 - 3) Use staples to hold panel layers together during mortar drying period. Staples (1/4" (6.35 mm) crown, 43 mil (18 ga.), and ½" (12.7 mm) legs) to be installed at 8" (203.2 mm) on center in the field and 1" (25.4 mm) on center along the perimeter of the USG Fiberock® panel. Set pneumatic tool pressure to drive fasteners flush or slightly below underlayment surface. To prevent fastener heads from telegraphing through resilient floor covering, do not countersink more than 1/16" (1.58 mm) below surface.
 - 4) On surface layer of USG Fiberock® Underlayment, use patching compound sparingly to fill wide joints, repair any surface voids and correct joint lippage (panel edge sitting above or below the floor plane). Carefully fill joints wider than 1/32" (0.76 mm) and any surface imperfections with only enough material to infill void - do not feather. Correct joint lip-page by applying patching compound to low side only and feathering to level. Allow compound to dry completely (90 min. minimum), then lightly sand or scrape, taking care not to scuff panel surface; use a flat blade to scrape away any excess material. Remove dust, dirt and debris from underlayment surface before application of floor covering.

2. Poured Floor Underlayment:

- 1) USG Levelrock® Brand or DUROCK™ Brand floor underlayment can be poured directly onto USG Structural Panel Concrete Subfloor in lieu of a dry underlayment panel.
Note: *Structural Panel Concrete Subfloor joints must be taped, and a primer may be required, prior to underlayment pour.*
- 2) USG Fiberock® Brand Underlayment panels should be secured to USG Structural Panel Concrete Subfloor using staples and a modified thin set mortar.
- 3) Refer to USG Performance Flooring Portfolio – IG2013, along with USG's submittal and SDS pages at USG.com/floor for the most recent product data and installation procedures for USG Levelrock® Brand, Durock™ Brand, USG Fiberock® Brand Underlayment products.

3. USG Fiberock® Underlayment (over USG Structural Panel Concrete Subfloor without sound mat):
 - 1) Lay cut edges of USG Fiberock® Underlayment against the wall; only factory edges should be joined. Begin laying panels at one corner. Maintain 1/4" (6.35 mm) space between panels and perimeter walls. Stagger joints a minimum of 16" (406 mm) so that four panel corners never meet, and offset end and edge joints of panels a minimum of 12" - 16" (305 mm - 406 mm) from subfloor panel joints. Adjoin panel edges and ends lightly together. A maximum 1/32" (0.76 mm) gap is allowed.
 - 2) The USG Fiberock® Underlayment must be bonded with modified thin set mortar
 - 3) Staples (1/4" (6.35 mm) crown, 43 mil (18 ga.), and 1" (25.4 mm) legs) to be installed at 4" (102 mm) on center in the field and 1" (25.4 mm) on center along the perimeter of the USG Fiberock® panel. Set pneumatic tool pressure to drive fasteners flush or slightly below underlayment surface. To prevent fastener heads from telegraphing through resilient floor covering, do not countersink more than 1/16" (1.58 mm) below surface.
 - 4) Use patching compound sparingly to fill wide joints, repair any surface voids and correct joint lippage (panel edge sitting above or below the floor plane). Carefully fill joints wider than 1/32" (0.76 mm) and any surface imperfections with only enough material to infill void - do not feather. Correct joint lip-page by applying patching compound to low side only and feathering to level. Allow compound to dry completely (90 min. minimum), then lightly sand or scrape, taking care not to scuff panel surface; use a flat blade to scrape away any excess material. Remove dust, dirt and debris from underlayment surface before application of floor covering.

E. Floor Finish:

1. Leftover material shall be removed from the job site.
2. Remove all foreign material from the floor surface and vacuum all dust from the surface.
4. Before the application of floor finish materials, ensure that all panels are properly fastened, with the fastener head driven flush or slightly below the surface of the panels. If required butt joints and T&G joints shall be filled with an elastomeric patching compound [*cement-based compounds, can crack*].
5. Direct application of bonded floor finishes to USG Structural Subfloor is not recommended.
6. Engineered Wood – Apply a building paper, No. 15 felt or equivalent, over USG Structural Panel Concrete Subfloor prior to applying wood flooring. For engineered wood flooring, use the moisture barrier recommended for the engineered wood flooring system specified in lieu of the building paper. Follow the wood flooring manufacturer's installation instructions for applying wood flooring to plywood or OSB floor sheathing. USG Structural Panels must be kept dry and maintained in a conditioned space for a minimum of 30 days prior to installation of wood flooring.
7. Ceramic Tile – Ceramic tile should be installed over an underlayment panel or poured underlayment as described in §3.02.D of this specification. Apply Ceramic tile in accordance with ceramic tile manufacturer's instructions.
8. Carpet – For residential carpet & pad, apply tackless strips (designed for concrete application) for the installation of stretched carpet. Residential carpet and pad can be installed directly to USG Structural Panel Concrete Subfloor or to an underlayment. For all Carpet Tile, it is recommended to use an underlayment as described in §3.02.D of this specification.
9. Vinyl Flooring - An appropriate underlayment should be used as described in §3.02.D of this specification.
10. If USG Structural Panel Concrete Subfloor is left bare in extremely-light traffic areas, it is recommended that you seal the panels with a concrete sealer to seal the porous surface.

END OF SECTION

SECTION 06241 - SOLID SURFACING FABRICATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Provide solid surfacing fabrications including but not limited to following:
 - 1. Window Sills
- B. Related Sections: Following description of work is included for reference only and shall not be presumed complete:
 - 1. Finish Carpentry - Section 06100.
 - 2. Joint Sealants - Section 07900.

1.2 REFERENCES

- A. Definitions:
 - 1. Solid Surface: Non-porous, homogeneous material maintaining the same composition throughout the part with a composition of acrylic polymer, aluminum trihydrate filler and pigment.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Preinstallation Meetings: Arrange preinstallation meeting 1 week prior to commencing work with all parties associated with trade as designated in Contract Documents or as requested by Architect. Presided over by Contractor, include Architect who may attend, Subcontractor performing work of this trade, Owner's representative, testing company's representative and consultants of applicable discipline. Review Contract Documents for work included under this trade and determine complete understanding of requirements and responsibilities relative to work included, storage and handling of materials, materials to be used, installation of materials, sequence and quality control, Project staffing, restrictions on areas of work and other matters affecting construction, to permit compliance with intent of work of this Section.

1.4 SUBMITTALS

- A. Product Data: Indicate Product description including solid surface sheets, sinks, bowls and illustrating full range of standard colors, fabrication information and compliance with specified performance requirements. Submit Product data with resistance to list of chemicals.
- B. Shop Drawings: Submit Shop Drawings for work of this Section in accordance with section 01600. Indicate plans, sections, dimensions, component sizes, edge details, thermosetting requirements, fabrication details, attachment provisions, sizes of furring, blocking, including concealed blocking and coordination requirements with adjacent work. Show locations and sizes of cutouts and holes for plumbing fixtures, faucets, soap dispensers, waste receptacles and other items installed in solid surface.
- C. Coordination Drawings: Submit coordination drawings indicating plumbing and miscellaneous steel work indicating locations of wall rated or non-rated, blocking requirements, locations and recessed wall items and similar items.
- D. Samples: Submit samples in accordance with Section 01 30 00. Submit minimum 6" x 6" samples.
 - 1. Cut sample and seam together for representation of inconspicuous seam. Indicate full range of color and pattern variation. Approved samples will be retained as standards for work.
- E. Test and Evaluation Reports: Submit flammability test reports and food preparation zone certifications/listing confirming compliance with NSF/ANSI 51. Refer to www.nsf.org for the latest compliance to NSF/ANSI 51 for Food Zone — all food types.

1.5 CLOSEOUT SUBMITTALS

- A. Operational and Maintenance Data:

1. Submit manufacturer's care and maintenance data, including repair and cleaning instructions. Include in Project closeout documents.
2. Provide a commercial care and maintenance kit and video. Review maintenance procedures and warranty details with Owner upon completion.

1.6 QUALITY ASSURANCE

A. Qualifications:

1. Installers: Provide work of this Section executed by competent installers with minimum 5 years of experience in the application of Products, systems and assemblies specified and with approval and training of the Product manufacturers.

B. Mock-Ups:

1. Prior to final approval of Shop Drawings, erect 1 full size mock-up of each component at Project site demonstrating quality of materials and execution for Architect review.
2. Should mock-up not be approved, rework or remake until approval is secured. Remove rejected units from Project site.
3. Approved mock-up will be used as standard for acceptance of subsequent work.
4. Approved mock-ups may remain as part of finished work.

1.7 DELIVERY, STORAGE AND HANDLING

A. Delivery and Acceptance Requirements: Deliver no components to Project site until areas are ready for installation.

B. Storage and Handling Requirements:

1. Store components indoors prior to installation.
2. Handle materials to prevent damage to finished surfaces.

1.8 WARRANTY

- A. Manufacturer Warranty: Provide manufacturer's standard warranty for material only for period of 10 years against defects and/or deficiencies in accordance with General Conditions of the Contract. Promptly correct any defects or deficiencies which become apparent within warranty period, to satisfaction of Architect and at no expense to Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer Products of following manufacturers are acceptable subject to Conformance to requirements of Drawings, Schedules and Specifications:

1. Corian® by DuPont; www.corian.com.
2. Wilsonart Contract; www.wilsonartcontract.com.
3. Formica; www.formica.com.

B. Equal products of other manufacturers may be used in the work provided such products have been approved by the Architect, not less than Ten (10) days prior to scheduled bid opening.

2.2 MATERIALS

A. Performance/Design Criteria:

<u>Property</u>	<u>Requirement</u>	<u>Test Procedure</u>
(min or max)		

1. Solid Surface Based Products:

a. Tensile Strength	6000 psi min	ASTM D638
---------------------	--------------	-----------

b. Tensile Modulus	1.5 x 10 ⁶ psi min	ASTM D638
c. Tensile Elongation	0.4% min.	ASTM D638
d. Flexural Strength	10000 psi min	ASTM D790
e. Flexural Modulus	1.2 x 10 ⁶ psi min	ASTM D790
f. Hardness	>85-Rockwell "M" scale min.	ASTM D785
g. Thermal Expansion	2.2 x 10 ⁻⁵ in./in./°F	ASTM E228
h. Fungi and Bacteria	Does not support microbial growth	ASTM G21 & G22
i. Microbial Resistance	Highly resistant to mold growth	UL 2824
j. Ball Impact	No fracture - 1/2 lb. Ball: 6 mm slab - 36" drop 12 mm slab - 144" drop	NEMA LD 3, Method 3.8
k. Weatherability	ΔE*94<5 in 1,000 hrs	ASTM G155
l. Flammability		ASTM E84, NFPA 255 & UL 723

All Colors

	6 mm	12 mm	
m. Flame Spread	<25	<25	
n. Smoke Developed	<25	<25	
o. Class	A	A	NFPA 101®, Life Safety Code

- B. Solid Surface Material: Single Source manufacturer for all solid surfacing fabrications on entire project.
- C. Non-porous, homogeneous material maintaining the same composition throughout the part with a composition of acrylic polymer, aluminum trihydrate filler and pigment; not coated, laminated or of composite construction; meeting following criteria:
- D. Flammability: Class 1 and A when tested to UL 723.
- E. Food Equipment Material Compliance: Food Zone to NSF/ANSI 51.
 - 1. Ensure material has minimum physical and performance properties specified under "Performance/Design Criteria".
 - 2. Ensure superficial damage to a depth of 0.010" is repairable by sanding and polishing.
- F. Adhesive for Bonding to Other Products: One component silicone to ASTM C920.
- G. Sealant: A standard mildew-resistant, FDA/UL® [and NSF/ANSI 51 compliant in Food Zone area,] recognized silicone color matched sealant or clear silicone sealants.
- H. Heat Reflecting Tape: Manufacturer's standard aluminum foil tape, with required thickness, for use with cutouts near heat sources.
- I. Insulating Nomex® Fabric: Manufacturer's standard for use with conductive tape in insulating solid surface material from adjacent heat source.

2.3 COMPONENTS

- A. Window Sills: 3/4" thick solid surfacing material, adhesively joined with inconspicuous seams, edge details as indicated on Drawings or from manufacturers standards. Colors to be selected by Architect from manufacturer's full color range.

B. Fabrication:

1. Fabricate components in shop to greatest extent practical to sizes and shapes indicated, in accordance with approved Shop Drawings and solid polymer manufacturer requirements. Form joints between components using manufacturer's standard joint adhesive without conspicuous joints. Provide factory cutouts for plumbing fittings and bath accessories as indicated on Drawings.
2. Where indicated, thermoform corners and edges or other objects to shapes and sizes indicated on Drawings, prior to seaming and joining. Cut components larger than finished dimensions and sand edges to remove nicks and scratches. Heat entire component uniformly prior to forming.
3. Ensure no blistering, whitening and cracking of components during forming.
4. Fabricate joints between components using manufacturer's standard joint adhesive. Ensure joints are inconspicuous in appearance and without voids. Attach 50 mm (2") wide reinforcing strip of solid polymer material under each joint. Reinforcing strip of solid polymer material is not required when using DuPont™ Joint Adhesive 2.0.
5. Rout and finish component edges to a smooth, uniform finish. Rout cutouts, then sand edges smooth. Repair or reject defective or inaccurate work.
6. Finish: Ensure surfaces have uniform finish: As selected by Architect.
 - a. Matte, with a 60° gloss rating of 5 - 20.
 - b. Semi-gloss, with a 60° gloss rating of 25 - 50.
 - c. Polished, with a 60° gloss rating of 55 - 80.
7. Fabrication Tolerances:
 - a. Variation in Component Size: +/-1/8".
 - b. Location of Openings: +/-1/8" from indicated location.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:

1. Examine substrates and conditions, with fabricator present for compliance with requirements for installation tolerances and other conditions affecting performance of work. Proceed with installation only after unsatisfactory conditions have been corrected.
2. Verify actual site dimensions and location of adjacent materials prior to commencing work.
3. Notify Architect in writing of any conditions which would be detrimental to installation.

B. Evaluation and Assessment: Commencement of work implies acceptance of previously completed work.

3.2 INSTALLATION

- A. Install components plumb, level, rigid, scribed to adjacent finishes in accordance with reviewed Shop Drawings and Product installation details.
- B. Fabricate field joints using manufacturer's recommended adhesive, with joints being inconspicuous in finished work. Exposed joints/seams are not permitted. Keep components and hands clean when making joints. Reinforce field joints as specified herein. Cut and finish component edges with clean, sharp returns.
- C. Route radii and contours to template. Anchor securely to base component or other supports. Align adjacent components and form seams to comply with manufacturer's written recommendations using adhesive in color to match work. Carefully dress joints smooth, remove surface scratches and clean entire surface.

- D. Install sills with no more than 1/8" sag, bow or other variation from a straight line.
- E. Adhere sills using manufacturer's recommended adhesive and mounting hardware.
- F. Adhere sills using manufacturer recommended adhesives and color-coordinated silicone sealant.
- G. Seal between wall and components with joint sealant as specified herein and in Section 0790, as applicable.
- H. Keep components and hands clean during installation. Remove adhesives, sealants and other stains. Ensure components are clean on date of Substantial Completion of the Work.
- I. Provide holes and cutouts indicated on approved shop drawings. Rout cutouts and complete by sanding all edges smooth.

3.3 REPAIR

- A. Repair minor imperfections and cracked seams and replace areas of severely damaged surfaces in accordance with manufacturer's "Technical Bulletins".

3.4 SITE QUALITY CONTROL

- A. Non-Conforming Work: Replace damaged work which cannot be satisfactorily repaired, restored or cleaned, to satisfaction of Architect at no cost to Owner.

3.5 CLEANING

- A. Remove excess adhesive and sealant from visible surfaces.
- B. Clean surfaces in accordance with manufacturer's "Care and Maintenance Instructions".

3.6 PROTECTION

- A. Provide protective coverings to prevent physical damage or staining following installation for duration of Project.
- B. Protect surfaces from damage until date of Substantial Completion of the Work.

END OF SECTION

SECTION 06410 - CUSTOM LAMINATED MILLWORK

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Specially fabricated Laminate Wall Panels.

1.2 RELATED REQUIREMENTS

- A. Section 06100 - Rough Carpentry: Support framing, grounds, and concealed blocking.
- B. Section 04412 – Granite Counters.
- C. Section 06241 – Solid Surface Fabrications - Counters.

1.3 REFERENCE STANDARDS

- A. ANSI A208.2 - American National Standard for Medium Density Fiberboard for Interior Use; 2009.
- B. AWI/AWMAC/WI (AWS) - Architectural Woodwork Standards; 2009.
- C. AWI/AWMAC (QSI) - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada; 2005, 8th Ed., Version 2.0.
- D. BHMA A156.9 - American National Standard for Cabinet Hardware; Builders Hardware Manufacturers Association; 2010 (ANSI/BHMA A156.9).
- E. HPVA HP-1 - American National Standard for Hardwood and Decorative Plywood; Hardwood Plywood & Veneer Association; 2009 (ANSI/HPVA HP-1).
- F. NEMA LD 3 - High-Pressure Decorative Laminates; National Electrical Manufacturers Association; 2005.
- G. NHLA G-101 - Rules for the Measurement & Inspection of Hardwood & Cypress; National Hardwood Lumber Association; 2011.
- H. PS 1 - Structural Plywood; 2009.
- I. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology (Department of Commerce); 2010.
- J. WI (MAN) - Manual of Millwork; Woodwork Institute; 2003.

1.4 SUBMITTALS

- A. See Section 01300 - Administrative Requirements, for submittal procedures.
- B. Shop Drawings: Indicate materials, component profiles and elevations, assembly methods, joint details, fastening methods, accessory listings, hardware location and schedule of finishes.
- C. Product Data: Provide data for hardware accessories, including cabinet hardware and accessories and finishing materials and processes. For hardboard, medium density fiberboard, particleboard, plywood, high pressure decorative laminate, adhesive for bonding plastic laminate, thermoset decorative overlay, solid surfacing material. cabinet hardware and accessories, and finishing materials and processes.
- D. Samples: Submit four actual samples of architectural cabinet construction, minimum 12 inches square, illustrating proposed cabinet, countertop, back and shelf unit substrate and finish.
- E. Samples: Submit actual sample items of proposed pulls, hinges, shelf standards, and locksets, demonstrating hardware design, quality, and finish.
- F. Product Certificates: Signed by manufacturers of woodwork certifying that products furnished comply with requirements.
- G. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and address of architects and owners, and other information specified.

1.5 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 5 years with value of woodwork within 20 percent of cost of woodwork for this Project.
- B. Perform work in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Premium quality, unless other quality is indicated for specific items.
- C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum three years of documented experience. Member in good standing of the Architectural Woodwork Institute (AWI) and familiar with the AWI/AWMAC QSI.
- D. Quality Certification: Provide inspection and quality certification of completed custom cabinets in accordance with AWI/AWMAC Quality Certification Program.
- E. Source Limitations: Engage a qualified woodworking firm to assume undivided responsibility for production and installation of interior architectural woodworking including wood doors when veneer matching includes door faces.

1.6 MOCK-UP

- A. Provide mock-up of typical base cabinet and wall cabinet, including hardware, finishes, and plumbing accessories.
- B. Locate where directed.
- C. Mock-up may remain as part of the Work.

1.7 PRE-INSTALLATION MEETING

- A. Convene not less than one week before starting work of this section.

1.8 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of work specified in other Sections to ensure that interior architectural woodwork can be supported and installed as indicated.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver woodwork until painting and similar operations that could damage woodwork have been completed in installation areas. If woodwork must be stored in other installation areas, store only in areas where environmental conditions comply with requirements specified in "Project Conditions" Article.

1.10 PROJECT CONDITIONS

- A. Environmental Limitations: Do not deliver or install woodwork until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.
- B. Field Measurements: Where woodwork is indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on shop drawings. Coordinate fabrication schedule with construction progress to avoid delaying the work.
 - 1. Locate concealed framing, blocking, and reinforcements that support woodwork by field measurements before being enclosed and indicate measurements on shop drawings.
 - 2. Established Dimensions: Where field measurements cannot be made without delaying the work, establish dimensions and proceed with fabricating woodwork without field measurements. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 – PRODUCTS

2.1 LUMBER MATERIALS

- A. Softwood Lumber: NIST PS 20; Graded in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Grade II/Custom; average moisture content of 5-10 percent; species as scheduled.
- B. Hardwood Lumber: NHLA; Graded in accordance with AWI/AWMAC Architectural Woodwork Quality Standards Illustrated, Grade II/Custom; average moisture content of 5-10 percent; species as scheduled.

2.2 PANEL MATERIALS

- A. Softwood Faced Plywood: DOC PS 1, Medium Density Overlay.
- B. Medium Density Fiberboard (MDF): ANSI A208.2; type as specified in AWI/AWMAC Architectural Woodwork Quality Standards Illustrated; composed of wood fibers pressure bonded with moisture resistant adhesive to suit application; sanded faces; thickness as required.
 - 1. Use as backing for plastic laminate unless otherwise indicated.
- C. Core Material at Sinks: Marine-grade plywood, medium-density fiberboard made with exterior glue or exterior-grade plywood.
- D. Wall Panels: Marine-grade plywood, medium-density fiberboard made with exterior glue or exterior-grade plywood.

2.3 LAMINATE MATERIALS

- A. Manufacturers: Basis of Design as indicated on the Drawings.
 - 1. Substitutions: See Section 01600 - Product Requirements.
- B. Product: As indicated on the Drawings.
- C. High Pressure Decorative Laminate (HPDL): NEMA LD 3, types as recommended for specific applications and as follows:
 - 1. Horizontal Surfaces: HGS, 0.048 inch nominal thickness, through color, colors as scheduled, finish as scheduled.
 - 2. Vertical Surfaces: VGS, 0.028 inch nominal thickness, through color, colors as scheduled, finish as scheduled.
 - 3. Cabinet Liner: CLS, 0.020 inch nominal thickness, through color, colors as scheduled, finish as scheduled.
 - 4. Laminate Backer: BKL, 0.020 inch nominal thickness, undecorated; for application to concealed backside of panels faced with high pressure decorative laminate.
- D. Melamine Laminate tested to meet NEMA Test LD 3.
- E. Colors for cabinet surfaces shall be selected from Wilsonart's standard solid and pattern offering. A maximum of one (1) color to be selected per unit face and two (2) colors per project.
- F. Melamine colors shall be light beige or dove grey. One color only per project.
- G. Colors: All To be selected by architect during submittal phase of project.

2.4 ACCESSORIES

- A. Adhesive: Type recommended by fabricator to suit application.
- B. Fasteners: Size and type to suit application.
- C. 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.
- D. Concealed Joint Fasteners: Threaded steel.
- E. Grommets: Standard plastic, painted metal, or rubber grommets for cut-outs, in color to match adjacent surface.

2.5 HARDWARE

- A. Hardware: BHMA A156.9, types as recommended by fabricator for quality grade specified.
- B. Adjustable Shelf Supports: Standard side-mounted system using shelf brackets and coordinated shelf rests, satin chrome finish, for nominal 1 inch spacing adjustments. Comply with BHMA A156.9, B04102, with shelf brackets B04112.
- C. Adjustable Shelf Supports: Standard back-mounted system using surface mounted metal shelf standards and coordinated cantilevered shelf brackets, satin chrome finish, for nominal 1 inch spacing adjustments.
- D. Drawer and Door Pulls: Aluminum/stainless steel pull, 1'-0" long.
 - 1. Product: Item No. 112.83.006 manufactured by Westin Collection.
- E. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.
 - 1. Satin Nickel; match Architect's sample.
- F. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.
- G. Catches: Magnetic.

2.6 WALL PANELS

- A. General: Provide materials which have been selected for surface flatness and smoothness. Exposed surfaces which exhibit pitting, seam marks, roller marks, stains, discolorations, telegraphing of core material, or other imperfections on finished units are not acceptable.
- B. Adhesives or fasteners to be provided for securing panels to walls. Such materials to allow for contraction or expansion of panels where necessary.
- C. Panels shall be minimum 3/4" thick unless otherwise specified.
- D. Types:
 - 1. Plastic laminate panels shall be surfaced with high pressure decorative laminate for vertical grade laminate. A high pressure decorative laminate backer sheet (BKL) as specified in this section shall be applied to the concealed surface of each panel, which contributes warp resistance and dimensional stability.
 - 2. Cores shall be Marine-grade plywood, medium-density fiberboard made with exterior glue or exterior-grade plywood.
 - 3. All exposed edges must be covered with the same laminate as vertical panel surface. When splice joints are required, they shall be joined with dowel pins and tite joint fasteners as needed for a gapless joint.
 - 4. Laminate Color Selection(s): Colors for panels shall be selected from Wilsonart's standard solid, wood grain and pattern offering. A maximum of Two (2) colors per project.
- E. Plastic Laminate Type: Fire rated type, 0.050" thick; UL tested and labeled ratings of 25 for flame spread, 25 for fuel contributed and 100 for smoke developed when bonded to wood particle board.
- F. Preparations for Finishing: Comply with AWI Quality Standards, Section I500, for sanding, filling countersunk fasteners, backpriming and similar preparations for finishing of architectural woodwork, as applicable to each unit of work..

2.7 SHOP TREATMENT OF WOOD MATERIALS

- A. Fire Retardant Treatment (FR-S Type): Chemically treated and pressure impregnated; capable of providing flame spread index of 25, maximum, and smoke developed index of 450, maximum, when tested in accordance with ASTM E84.
- B. Provide UL approved identification on fire retardant treated material.
- C. Deliver fire retardant treated materials cut to required sizes. Minimize field cutting.

2.8 FABRICATION

- A. Fitting: When necessary to cut and fit on site, provide materials with ample allowance for cutting. Provide matching trim for scribing and site cutting.

- B. 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 from sink cut-outs.
 - 1. Apply laminate backing sheet to reverse side of plastic laminate finished surfaces.
 - 2. Cap exposed plastic laminate finish edges with material of same finish and pattern.
- C. Mechanically fasten back splash to countertops as recommended by laminate manufacturer at 16 inches on center.
- D. Provide cutouts for plumbing fixtures, inserts, appliances, outlet boxes, and fixtures and fittings. Verify locations of cutouts from on-site dimensions. Prime paint cut edges.
- E. Fastening devices and their attachment shall be submitted for approval prior to installation. Drywall screws will not be allowed for the attachment and installation of millwork.
- F. Continuous or Unit Tops: All cabinets over 42" and up to 72" in height shall be supplied where shown with a finished 1" continuous top laminated with high pressure decorative laminate and balanced with high pressure backer BKL.
- G. Bases: Provide and install all base and tall units with finished integral base. Provide ¾" thick marine grade plywood bases. All bases shall have finished facings unless rubber vinyl base covering is being furnished and applied by others.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Verify adequacy of backing and support framing.
- B. Verify location and sizes of utility rough-in associated with work of this section.

3.2 INSTALLATION

- A. Use fixture attachments in concealed locations for wall mounted components.
- B. Use concealed joint fasteners to align and secure adjoining cabinet units and countertops.
- C. Carefully scribe casework abutting other components, with maximum gaps of 1/32 inch. Do not use additional overlay trim for this purpose.
- D. Secure cabinets to floor using appropriate angles and anchorages. Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware so center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.
 - 1. Install cabinets with no more than 1/8" in 96 inch sag, bow or other variation from a straight line.
 - 2. Maintain veneer sequence matching of cabinets with transparent finish.
 - 3. Fasten wall cabinets through back, bear top and bottom, at ends and not more than 16 inches o.c. with No. 10 wafer head screws sized for 1 inch penetration into wood framing, blocking or hanging strips.
- E. Securely anchor countertops by screwing through corner blocks of base cabinets or other supports into underside of countertop.
 - 1. Align adjacent solid surface material countertops and form seams to comply with manufacturer's written recommendations using adhesive in color to match countertop. Carefully dress joints smooth, remove surface scratches and clean entire surface.
 - 2. Install countertops with no more than 1/8 inch in 96 inch sag, bow or other variation from a straight line.
 - 3. Secure backsplashes to tops with concealed metal brackets at 16 inches o.c. and to walls with adhesive.
 - 4. Caulk space between backsplash and wall with sealant.
- F. Countersink anchorage devices at exposed locations. Conceal with solid wood plugs of species to match surrounding wood; finish flush with surrounding surfaces.

3.3 ADJUSTING

- A. Repair damaged and defective woodwork, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.
- B. Adjust installed work.
- C. Adjust moving or operating parts to function smoothly and correctly.
- D. Clean woodwork on exposed and semi exposed surfaces. Touch up shop applied finishes to restore damaged or soiled areas.

3.4 CLEANING

- A. Clean casework, counters, shelves, hardware, fittings, and fixtures.

END OF SECTION

ROLLED, SELF ADHERING WATERPROOFING MEMBRANE

SECTION 07132

SELF-ADHERING SHEET WATERPROOFING

Revision Date: December 14, 2023

Specifier Notes: This guide specification is written according to the Construction Specifications Canada (CSC) MasterFormat. The section must be carefully reviewed and edited by the Architect or Engineer to meet the requirements of the project. Coordinate this section with other specification sections and the drawings.

Specifier Notes: W.R. Meadows MEL-ROL is self-adhering sheet waterproofing system that is a flexible that is available as a standard and two cold weather versions. It is composed of a nominally 1.4 mm (56 mil) thick layer of polymeric waterproofing membrane on a heavy duty, 0.1 mm (4 mil) thick, polyethylene carrier film. The two components are laminated together under strict quality-controlled production procedures. A convenient overlap guideline is printed 63.5 mm (2 ½ inch) in from the material edge on each side to assure proper overlap coverage and to assist in maintaining uniform alignment. Special exposed polymeric membrane strips are provided on both sides for positive membrane-to-membrane adhesion in the overlap area. The membrane strips are protected by a pull-off release strip. MEL-ROL waterproofing system provides a cost-effective answer to properly waterproof vertical and horizontal foundations, retaining walls, tunnels, plaza decks and split-slabs for parking decks in residential and commercial construction. MEL-ROL is also applicable for insulated concrete forms (ICF). This specification is based on a single-ply application. Consult W. R. Meadows for a 2-ply MEL-ROL guide specification.

PART 1 GENERAL

1.1 SECTION INCLUDES

- .1 Surface preparation.
- .2 Application of rolled, self-adhering sheet waterproofing membrane system.

1.2 RELATED SECTIONS

Specifier Notes: Edit the list of related sections as required for the project. List other sections dealing with work directly related to this section.

- .1 Section 03 30 00 - Cast-in-Place Concrete.
- .2 Section 07 21 00 – Thermal Insulation.
- .3 Section 07 60 00 – Flashing and Sheet Metal.
- .4 Section 07 92 00 – Joint Sealants.
- .5 Section 33 41 23 – Drainage Layers.

Renovation to Arts Center For
Goshen High School For The
Pike County Schools BOE
Troy, Alabama

ROLLED, SELF ADHEREING WATERPROOFING
MEMBRANE
07132-1

1.3 REFERENCES

- .1 American Railway Engineering and Maintenance-of-Way Association (AREMA) Specification Chapter 29 - Waterproofing.
- .2 ASTM D146 - Standard Test Methods for Sampling and Testing Bitumen-Saturated Felts and Fabrics Used in Roofing and Waterproofing.
- .3 ASTM D412 - Standard Test Methods for Vulcanized Rubber and Thermoplastic Elastomers-Tension.
- .4 ASTM D570 - Standard Test Method for Water Absorption of Plastics.
- .5 ASTM D903 - Standard Test Method for Peel or Stripping Strength of Adhesive Bonds.
- .6 ASTM D1876 – Standard Test Method for Peel Resistance of Adhesives. (T-Peel Test).
- .7 ASTM D1970 - Standard Specification for Self-Adhering Polymer Modified Bituminous Sheet Materials Used as Steep Roofing Underlayment for Ice Dam Protection.
- .8 ASTM E96 (Method B) - Standard Test Methods for Water Vapour Transmission of Materials.
- .9 ASTM E154 - Standard Test Methods for Water Vapour Retarders Used in Contact with Earth Under Concrete Slabs, on Walls, or as Ground Cover.
- .10 National Roofing Contractors Association – Roofing and Waterproofing Manual.

1.4 SUBMITTALS

- .1 Comply with Section 01 33 00 - Submittal Procedures.
- .2 Submit manufacturer's product data and application instructions.

1.5 QUALITY ASSURANCE

- .1 Installer Qualifications:
 - .1 Use an experienced installer and adequate number of skilled personnel who are thoroughly trained and experienced in the application of fluid applied waterproofing membranes.
- .2 Obtain waterproofing materials from a single manufacturer regularly engaged in manufacturing the product.
- .3 Provide products which comply with all state and local regulations controlling use of volatile organic compounds (VOCs).

1.6 DELIVERY, STORAGE, AND HANDLING

- .1 Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.

Renovation to Arts Center For
Goshen High School For The
Pike County Schools BOE
Troy, Alabama

ROLLED, SELF ADHEREING WATERPROOFING
MEMBRANE
07132-2

- .2 Store materials in a clean dry area in accordance with manufacturer's instructions.
- .3 Store adhesives and primers at temperatures of 5 degrees C (40 degrees F) and above to facilitate handling.
- .4 Store membrane cartons on pallets.
- .5 Do not store at temperatures above 32 degrees C (90 degrees F) for extended periods.
- .6 Keep away from sparks and flames.
- .7 Completely cover when stored outside. Protect from rain.
- .8 Protect materials during handling and application to prevent damage or contamination.
- .9 Avoid use of products which contain tars, solvents, pitches, polysulfide polymers, or PVC materials that may come into contact with waterproofing membrane system.

1.7 ENVIRONMENTAL REQUIREMENTS

- .1 Product not intended for uses subject to abuse or permanent exposure to the elements.
- .2 Protect rolls from direct sunlight until ready for use.
- .3 Do not apply standard membrane when air or surface temperatures are below 4 degrees C (40 degrees F).
- .4 Do not apply to frozen concrete.

PART 2 PRODUCTS

2.1 MANUFACTURER

- .1 W. R. MEADOWS®, INC., 70 Hannant Ct, Milton, ON L9T 5C1, Canada. (905) 878-4122

2.2 MATERIALS

- .1 Rolled, Self-Adhering Sheet Waterproofing Membrane: Polymeric waterproofing membrane protected by release paper on polyethylene carrier film with exposed polymeric membrane strips on both sides protected by pull-off release strips.
 - .1 Performance Based Specification: Waterproofing membrane shall have the following characteristics:
 - .1 Compliance: AREMA Specification Chapter 29 - Waterproofing.
 - .2 Thickness:
 - .1) Carrier Film: 4 mils.
 - .2) Polymeric Membrane: 56 mils.
 - .3 Tensile Strength, ASTM D412, Die C:
 - .1) Carrier Film: 40.71 MPa (5900 psi), minimum.
 - .2) Polymeric Membrane: 3.23 MPa (460 psi), minimum.

Renovation to Arts Center For
Goshen High School For The
Pike County Schools BOE
Troy, Alabama

ROLLED, SELF ADHEREING WATERPROOFING
MEMBRANE
07132-3

- .4 Elongation, ASTM D412, Die C: Polymeric Membrane: 971 %, minimum.
- .5 Peel Adhesion, ASTM D903: 2068 N/m (11.8 lbf/in.).
- .6 Lap Adhesion, ASTM D1876: 1508 N/m (8.62 lbf/in.).
- .7 Water Vapor Permeability, ASTM E96, Method B: 0.036 perms.
- .8 Water Absorption, ASTM D570: 0.1 percent, 72 hours maximum.
- .9 Resistance to Hydrostatic Head, ASTM D5385: Equivalent to 70.3 m (230.9 feet) of water.
- .10 Puncture Resistance, ASTM E154: 214.6 N (48.2 lbf).
- .11 Exposure to Fungi, Soil Test: Pass, 16 weeks.
- .12 Color:
 - .1) Carrier Film: White.
 - .2) Polymeric Membrane: Black.

Specifier Notes: Select one of the following MEL-ROL products in Part 2.2.2 based on air and substrate temperatures during time of application.

- .2 Proprietary Based Specification: MEL-ROL Waterproofing System by W.R. MEADOWS.
 - .1 MEL-ROL: For use at temperatures of 4°C (40°F) and above.
 - .2 MEL-ROL LT (Low Temperature): For use at temperatures of -7°C (20°F) to 16°C (60°F).
 - .3 MEL-ROL XLT (Extra Low Temperature): For use at temperatures of -18°C (0°F) to 16°C (60°F).

2.3 ACCESSORIES

- .1 Surface Conditioner:
 - .1 MEL-PRIME Solvent-based adhesive.
 - .2 MEL-PRIME W/B water-based adhesive.
- .2 Flashing and Fillets: MEL-ROL LIQUID MEMBRANE.
- .3 Termination Sealant: POINTING MASTIC.
- .4 Termination Bar: TERMINATION BAR.
- .5 Corner and Detailing Tape: DETAIL STRIP.
- .6 Waterproofing Protection Course: PROTECTION COURSE (VIBRAFLEX® PC) or PERMINATOR 10-mil or 15-mil.
- .7 Rolled Matrix Drainage System: MEL-DRAIN Rolled Matrix Drainage System.

PART 3 EXECUTION

3.1 EXAMINATION

- .1 Examine surfaces to receive self-adhering membrane. Notify Architect if surfaces are not acceptable. Do not begin surface preparation or application until unacceptable conditions have been corrected. Commencement of the Work shall construe contractor acceptance of conditions.

Renovation to Arts Center For
Goshen High School For The
Pike County Schools BOE
Troy, Alabama

ROLLED, SELF ADHEREING WATERPROOFING
MEMBRANE
07132-4

MCKEE PROJECT NO. 20.119

- .2 Apply self-adhering sheet waterproofing to cured concrete surfaces a minimum of 3 days after removal of forms.

3.2 SURFACE PREPARATION

- .1 Protect adjacent surfaces not designated to receive waterproofing.
- .2 Clean and prepare surfaces to receive waterproofing in accordance with manufacturer's instructions.
- .3 Do not apply waterproofing to surfaces unacceptable to manufacturer.
- .4 Concrete surfaces must be clean, smooth and free of standing water.
- .5 Patch all holes and voids and smooth out any surface misalignments.
- .6 Apply only enough adhesive to surfaces that will be covered with self-adhering membrane within one working day. Apply adhesive in accordance with manufacturer's recommended coverage rates.
- .7 Apply fillet beads of termination sealant at inside corners. Upon curing of sealant, install corner tape on all inside and outside corners, including footings. Ensure a minimum 7.6 cm (3 inch) coverage of membrane onto each adjacent plane.
- .8 Joint Reinforcement
 - .1 For static cracks and cold joints a minimum of 1.6 mm (1/16 inch) but not greater than 3.175 mm (1/8 inch), apply detailing membrane 23 cm (9-inch) wide strip of self-adhering detail tape centred over the joint.
 - .2 For expansion joints up to 2.5 cm (1 inch), apply a backer rod larger than joint width into the gap and cover with self-adhering detail tape. Ensure not less than 7.6 cm (3 inches) of membrane are applied to substrates on both sides of the gap.
- .9 Pipe Penetrations
 - .1 Finger flash pipe penetrations with a minimum 15 cm (6-inch) wide detailing tape by applying 7.6 cm (3-inch) fingers onto surrounding substrate and 7.6 cm (3-inches) of tape onto pipe circumference, with 5 cm (2-inch) minimum overlap. Seal all edges of flashing with termination sealant.
- .10 Seal all terminations and exposed membrane edges with termination sealant.

3.3 APPLICATION

- .1 Primary Membrane Application
 - .1 Apply waterproofing membrane system in accordance with manufacturer's instructions.
 - .2 Remove release backing paper, then position the membrane at the lowest point. Ensure the proper overlap is maintained for all side and end laps.
 - .3 Pull balance of release paper off, then press into place to ensure full contact and elimination of all wrinkles. Roll press entire membrane and seams.
 - .4 Stagger end laps and overlap all seams at least 6.35 cm (2 ½ inches).
 - .5 Terminate top leading edge of membrane with termination bar and termination sealant as required.
 - .6 Seal all terminations and non-factory edges with termination sealant.

- .7 Inspect membrane before covering and repair as necessary. Cover tears and inadequate overlaps with membrane, extending 15 cm (6 inches) beyond affected areas. Seal all sides of patches and repair areas with termination sealant.

Specifier Notes: When installing vertically, the membrane can be applied in both the horizontal and vertical orientation. It is important that the minimum 6.35 cm (2-1/2-inch) overlap, pre-marked on the membrane carrier sheet, is maintained.

Specifier Notes: When using asphaltic rigid protection course sheets on tall vertical surfaces, temporary supports may be required to allow adhesive to fully cure and bond the sheet to the waterproofing. In lieu of the asphaltic protection course sheets on tall surfaces, alternative protection accessories may be used as outlined in Part 3.4.1. Delete the protection materials that are not used.

3.4 PROTECTION

- .1 Protect membrane immediately after application with the application of [rigid insulation by others] or [drainage panel] or [asphaltic sheet] [polyolefin sheet].
- .2 Backfill immediately using care to avoid damaging waterproofing membrane system.

END OF SECTION

SECTION 07200 - INSULATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract including General and Supplementary Conditions and Division 1 Specification sections shall apply to work of this section.

1.2 DESCRIPTION OF WORK

- A. Extent of insulation work is shown on drawings and indicated by provisions of this section.
- B. Applications of insulation specified in this section include the following:
 - 1. Sound Attenuation at interior stud walls.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's product specifications and installation instructions for each type of insulation and vapor barrier material required.

1.4 PRODUCT HANDLING

- A. General Protection: Protect insulations from physical damage and from becoming wet, soiled, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storage and protection during installation.

PART 2 - PRODUCTS

2.1 BATT INSULATION

A. MANUFACTURERS:

- 1. The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function.
 - a. Certain-Teed Products Corp.; Valley Forge, PA
 - b. Manville Bldg. Materials Corp.; Denver, CO.
 - c. Owens-Corning Fiberglass Corp.; Toledo, OH.
- 2. Equal products of other manufacturers may be used in the work, provided such products have been approved by the Architect, not less than Ten (10) days prior to scheduled bid opening.

B. MATERIALS:

- 1. Mineral/Glass Fiber Blanket/Batt Insulation (M/GFB-Ins): Inorganic (nonasbestos) fibers formed into resilient flexible blankets or semi-rigid batts; FS HH-1-521. Manufacturer's standard lengths and widths as required to coordinate with spaces to be insulated.
- 3. Interior Stud Walls: Provide unfaced Sound Attenuation batts at interior stud partitions.
 - a. **Thickness: 6" (nominal), unfaced batts.**
- 4. Above New Acoustical Ceilings: Provide unfaced Sound Attenuation batts above all interior metal stud partition-divider walls as indicated on drawings.
 - a. Thickness: 6" (nominal), Unfaced batts laid over acoustical ceiling.
 - b. Install 4'-0" out from each side of partition/divider wall.
 - c. Install entire length of partition/divider wall.

PART 3 - EXECUTION

3.1 INSPECTION AND PREPARATION

- A. Installer must examine substrates and conditions under which insulation work is to be performed and must notify Contractor in writing of unsatisfactory conditions. Do not proceed with insulation work until unsatisfactory conditions have been corrected in manner acceptable to Installer.
- B. Clean substrates of substances harmful to insulations or vapor barriers, including removal of projections which might puncture vapor barriers.
- C. Close off openings in cavities to receive poured-in-place and insulation, sufficiently to prevent escape of insulation. Provide bronze or stainless steel screen (inside) where openings must be maintained for drainage or ventilation.

3.2 INSTALLATION

- A. General: Comply with manufacturer's instructions for particular conditions of installation in each case. If printed instructions are not available or do not apply to project conditions, consult manufacturer's technical representative for specific recommendations before proceeding with work.
- B. Extend insulation full thickness as shown over entire area to be insulated. Cut and fit tightly around obstructions, and fill voids with insulation. Remove projections which interfere with placement.

3.3 PROTECTION

- A. General: Protect installed insulation and vapor barriers from harmful weather exposures and from possible physical abuses, where possible by non-delayed installation of concealing work or, where that is not possible, by temporary covering or enclosure. Installer shall advise Contractor of exposure hazards, including possible sources of deterioration and fire hazards.

END OF SECTION

SECTION 07410
GALVALUME STANDING SEAM METAL ROOFING

PART 1 - GENERAL

1.1 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.

1.2 DESCRIPTION OF WORK

- A. The work under this section consists of all preformed metal roofing, underlayment, ridge vent system, sheet metal, roof drainage accessories and all related items necessary to complete the roofing system work indicated on the drawings and herein specified including but not limited to the following:
1. Formed Roof Panels for Standing Seam Installation
 2. Underlayment.
 3. Workmanship
 4. Inspection of Surfaces
 5. Protection
 6. Delivery, Samples and Shop Drawings

1.3 QUALITY ASSURANCE

- A. The Contractor shall engage the services of a Professional Roof Consultant. The Consultant must hold a minimum title of Registered Roof Observer (RRO) through the International Institute of Building Enclosure Consultants (IIBEC) and provide evidence of adequate insurance as required below. The Consultant should perform three (3) inspections during the installation of each new roof system type (1 – Start up inspection; 2 – Interim inspection; 3 – Final inspection). The Consultant must document all site visits with photographs and written reports. All reports shall be forwarded to the Architect with documentation of the roofing progress and any deficiencies noted during the inspections. ***(Note: Although the contractor will be paying the roof consultant from their proceeds, the roof consultant will be considered an agent of the owner and architect throughout the project and will perform the required inspections on behalf of the owner and architect. The above specification shall be applied to individual facilities when multiple site locations are included in the project.)***
1. Roof Consultant Insurance Requirements:
 - a. Gen. Liability - \$1,000,000 each occurrence - \$2,000,000 General Aggregate / Auto. Liability - \$1,000,000 / Umbrella Liability. - \$1,000,000 / Workers Compensation - \$1,000,000 per statute / Professional Liability - \$1,000,000
 2. Approved Roof Consulting Firm:
 - a. Roof Asset Management, Inc.
David Lee, RRO, CIT, FAA-107
Millbrook, AL / (334) 590-7999 / dlee@roof-asset.com
 - b. Professional Roof Observers, LLC.
1200 Sumac Road
Pulaski, TN 38478
Kevin Turner / (931) 703-6018 / kturner@professionalroofobservers.net.

- c. Substitutions: Roof consulting firms must be pre-approved by the Architect. Requests for a substituting firm must be submitted "In writing" 10 (Ten) days prior to the bid opening.
- B. Performance Test Standards: Provide preformed panel systems which have been pretested and certified by manufacturer to provide specified resistance to air and water infiltration and structural deflection and failure when installed as indicated and when tested in accordance with AAMA 501, "Methods of Test for Metal Curtain Walls".
- C. Field Measurements: Where possible, prior to fabrication of prefabricated panels, take field measurements of structure or substrates to receive panel system. Allow for trimming panel units where final dimensions cannot be established prior to fabrication.
- D. Impact Resistance: Roof coverings installed on low-slope roofs (roof slope <2:12) shall resist impact damage based on the results of tests conducted in accordance with ASTM D 3746, ASTM D 4272, CGSB 37-GP-52M or the "Resistance to Foot Traffic Test" FM 4470.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's product specifications, standard details, certified product test results, installation instructions and general recommendations, as applicable to materials and finishes for each component and for total system of preformed panels.
- B. Samples: Submit 2 samples 12" square of each exposed finish material.
- C. Shop Drawings: Submit small-scale layouts of panels on roofs, and large-scale details of edge conditions, joints, corners, custom profiles, supports, anchorages, trim, flashings, closures, and special details. Distinguish between factory and field assembly work.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver and store prefabricated components, sheets, panels, and other manufactured items so they will not be damaged or deformed.
- B. Stack materials on platforms or pallets, covered with tarpaulins or other suitable weathertight ventilated covering. Store metal sheets or panels so that water accumulations will drain freely. Do not store sheets or panels in contact with other materials which might cause staining.

1.6 ROOFER'S QUALIFICATIONS

- A. Installation of the metal roofing and roof related accessories shall be performed by Certified / Preferred Roofers authorized by the manufacturer as trained and qualified to erect the manufacturer's product.
- B. The Contractor shall submit a letter from the manufacturer of the metal roofing system, certifying the date of certification from the Manufacturer and the dates and year the Roofing Contractor attended school, prior to full certification that this Roofing Contractor is a certified roofer.

1.7 ROOFING WARRANTIES & GUARANTEE

- A. Weather Tightness Warranty
 - 1. The entire installation (sub-framing, clips, panels, fasteners, rakes, eave, ridge, valley flashing conditions, roof to wall conditions as well as all materials specified as supplied by the manufacturer) shall be guaranteed weather tight for a minimum of Twenty (20) years (NO Dollar Limit NDL). Provide written warranty, signed by metal roofing manufacturer and his authorized installer, agreeing to replace/repair defective materials and workmanship during the warranty period, certified by the third-party inspection firm as stated under QUALITY ASSURANCE. This warranty shall be identified as neither Non-Depreciating, Non-Pro-Rated,

nor have exclusions that identify, valleys, curbs, and flashings. The warranty shall be signed by the Manufacturer of the roofing materials and the authorized installer.

2. Compatibility: Provide products which are recommended by manufacturers to be fully compatible with indicated substrates or provide separation materials as required to eliminate contact between incompatible materials.

B. Manufacturer's Warranty

1. Manufacturer's roofing warranties which contain language regarding the governing of the warranty 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 warranties.
2. Roof Panels: Durability of the metallic coated and unpainted roof panels due to rupture, structural failure or perforation shall be warranted for a period of Twenty (20) years by the manufacturer.
3. Color Finish:
 - a. The exterior color finish for painted panels shall be warranted by the Manufacturer for Twenty-five (25) years against blistering, peeling, cracking, flaking, chalking, and shipping.
 - b. Excessive color change and chalking shall be warranted for Twenty-five (25) years.
 - i. Color change shall not exceed 5 NBS units per ASTM D2244.68T, chalking shall not be less than a rating of 6 (white) or 8 (other colors) per ASTM D-659.
4. The roofing manufacturer shall be required to provide documentation certifying the roofing system and products specified comply with the performance requirements as set forth in IBC Chapter 15, Section 1504. The documentation shall be attached to the roof warranty at the close out of the project.

C. Contractor's Roofing Guarantee

1. Contractor shall furnish Contractors 5 Year Roofing Guarantee. This roofing guarantee is included in the front-end documentation of this project manual.

- D.** All roof warranties/guarantees shall be provided to the Owner, by the Contractor at the Final Inspection to obtain the Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A.** The following manufacturers' products have been used to establish minimum standards for materials, workmanship, and function:
1. American Buildings Company/A Nucor Company; (Basis of Design and Quality); www.americanbuildings.com; 1150 State Docks Road, Eufaula, Alabama 36027; Phone: 334.687.2032.
 2. Butler Manufacturing; www.buttermfg.com; 1540 Genessee St., Kansas City, MO. 64102; Phone: 816.968.3000
 3. MBCI Manufacturing; www.mbc.com; 2280 Monier Avenue, Lithia Springs, Georgia, 30122; Phone: 844.2506 or 770.729.4772.
 4. Varco Pruden; www.vp.com; 3200 Players Club Circle, Memphis, TN 38125; Phone: 1.901.748.8000
 5. Morin / A Kingspan Group Company; www.kingspan.com/us/en-us/product-groups/metal-roof-wall-systems; 1975 Eidson Drive, Florida, 32724; Phone: 860.584.0900 or 800.640.9501
 6. ACI Building Systems, LLC.; www.acibuildingsystems.com; 10125 Highway 6 West, Batesville, MS 38606; Phone: 662.563.4574.

7. AllSouth Pre-Engineered Components, LLC.; 985 Technology Drive, Dothan, Alabama, 36303; Phone: 334.699.8394; www.buildwithape.com.
8. Berridge Manufacturing Company; www.berridge.com; 319 Lee Industrial Boulevard, Austell, Georgia; Ph: 770.941.5141.

2.2 MATERIALS

- A. All materials shall be from a single source.
- B. Loc-Seam 360 with Galvalume Finish by American Buildings Company/A Nucor Company.
 1. Standing seam roof panel shall have a configuration consisting of 2-inch vertical rib spaced on 16-inch centers. The panel shall have flush horizontal and vertical surfaces to facilitate sealing at terminations. Panel configurations which create voids requiring supple metal closure devices shall not be considered acceptable. Panels shall be joined at the sidelap with an interlocking seam mechanically locked by a seaming machine after installation. The female panel seam shall have a factory applied sealant, in compliance with UL90.
 2. The panel shall be 24-gauge (minimum) AZ50 or AZ55 aluminum-zinc alloy-coated steel, conforming to the requirements of ASTM A 792, Grade 80. Galvalume Finish. Minimum yield strength shall be 80,000 PSI.
 3. Deviations in appearance from the quality standard manufacturer's panel must be approved by the owner before acceptance.
 4. Changes in framing or variations in loading to the existing structure caused by alternate roof systems shall be subject to review and all costs for any modifications shall be the responsibility of the General Contractor.
 5. System Description: The roof system is a concealed fastener interlocking standing seam system. Panel must not be roll formed on site, nor use a portable roll former whereby the contractor manufactures the panel versus a single sourced manufacture providing the finished materials with a single sourced warranty.
 6. Roof panels shall be standing seam interlocking design and secured to the supports with a concealed structural fastening system. UL certification must appear on the panel if so requested.
 7. The concealed attachment system shall eliminate all through penetration of the exposed roofing surface into structural supports and allow the roof covering to move independently of any differential thermal movement by the framing system.
 8. The panel to structural clip shall be designed to provide +/- one inch of thermal movement. It shall incorporate a self-centered feature to assure one inch of movement in both directions.
 9. The standing seam shall have integral male and female interlocking ribs with a factory applied, non-hardening sealant, and the seams shall be continuously locked or crimped together by mechanical means during installation.
 10. Roof panels shall be fastened to the support framing members with a concealed clip or backing device of steel having a protective metallic coating. Through penetration of the roofing surface by exposed fasteners shall occur only for non-structural connection at panel termination and roof perimeter flashing location.
 11. Panel termination and perimeter flashing (attached to roof panels) shall be sealed with sealants recommended by the manufacturer.
 12. Required closures shall be metal. Non-metal closures shall not be acceptable.
 13. Provide thermal blocks at all roof to purlin connection points/deck supports.

2.3 METAL FINISHES

- A. General: Apply coating either before or after forming and fabricating panels, as required by coating process and as required for maximum coating performance capability. Protect coating promptly after application and cure, by application of strippable film or removable adhesive cover and retain until installation has been completed.
- B. Color Finish on Roof Panels and Trim:
 - 1. Panels shall have a Galvalume Finish.

2.4 ROOF PANELS

- A. General: Provide roofing sheets formed to the general profile or configuration indicated. All roof panels shall be full length, no end laps allowed.
- B. Zinc-Coated Steel Sheets: Provide structural quality hot-dip galvanized steel sheets, complying with requirements of ASTM A446, Grade C, with G90 coating complying with ASTM A525.
- C. Aluminum Coated Steel Sheets: Provide drawing quality aluminum coated steel sheets, complying with requirements of ASTM A463, with T1-40 coating.
 - 1. Metal thickness not less than 24 ga. (0.0179").
- D. Accessories: Provide the following sheet metal accessories factory formed of the same material and finish as the roofing and siding.
 - 1. Flashings.
 - 2. Fillers.
 - 3. Metal expansion joints.
 - 4. Facias
 - 5. Ridge covers.
 - 6. Cover exposed structural and secondary members at exterior.
- E. Fasteners:
 - 1. Provide self-tapping screws, bolts, nuts, self-locking rivets, self-locking bolts, end welded studs, and other suitable fasteners as standard with the manufacturer designed to withstand design loads.
 - 2. Provide metal-backed neoprene washers under heads of fasteners bearing on weather side of panels.
 - 3. Use stainless steel fasteners for exterior application and galvanized or cadmium plated fasteners for interior applications.
 - 4. Locate and space fastenings in true vertical and horizontal alignment. Use proper type fastening tools to obtain controlled uniform compression for positive seal without rupture of neoprene washer.
 - 5. Provide fasteners with heads matching color of roofing sheets by means of plastic caps or factory-applied coating.
- F. Flexible Closure Strips: Provide closed-cell, expanded cellular rubber, self-extinguishing flexible closure strips. Cut or premold closure strips to match corrugation configuration of roofing and siding sheets. Provide closure strips where indicated or necessary to ensure weathertight construction.
- G. Sealing Tape: Provide pressure sensitive 100 percent solids isobutylene tripolymer compound sealing tape with release paper backing. Provide permanently elastic, non-sag, non-toxic, non-staining tape not less than 1/2" wide and 1/8" thick.
- H. Joint Sealants: Provide one-part elastomeric polyurethane polysulfide or silicone rubber sealant as recommended by the building manufacturer.

2.5 UNDERLAYMENTS

A. Self-Adhered Underlayment:

1. Manufacturers: The following manufacturers' products have been used to establish minimum standards for materials, workmanship, and function:
 - a. SDP Advanced Polymer Products
 - b. Carlisle Dri-Start A
 - c. Grace HT
2. Materials:
 - a. Install 40 mil self- adhering ice and water shield membrane.
 - b. Palisade SA-HT; SDP Advanced Polymer Products
 - i. Color - KOOL BLUE™
 - ii. Top Surface - STRONGHOLD™ Anti-Skid Technology: Polymer
 - iii. Bottom Release Liner - Silicone Split Release Poly
 - iv. Permeability - ASTM E96 - 00 0.01 perms
 - v. Nominal Thickness - ASTM D1777 - 40 mil (1 mm)
 - vi. Nail Sealability - ASTM D1970 - Pass
 - vii. Lap Sealability - ASTM D1970 - Pass
 - viii. Tensile Strength - ASTM D226 - 121 lbf/in. (21kN/m)
 - ix. Tear Strength - ASTM D4523 - 160 lbf/in. (28 kN/m)
 - x. Elongation - ASTM D2523-00 - 16%
 - xi. Low Temperature Flexibility - ASTM D1970 - -22 F (-30 C) - Pass
 - xii. Adhesion to Plywood - ASTM D1876 - 55 lbf/in.:75 F (9.6 kN/m: 24 C)
 - xiii. Adhesion to Plywood - ASTM D1876 - 23 lbf/in.: 40 F (4 kN/m: 4.4 C)
 - xiv. UV Exposure - ASTM G90 - 6 months
 - xv. Temperature Range - ASTM D1970 - LT: 15 F (-9 C) to HT: 250 F (121 C)
 - xvi. Dimensions - 36 in. x 66.7 ft. (91.4 cm x 20.3 m)

2.6 MISCELLANEOUS MATERIALS

- A. Internal Panel Framing: Manufacturer's standard.
- B. Fasteners: Manufacturer's standard noncorrosive types, with exterior heads gasketed.
- C. Accessories: Except as indicated as work of another specification section, provide components required for a complete roofing/siding system, including:
 1. Trim
 2. Copings
 3. Fascias
 4. Gravel stops
 5. Mullions
 6. Sills
 7. Corner Units
 8. Ridge Closures

9. Clips
 10. Seam Covers
 11. Battens
 12. Flashings

 13. Gutters
 14. Downspouts
 15. Louvers
 16. Sealants
 17. Gaskets
 18. Fillers
 19. Closure Strips
 20. All similar items.
 21. Match materials/finishes of preformed panels.
- D. Bituminous Coating: Cold-applied asphalt mastic, SSPC paint 12, compounded for 15 mil dry film thickness per coat.

2.7 SHEET METAL ACCESSORIES

- A. General: Provide coated steel sheet metal accessories with coated steel roofing and siding panels.
- B. Gauges of Materials:
 1. Roof Panels - 24 ga.
 2. Rake Flashing - 26 ga.
 3. Fascia – 26 ga.
- C. Roof Curbs: The fully welded roof curb units shall be fabricated to the specifications of the roofing manufacturer, thus assuring its compatibility with the roof constructions framing and covering. Roof curbs shall be of size and design to accommodate the various projecting elements to be retained. The contractor is responsible for verification of the various sizes, configurations, and requirements. It is expected that the contractor use the existing conditions, surfaces, and elements as a source material for these requirements. The roof curb shall be of size and design required for fan, vent, or air conditioning equipment. It shall support the specific ventilating device in a nominally horizontal position above the weather surface of the roof and adequately deflect storm drainage around its periphery. All sealants, closures, and fasteners, etc. shall be included for proper installation and performance. Roof subframing and/or headers shall be provided for additional rigidity and support of the curb and its ventilating device. Roof vent curb and supporting framing shall provide for expected expansion and contraction of roof panels.
- D. Roof Jacks: Openings 8" in diameter or smaller may be flashed and sealed to the roof panel by jacks. Material shall be an EPDM material with an aluminum sealing ring base. Jacks are acceptable providing attachment in flat of panel and no standing seam rib has been altered. If rib must be cut, a curb must be used. Installation of roof jacks must comply with manufacturer's instructions.

PART 3 - EXECUTION

3.1 PRE-ROOFING CONFERENCE

- A. A pre-roofing conference is required before any roofing materials are installed. This conference shall be conducted by a representative of the Architect and attended by representatives of the Owner, General Contractor, Roofing Contractor, Sheet Metal Contractor, Roof Deck Manufacturer (if applicable), and the Roofing Materials Manufacturer (if warranty is required of this manufacturer). If equipment of substantial size is to be placed on the roof, the Mechanical Contractor must also attend this meeting. Provide at least 72 hours advance notice to participants prior to convening pre-roofing conference.
- B. The pre-roofing conference is intended to clarify demolition 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. If this pre-roofing conference cannot be satisfactorily concluded without further inspection and investigation by any of the parties present, it shall be reconvened at the earliest possible time to avoid delay of the work. In no case should the work proceed without inspection of all roof deck areas and substantial agreement on all points.
- C. The following are to be accomplished during the conference:
 - 1. To review all Factory Mutual and Underwriters Laboratories requirements listed in the specifications and resolve any questions or conflicts that may arise.
 - 2. To establish trade-related job schedules, including the installation of roof-mounted mechanical equipment.
 - 3. To 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. To establish those areas on the job site that will be designated as work and storage areas for roofing operations.
 - 6. To establish weather and working temperature conditions to which all parties must agree.
 - 7. To 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.
- D. The Architect 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 General Contractor and the Owner.

3.2 INSTALLATION

- A. General: Comply with panel fabricator's and material manufacturer's instructions and recommendations for installation, as applicable to project conditions and supporting substrates. Anchor panels and other components of the work securely in place, with provisions for thermal/structural movement.
 - 1. Install panels with concealed fasteners.
- B. Installation Tolerances: Shim and align panel units within installed tolerance of 1/4" in 20'-0" on level/plumb/slope and location/line as indicated, and within 1/8" offset of adjoining faces and of alignment of matching profiles.
- C. Joint Sealers: Install gaskets, joint fillers and sealants where indicated and where required for weatherproof performance of panel systems. Provide types of gaskets and sealants/fillers indicated or, if not otherwise indicated, types recommended by panel manufacturer.
- D. Refer to other sections of these specifications for product and installation requirements applicable to indicated joint sealers.

- E. Water shall be prevented from entering the building during the work. This shall involve keeping penetrations sealed, planning the work to reroof sections, and sealing new to old or other precautionary and effective safeguards.

3.3 ROOFING

- A. General: Arrange and nest sidelap joints so that prevailing winds blow over, not into, lapped joints. Apply panels and associated items for neat and weathertight enclosure. Avoid “panel creep” or application not true to line. Protect factory finishes from damage.
 - 1. Provide weatherseal under ridge cap. Flash and seal roof panels at eave and rake with rubber, neoprene, or other closures to exclude weather.
- B. Standing Seam Roof Panel System: Fasten roof panels to hat channels with concealed clip in accordance with the manufacturer’s instructions.
 - 1. Install clips at each support using self-drilling fasteners.
 - 2. At end laps of panels install two strips of tape caulk between panels.
 - 3. Install factory-caulked cleats at standing seam joints. Machine seam cleats to the panels to provide a weather-tight joint.
- C. Sheet Metal Accessories: Install gutters, downspouts, ventilators, louvers, and other sheet metal accessories in accordance with manufacturer’s recommendations for positive anchorage to building and weathertight mounting. Adjust operating mechanism for precise operation.

3.4 CLEANING AND PROTECTION

- A. Damaged Units: Replace panels and other components of the work which have been damaged or have deteriorated beyond successful repair by means of finish touch-up or similar minor repair procedures.
- B. Cleaning: Remove temporary protective coverings and strippable films (if any) as each panel is installed. Upon completion of panel installation, clean finished surfaces as recommended by panel manufacturer and maintain in a clean condition during construction.

END OF SECTION

SECTION 07421 – METAL WALL PANELS

PART 1 – GENERAL

1.1 SECTION INCLUDES

- A. Fluted-profile, concealed fastener, lap-seam metal wall panels, with related metal trim and accessories.

1.2 RELATED REQUIREMENTS

- A. Division 05 Section "Structural Steel Framing" for steel framing supporting metal panels.
- B. Division 05 Section "Cold-Formed Metal Framing" for cold-formed metal framing supporting metal panels.
- C. Division 07 Section "Thermal Insulation" for thermal insulation installed behind metal panels.
- D. Division 07 Section "Air Barriers" for air barriers within wall assembly and adjacent to wall assembly.
- E. Division 07 Section "Metal Soffit Panels" for soffit panels installed with metal wall panels.
- F. Division 07 Section "Sheet Metal Flashing and Trim" for sheet metal flashing items in addition to items specified in this Section.
- G. Division 13 Section "Metal Building Systems" for steel framing supporting metal panels.

1.3 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 Pre-painted 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 E283 - Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
 - 7. ASTM E331 - Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference.
 - 8. 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.

1.4 QUALITY ASSURANCE

- A. Manufacturer/Source: Provide metal panel assemblies and accessories from a single manufacturer accredited under IAS AC472, Part B.
- B. Manufacturer Qualifications: Approved manufacturer listed in this Section with minimum five years experience in manufacture of similar products in successful use in similar applications.
 - 1. Approval of Comparable Products: Submit the following in accordance with project substitution requirements, within time allowed for substitution review:
 - a. Product data, including certified independent test data indicating compliance with requirements.
 - b. Samples of each component.
 - c. Sample shop drawings from similar project.
 - d. Project References: Minimum of five installations not less than three years old, with Owner and Architect contact information.
 - e. Sample warranty.
 - f. Certificate of accreditation under IAS AC472 Part B.
 - 2. Substitutions following award of contract are not allowed except as stipulated in Division 01 General Requirements.
 - 3. Approved manufacturers must meet separate requirements of Submittals Article.
- C. Installer Qualifications: Experienced Installer with minimum of five years experience with successfully completed projects of a similar nature and scope.
 - 1. Installer's Field Supervisor: Experienced mechanic supervising work on site whenever work is underway.

1.5 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.

1.6 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.

SECTION 07900 - JOINT SEALERS

PART 1 - GENERAL

1.1 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.

1.2 DESCRIPTION OF WORK

- A. The extent of each form and type of joint sealer is indicated on drawings and by provisions of this section.
- B. The applications for joint sealers as work of this section include the following:
 - 1. Joints (Exterior).
 - 2. Flashing Joints.
 - 3. Interior wall/ceiling joints.
- C. General Performance: Except as otherwise indicated, joint sealers are required to establish and maintain airtight and waterproof continuous seals on a permanent basis, within recognized limitations of wear and aging as indicated for each application. Failures of installed sealers to comply with this requirement will be recognized as failures of materials and workmanship.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's product specifications, handling/installation/curing instructions, and performance tested data sheets for each elastomeric product required.

1.4 JOB CONDITIONS

- A. Weather Conditions: Do not proceed with installation of liquid sealants under unfavorable weather conditions. Install elastomeric sealants when temperature by manufacturer for installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. General: Manufacturers listed in this article include those known to produce the indicated category of prime joint sealant material, either as a nominally pure generic product or as an equivalent-performance modification thereof or proprietary product.
- B. Manufacturers: The following manufacturer's products have been used to establish minimum standards for materials, workmanship and function:
 - 1. Acrylic Emulsion Latex Sealants:
 - a. Bostik.
 - b. Pecora Corp.
 - c. Sonneborn Building Products.
 - d. Tremco, Inc.
 - 2. Polyurethane Sealants:
 - a. Bostik.
 - b. Master Builders.
 - c. Pecora Corp.
 - d. Sonneborn Building Products.
 - e. Tremco, Inc.
 - 3. Butyl Sealants:

- a. Bostik.
- b. TEC Incorporated.
- c. Tremco, Inc.
- 4. Equal products of other manufacturers may be used in the work, provided such products have been approved by the Architect, not less than Ten (10) days prior to scheduled bid opening.

2.2 MATERIALS

- A. NOTE: The use of silicone sealants shall not be used at any exterior conditions.
- B. General Purpose Exterior Sealant: Polyurethane; ASTM C 920, Grade NS, Class 25, Uses M, G, and A; single component. (Silicone sealant shall not be used at exterior conditions).
 - 1. Color: Standard colors matching finished surfaces.
 - 2. Applications: Use for:
 - a. Control, expansion, and soft joints in masonry, stone or concrete.
 - b. Joints between concrete and other materials.
 - c. Joints between metal frames and other materials.
 - d. Other exterior joints for which no other sealant is indicated.
- C. Exterior Metal Lap Joint Sealant: Butyl or polyisobutylene, nondrying, nonskinning, noncuring.
 - 1. Applications: Use for:
 - a. Concealed sealant bead in sheet metal work.
- D. General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C 834, single component, paintable.
 - 1. Color: Standard colors matching finished surfaces.
 - 2. Applications: Use for:
 - a. Interior wall and ceiling control joints.
 - b. Joints between door and window frames and wall surfaces.
 - c. Other interior joints for which no other type of sealant is indicated.
- E. Acoustical Sealant: Butyl or acrylic sealant; ASTM C 920, Grade NS, Class 12-1/2, Uses M and A; single component, solvent release curing, nonskinning.
 - 1. Applications: Use for concealed locations only:
 - a. Sealant bead between top stud runner and structure and between bottom stud track and floor or wall.
- F. Paving Joint Sealant: Polyurethane, self-leveling; ASTM C 920, Class 25, Uses T, M and A; single component.
 - 1. Color: Standard color matching finished surfaces.
 - 2. Applications: Use for:
 - a. Joints in sidewalks and paving, either vehicular or pedestrian.
 - b. Isolation joints and control joints in slabs on grade.
- G. Bituminous and Fiber Joint Filler (BtmF-JF) provide resilient and non-extruding type premolded bituminous-impregnated fiberboard units complying with ASTM D 1751; FS HH-F-341, Type I; or AASHTO M213.

H. Miscellaneous Materials:

1. Joint Primer/Sealer: Provide type of joint primer/sealer recommended by sealant manufacturer for joint surfaces to be primed or sealed.
2. Bond Breaker Tape (BB-Tp): Provide polyethylene tape or other plastic tape as recommended by sealant manufacturer, to be applied to sealant-contact surfaces where bond to substrate or joint filler must be avoided for proper performance of sealant. Provide self-adhesive tape where applicable.
3. Sealant Backer Rod (S-BR): provide compressible rod stock of polyethylene foam, polyurethane foam, polyethylene jacketed polyurethane foam, butyl rubber foam, neoprene foam or other recommended by sealant manufacturer for back-up of and compatibility with sealant. Where used with hot-applied sealant, provide heat-resistant type which will not be deteriorated by sealant application temperature as indicated.
 - a. Rod Size to Joint Width: Size of all backer rod width shall be 2 times the width of joint/gap to be sealed.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Installer must examine substrate, (joint surfaces) and conditions under which joint sealer work is to be performed and must notify Prime Contractor of unsatisfactory conditions.

3.2 JOINT PREPARATION

- A. Clean joint surfaces immediately before installation of gaskets, sealants or caulking compounds. Remove dirt, insecure coatings, moisture and other substrate which could interfere with seal of gasket or bond of sealant or caulking compound. Etch concrete and masonry joint surfaces as recommended by sealant manufacturer. Roughen vitreous and glazed joint surfaces as recommended by sealant manufacturer.
- B. Prime or seal joint surfaces where indicated, and where recommended by sealant manufacturer. Confine primer/sealer to areas of sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.3 INSTALLATION

- A. Comply with manufacturer's printed instructions except where more stringent requirements are shown on specified, and except where manufacturer's technical representative directs otherwise.
- B. Set joint filler units at depth or position in joint as indicated to coordinate with other work, including installation of bond breakers, backer rods and sealant. Do not leave voids or gaps between ends of joint filler units.
- C. Install sealant backer rod for liquid-applied sealants, except where shown to be omitted or recommended to be omitted by sealant manufacturer for application indicated.
- D. Install bond breaker tape where indicated and where required by manufacturer's recommendations to ensure that liquid-applied sealants will perform as intended.
- E. Employ only proven installation techniques, which will ensure that sealants are deposited in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of joint bond surfaces equally on opposite sides. Except as otherwise indicated, fill sealant rabbet to a slightly concave surface, slightly below adjoining surfaces. Where horizontal joints are between a horizontal surface and vertical surface, fill joint to form a slight cove, so that joint will not trap moisture and dirt.
- F. Install sealant to depths as shown or, if not shown, as recommended by sealant manufacturer but within the following general limitations, measured at center (thin) section of beads;
 - G. For normal moving joints sealed with elastomeric sealants but not subject to traffic, fill joints to a depth equal to 50% of joint width, but neither more than 1/2" deep nor less than 1/4" deep.
 - H. Spillage: Do not allow sealants or compounds to overflow from confines of joints, or to spill onto adjoining work, or to migrate into voids of exposed finishes. Clean adjoining surfaces by whatever means may be necessary to eliminate evidence of spillage.

- I. Recess exposed edges of gaskets and exposed joint fillers slightly behind adjoining surfaces, unless otherwise shown, so that compressed units will not protrude from joints.
- J. Bond ends of gaskets together with adhesive of "weld" by other means as recommended by manufacturer to ensure continuous watertight and airtight performance. Miter-cut and bond ends at corners unless molded corner units are provided.

3.4 CURE AND PROTECTION

- A. Cure sealants and caulking compounds in compliance with manufacturer's instructions and recommendations, to obtain high early bond strength, internal cohesive strength and surface durability. Advise Prime Contractor of procedures required for cure and protection of joint sealers during construction period, so that they will be without deterioration or damage (other than normal wear and weathering) at time of substantial completion. Cure and protect sealants in manner which will minimize increases in modulus of elasticity and other accelerated aging effects. Replace or restore sealants which are damaged or deteriorated during construction period.

END OF SECTION

SECTION 07600 - FLASHING AND SHEET METAL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract including General and Supplementary Conditions and Division 1 Specification Sections apply to work of this section.

1.2 DESCRIPTION OF WORK

- A. Extent of each type of flashing and sheet metal work is indicated on drawings and by provisions of this section.
- B. Types of work specified in this section include the following:
 - 1. Eave Strip/Drip Edge
 - 2. Fascia
 - 3. Soffit
 - 4. Gutters
 - 5. Downspouts
- C. Integral masonry flashings are specified as masonry work in sections of Division 4.

1.3 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); 2017a.
- B. ASTM B209 - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate; 2014.
- C. ASTM B209M - Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate (Metric); 2014.
- D. ASTM C920 - Standard Specification for Elastomeric Joint Sealants; 2018.
- E. ASTM D4479/D4479M - Standard Specification for Asphalt Roof Coatings - Asbestos-Free; 2007, with Editorial Revision (2012).
- F. ASTM D4586/D4586M - Standard Specification for Asphalt Roof Cement, Asbestos-Free; 2007, with Editorial Revision (2012).
- G. SMACNA (ASMM) - Architectural Sheet Metal Manual; 2012.

1.4 SUBMITTALS

- A. Product Data; Flashing, Sheet Metal, Accessories: Submit manufacturer's product data, installation instructions and general recommendations for each specified sheet material and fabricated product.

1.5 JOB CONDITIONS

- A. Coordinate work of this section with interfacing and adjoining work for proper sequencing of each installation. Ensure best possible weather resistance and durability of work and protection of materials and finishes.

PART 2 - PRODUCTS

2.1 SHEET METALS

- A. Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24 gage thick base metal, shop pre-coated with PVDF (Polyvinylidene Fluoride) coating.
- B. Finish: The exposed finish on all exposed metals and similar items shall consist of a 70% KYNAR 500® resin base coating applied to a cleaned, pretreated and primed surface. The dry film

thickness of the exterior coating shall not be less than .90 mil minimum, inclusive primer. The interior color finish shall consist of a backer coat with a dry film thickness of 0.5 mil. A low gloss finish is required to minimize the appearance of oil canning,

- a. Colors: As selected by Architect after Bid Date, from manufacturer's standard colors including white.

2.2 GUTTERS

- A. Gutters: Provide flat shapes, no rolled formed stiffeners or ribbed allowed. Form gutters in "continuous" sections not less than 8 feet in length, complete with end pieces, outlet tubes and other special pieces as may be required. Join sections with riveted and soldered or sealed joints. Provide expansion-type slip joint at center of runs.

1. Furnish gutter supports spaced at 36" on center constructed of same metal as gutters.

- B. Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24 gage thick base metal, shop pre-coated with PVDF (Polyvinylidene Fluoride) coating.
- C. Finish: The exposed finish on all exposed metals and similar items shall consist of a 70% KYNAR 500® resin base coating applied to a cleaned, pretreated and primed surface. The dry film thickness of the exterior coating shall not be less than .90 mil minimum, inclusive primer. The interior color finish shall consist of a backer coat with a dry film thickness of 0.5 mil. A low gloss finish is required to minimize the appearance of oil canning,
 - a. Colors: As selected by Architect after Bid Date, from manufacturer's standard colors including white.

2.3 DOWNSPOUTS

- A. Downspouts: Form downspouts in sections approximately 10 feet long (**no corrugated sections**), complete with elbows and offsets. Join sections with not less than 1-1/2" telescoping joints. Provide fasteners, designed to securely hold downspouts not less than 1" away from walls; locate fasteners at top and bottom and equally spaced at approximately 5 feet on center in between.
- B. Pre-Finished Galvanized Steel: ASTM A653/A653M, with G90/Z275 zinc coating; minimum 24 gage thick base metal, shop pre-coated with PVDF (Polyvinylidene Fluoride) coating.
- C. Finish: The exposed finish on all exposed metals and similar items shall consist of a 70% KYNAR 500® resin base coating applied to a cleaned, pretreated and primed surface. The dry film thickness of the exterior coating shall not be less than .90 mil minimum, inclusive primer. The interior color finish shall consist of a backer coat with a dry film thickness of 0.5 mil. A low gloss finish is required to minimize the appearance of oil canning,
 - a. Colors: As selected by Architect after Bid Date, from manufacturer's standard colors including white.

2.4 METAL SOFFIT SYSTEM – STEEL SOFFIT

- A. Manufacturer: The following manufacturers' products have been used to establish minimum standard for materials, workmanship and function:
 1. PAC-CLAD (Basis of Design); www.pac-clad.com; 1005 Tonne Road, Elk Grove Village, IL 60007; Ph: 800-PAC-CLAD
 2. MBCI Manufacturing; www.mbc.com; 2280 Monier Avenue, Lithia Springs, Georgia, 30122; Phone: 844.2506 or 770.729.4772.
 3. Morin / A Kingspan Group Company; www.kingspan.com/us/en-us/product-groups/metal-roof-wall-systems; 1975 Eidson Drive, Florida, 32724; Phone: 860.584.0900 or 800.640.9501
- B. Equal products of other manufacturers may be used in the work, provided such products have been approved by the Architect, not less than Ten (10) days prior to scheduled bid opening.
- C. MATERIALS - FORMED METAL SOFFIT PANELS

1. **PAC-CLAD Flush Profile, Concealed Fastener Metal Soffit Panels:** Structural metal panels consisting of formed metal sheet with vertical panel edges and flat pan, with flush joints between panels, field assembled with nested lapped edges, and attached to supports using concealed fasteners.
 - a. 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.
 - i. Nominal Thickness: 24 gauge (Standard) coated thickness, with smooth surface.
 - ii. Panel Width: 12 inches.
 - iii. Panel Thickness: 1 inch.
 - iv. Flush Narrow (Vented) Panels as indicated on drawings.
 - v. Flush Solid (Non-Vented) Panels as indicated on drawings.
2. Finish: The exposed finish on all exposed metals and similar items shall consist of a 70% KYNAR 500® resin base coating applied to a cleaned, pretreated and primed surface. The dry film thickness of the exterior coating shall not be less than .90 mil minimum, inclusive primer. The interior color finish shall consist of a backer coat with a dry film thickness of 0.5 mil. A low gloss finish is required to minimize the appearance of oil canning.
 - a. Colors: As selected by Architect after Bid Date, from manufacturer's standard colors including white.

2.5 METAL SOFFIT SYSTEM – ALUMINUM SOFFIT

- A. Manufacturers: The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function:
 1. Ply Gem/Mastic Aluminum Soffit (Basis of Design)
 2. Alside Aluminum Soffits
 3. Kaycan Aluminum
 4. Equal products of other manufacturers may be used in the work, provided such products have been approved by the Architect, not less than Ten (10) days prior to scheduled bid opening.
- B. Materials:
 1. Perforated Aluminum Soffit for ventilation
 - a. Envoy V-Groove by PlyGem/Mastic
 - b. 15 sq. in/Lin. ft..
 - c. Alumalure 2000 finish
 - d. .019" thick
 - e. 12" exposure or as indicated on drawings.

2.6 MISCELLANEOUS MATERIALS & ACCESSORIES

- A. Solder:
 1. For use with steel or copper, provide 50 - 50 tin/lead solder (ASTM B 32), with rosin flux.
 2. For use with stainless steel: Provide 60 - 40 tin/lead solder (ASTM B 32), with acid-chloride type flux, except use rosin flux over tinned surfaces.
- B. Fasteners: Same metal as flashing/sheet metal or, other noncorrosive metal as recommended by sheet manufacturer. Match finish of exposed heads with material being fastened.
- C. Bituminous Coating: FS TT-C-494 or SSPC - Paint 12, solvent type bituminous mastic, nominally free of sulfur, compounded for 15-mil dry film thickness per coat.

- D. Mastic Sealant: Polyisobutylene; nonhardening, nonskinning, non- drying, nonmigrating sealant.
- E. Epoxy Seam Sealer: 2-part noncrossive metal seam cementing compound, recommended by metal manufacturer for exterior/interior non-moving joints including riveted joints.
- F. Adhesives: Type recommended by flashing sheet manufacturer for waterproof/ weather-resistant seaming and adhesive application of flashing sheet.
- G. Paper Slip Sheet: 5-lb. rosin-sized building paper.
- H. Polyethylene Underlayment: 6-mil carbonated polyethylene film; FS L-P-512.
- I. Reglets: Metal or plastic units of type and profile indicated, compatible with flashing indicated, noncrossive.
- J. Metal Accessories: Provide sheet metal clips, straps, anchoring devices and similar accessory units as required for installation of work, matching or compatible with material being installed, noncrossive, size and gage required for performance.
- K. Roofing Cement: Must be compatible with materials with which it comes in contact.
- L. Provide precast concrete splashblock sloped away from building, approximately 12-inches wide x 24-inches long x 2-inches thick x 3-inches high, with 3-raised edges and one "open" end turned toward building – at locations where downspouts would otherwise drain on grade or paving.
 - 1. Provide 1-preformed metal pan with corrugated bottom and properly hemmed edges (minimum 12" x 24") at each downspout which drains onto a roof below.

2.9 FABRICATED UNITS

- A. General Metal Fabrication: Shop-fabricate work to greatest extent possible. Comply with details shown, and with applicable requirements of SMACNA "Architectural Sheet Metal Manual" and other recognized industry practices. Fabricate for waterproof and weather-resistant performance; with expansion provisions for running work, sufficient to permanently prevent leakage, damage or deterioration of the work. Form work to fit substrates. Comply with material manufacturer instructions and recommendations for forming material. Form exposed sheet metal work without excessive oil-canning, buckling and tool marks, true to line and levels indicated, with exposed edges folded back to form hems.
- B. Seams: Fabricate nonmoving seams in sheet metal with flat-lock seams. For metal other than aluminum, tin edges to be seamed, form seams, and solder. Form aluminum seams with epoxy seam sealer; rivet joints for additional strength where required.
- C. Expansion Provisions: Where lapped or bayonet-type expansion provisions in work cannot be used, or would not be sufficiently water/weatherproof, form expansion joints of intermeshing hooked flanges, not less than 2" deep, filled with mastic sealant (concealed within joints).
- D. Sealant Joints: Where movable, non-expansion type joints are indicated or required for proper performance of work, form metal to provide for proper installation of elastomeric sealant, in compliance with SMACNA standards.
- E. Separations: Provide for separation of metal from noncompatible metal or corrosive substrates by coating concealed surfaces at locations of contact, with bituminous coating or other permanent separation as recommended by manufacturer/fabricator.

PART 3 - EXECUTION

3.1 INSTALLATION REQUIREMENTS

- A. General: Except as otherwise indicated, comply with manufacturer's installation instructions and recommendations, and with SMACNA "Architectural Sheet Metal Manual".
 - 1. Anchor units of work securely in place by methods indicated, providing for thermal expansion of metal units; conceal fasteners where possible, and set units true to line and level as indicated. Install work with laps, joints and seams which will be permanently watertight and weatherproof.

- B. Underlayment: Where aluminum is to be installed directly on cementitious or wood substrates, install a slip sheet of red rosin paper and a course of polyethylene underlayment.
- C. Bed flanges of work in a thick coat of bituminous roofing cement where required for waterproof performance.
- D. Install reglets to receive counter-flashing in manner and by methods indicated. Where shown in concrete, furnish reglets to trades of concrete work for installation as work of Division-3 sections. Where shown in masonry, furnish reglets to trades of masonry work, for installation as work of Division-4 sections.
 - 1. Install counter-flashing in reglets, either by snap-in seal arrangement, or by wedging in place for anchorage and filling reglet with mastic or elastomeric sealant, as indicated and depending on degree of sealant exposure.

3.2 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces, removing substances which might cause corrosion of metal or deterioration of finishes.
- B. Protection: Installer shall advise Contractor of required procedures for surveillance and protection of flashings and sheet metal work during construction, to ensure that work will be without damage or deterioration, other than natural weathering, at time of substantial completion.

END OF SECTION

SECTION 07900 - JOINT SEALERS

PART 1 - GENERAL

1.1 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.

1.2 DESCRIPTION OF WORK

- A. The extent of each form and type of joint sealer is indicated on drawings and by provisions of this section.
- B. The applications for joint sealers as work of this section include the following:
 - 1. Joints (Exterior).
 - 2. Flashing Joints.
 - 3. Interior wall/ceiling joints.
- C. General Performance: Except as otherwise indicated, joint sealers are required to establish and maintain airtight and waterproof continuous seals on a permanent basis, within recognized limitations of wear and aging as indicated for each application. Failures of installed sealers to comply with this requirement will be recognized as failures of materials and workmanship.

1.3 SUBMITTALS

- A. Product Data: Submit manufacturer's product specifications, handling/installation/curing instructions, and performance tested data sheets for each elastomeric product required.

1.4 JOB CONDITIONS

- A. Weather Conditions: Do not proceed with installation of liquid sealants under unfavorable weather conditions. Install elastomeric sealants when temperature by manufacturer for installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. General: Manufacturers listed in this article include those known to produce the indicated category of prime joint sealant material, either as a nominally pure generic product or as an equivalent-performance modification thereof or proprietary product.
- B. Manufacturers: The following manufacturer's products have been used to establish minimum standards for materials, workmanship and function:
 - 1. Acrylic Emulsion Latex Sealants:
 - a. Bostik.
 - b. Pecora Corp.
 - c. Sonneborn Building Products.
 - d. Tremco, Inc.
 - 2. Polyurethane Sealants:
 - a. Bostik.
 - b. Master Builders.
 - c. Pecora Corp.
 - d. Sonneborn Building Products.
 - e. Tremco, Inc.
 - 3. Butyl Sealants:

- a. Bostik.
- b. TEC Incorporated.
- c. Tremco, Inc.
- 4. Equal products of other manufacturers may be used in the work, provided such products have been approved by the Architect, not less than Ten (10) days prior to scheduled bid opening.

2.2 MATERIALS

- A. NOTE: The use of silicone sealants shall not be used at any exterior conditions.
- B. General Purpose Exterior Sealant: Polyurethane; ASTM C 920, Grade NS, Class 25, Uses M, G, and A; single component. (Silicone sealant shall not be used at exterior conditions).
 - 1. Color: Standard colors matching finished surfaces.
 - 2. Applications: Use for:
 - a. Control, expansion, and soft joints in masonry, stone or concrete.
 - b. Joints between concrete and other materials.
 - c. Joints between metal frames and other materials.
 - d. Other exterior joints for which no other sealant is indicated.
- C. Exterior Metal Lap Joint Sealant: Butyl or polyisobutylene, nondrying, nonskinning, noncuring.
 - 1. Applications: Use for:
 - a. Concealed sealant bead in sheet metal work.
- D. General Purpose Interior Sealant: Acrylic emulsion latex; ASTM C 834, single component, paintable.
 - 1. Color: Standard colors matching finished surfaces.
 - 2. Applications: Use for:
 - a. Interior wall and ceiling control joints.
 - b. Joints between door and window frames and wall surfaces.
 - c. Other interior joints for which no other type of sealant is indicated.
- E. Acoustical Sealant: Butyl or acrylic sealant; ASTM C 920, Grade NS, Class 12-1/2, Uses M and A; single component, solvent release curing, nonskinning.
 - 1. Applications: Use for concealed locations only:
 - a. Sealant bead between top stud runner and structure and between bottom stud track and floor or wall.
- F. Paving Joint Sealant: Polyurethane, self-leveling; ASTM C 920, Class 25, Uses T, M and A; single component.
 - 1. Color: Standard color matching finished surfaces.
 - 2. Applications: Use for:
 - a. Joints in sidewalks and paving, either vehicular or pedestrian.
 - b. Isolation joints and control joints in slabs on grade.
- G. Bituminous and Fiber Joint Filler (BtmF-JF) provide resilient and non-extruding type premolded bituminous-impregnated fiberboard units complying with ASTM D 1751; FS HH-F-341, Type I; or AASHTO M213.

H. Miscellaneous Materials:

1. Joint Primer/Sealer: Provide type of joint primer/sealer recommended by sealant manufacturer for joint surfaces to be primed or sealed.
2. Bond Breaker Tape (BB-Tp): Provide polyethylene tape or other plastic tape as recommended by sealant manufacturer, to be applied to sealant-contact surfaces where bond to substrate or joint filler must be avoided for proper performance of sealant. Provide self-adhesive tape where applicable.
3. Sealant Backer Rod (S-BR): provide compressible rod stock of polyethylene foam, polyurethane foam, polyethylene jacketed polyurethane foam, butyl rubber foam, neoprene foam or other recommended by sealant manufacturer for back-up of and compatibility with sealant. Where used with hot-applied sealant, provide heat-resistant type which will not be deteriorated by sealant application temperature as indicated.
 - a. Rod Size to Joint Width: Size of all backer rod width shall be 2 times the width of joint/gap to be sealed.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Installer must examine substrate, (joint surfaces) and conditions under which joint sealer work is to be performed and must notify Prime Contractor of unsatisfactory conditions.

3.2 JOINT PREPARATION

- A. Clean joint surfaces immediately before installation of gaskets, sealants or caulking compounds. Remove dirt, insecure coatings, moisture and other substrate which could interfere with seal of gasket or bond of sealant or caulking compound. Etch concrete and masonry joint surfaces as recommended by sealant manufacturer. Roughen vitreous and glazed joint surfaces as recommended by sealant manufacturer.
- B. Prime or seal joint surfaces where indicated, and where recommended by sealant manufacturer. Confine primer/sealer to areas of sealant bond; do not allow spillage or migration onto adjoining surfaces.

3.3 INSTALLATION

- A. Comply with manufacturer's printed instructions except where more stringent requirements are shown on specified, and except where manufacturer's technical representative directs otherwise.
- B. Set joint filler units at depth or position in joint as indicated to coordinate with other work, including installation of bond breakers, backer rods and sealant. Do not leave voids or gaps between ends of joint filler units.
- C. Install sealant backer rod for liquid-applied sealants, except where shown to be omitted or recommended to be omitted by sealant manufacturer for application indicated.
- D. Install bond breaker tape where indicated and where required by manufacturer's recommendations to ensure that liquid-applied sealants will perform as intended.
- E. Employ only proven installation techniques, which will ensure that sealants are deposited in uniform, continuous ribbons without gaps or air pockets, with complete "wetting" of joint bond surfaces equally on opposite sides. Except as otherwise indicated, fill sealant rabbet to a slightly concave surface, slightly below adjoining surfaces. Where horizontal joints are between a horizontal surface and vertical surface, fill joint to form a slight cove, so that joint will not trap moisture and dirt.
- F. Install sealant to depths as shown or, if not shown, as recommended by sealant manufacturer but within the following general limitations, measured at center (thin) section of beads;
 - G. For normal moving joints sealed with elastomeric sealants but not subject to traffic, fill joints to a depth equal to 50% of joint width, but neither more than 1/2" deep nor less than 1/4" deep.
 - H. Spillage: Do not allow sealants or compounds to overflow from confines of joints, or to spill onto adjoining work, or to migrate into voids of exposed finishes. Clean adjoining surfaces by whatever means may be necessary to eliminate evidence of spillage.

- I. Recess exposed edges of gaskets and exposed joint fillers slightly behind adjoining surfaces, unless otherwise shown, so that compressed units will not protrude from joints.
- J. Bond ends of gaskets together with adhesive of "weld" by other means as recommended by manufacturer to ensure continuous watertight and airtight performance. Miter-cut and bond ends at corners unless molded corner units are provided.

3.4 CURE AND PROTECTION

- A. Cure sealants and caulking compounds in compliance with manufacturer's instructions and recommendations, to obtain high early bond strength, internal cohesive strength and surface durability. Advise Prime Contractor of procedures required for cure and protection of joint sealers during construction period, so that they will be without deterioration or damage (other than normal wear and weathering) at time of substantial completion. Cure and protect sealants in manner which will minimize increases in modulus of elasticity and other accelerated aging effects. Replace or restore sealants which are damaged or deteriorated during construction period.

END OF SECTION

SECTION 08100 - STEEL DOORS AND FRAMES

PART 1 – GENERAL

1.1 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.

1.2 SUMMARY

- A. This Section includes:
 - 1. Steel Doors
 - 2. Steel Frames.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 4 Section "Unit Masonry" for building anchors into and grouting frames in masonry construction.
 - 2. Division 8 Section "Wood Doors" for solid-core wood doors installed in steel frames.
 - 3. Division 8 Section "Finish Hardware" for door hardware and weatherstripping.
 - 4. Division 8 Section "Glazing" for glass in steel doors and sidelights.
 - 5. Division 9 Section "Gypsum Board Assemblies".
 - 6. Division 9 Section "Painting".

1.3 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product Data for each type of door and frame specified, including details of construction, materials, dimensions, hardware preparation, core, label compliance, sound ratings, profiles, and finishes.
- C. Shop Drawings showing fabrication and installation of steel doors and frames. Include details of each frame type, elevations of door design types, conditions at openings, details of construction, location and installation requirements of door and frame hardware and reinforcements, and details of joints and connections. Show anchorage and accessory items.
- D. Door Schedule: Submit schedule of doors and frames using same reference numbers for details and openings as those on Contract Drawings.
 - 1. Indicate coordination of glazing frames and stops with glass and glazing requirements.
- E. Samples for initial selection in the form of manufacturer's color charts showing the full range of colors available for factory-finished doors and frames.
- F. Samples for verification of each type of exposed finish required, prepared on Samples not less than 3 by 5 inches (75 by 125 mm) and of same thickness and material indicated for final unit of Work. Where finishes involve normal color and texture variations, include Sample sets showing the full range of variations expected.
- G. Oversize Construction Certification: For door assemblies required to be fire rated and exceeding limitations of labeled assemblies, submit certification of a testing agency acceptable to authorities having jurisdiction that each door and frame assembly has been constructed to conform to design, materials, and construction equivalent to requirements for labeled construction.

1.4 QUALITY ASSURANCE

- A. Provide doors and frames complying with ANSI/SDI 100 "Recommended Specifications for Standard Steel Doors and Frames" and as specified.

- B. Fire-Rated Door Assemblies: Units that comply with NFPA 80, are identical to door and frame assemblies tested for fire-test-response characteristics per ASTM E 152, and are labeled and listed by UL, Warnock Hersey, or another testing and inspecting agency acceptable to authorities having jurisdiction.
 - 1. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a testing agency acceptable to authorities having jurisdiction that doors conform to all standard construction requirements of tested and labeled fire-rated door assemblies except for size.
 - 2. Temperature-Rise Rating: Where indicated, provide doors that have a temperature-rise rating of 450 deg F (250 deg C) maximum in 30 minutes of fire exposure.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver doors and frames cardboard-wrapped or crated to provide protection during transit and job storage. Provide additional protection to prevent damage to finish of factory-finished doors and frames.
- B. Inspect doors and frames on delivery for damage. Minor damages may be repaired provided refinished items match new work and are acceptable to Architect; otherwise, remove and replace damaged items as directed.
- C. Store doors and frames at building site under cover. Place units on minimum 4-inch- (100-mm-) high wood blocking. Avoid using non-vented plastic or canvas shelters that could create a humidity chamber. If cardboard wrappers on doors become wet, remove cartons immediately. Provide minimum 1/4-inch (6-mm) spaces between stacked doors to promote air circulation.

PART 2 – PRODUCTS

2.1 MANUFACTURER

- A. Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
 - 1. Pioneer Industries
 - 2. Rocky Mountain Metals, Inc.
 - 3. Republic Doors & Frames/Allegion
 - 4. Steelcraft - Allegion

2.2 MATERIALS

- A. Hot-Rolled Steel Sheets and Strip: Commercial-quality carbon steel, pickled and oiled, complying with ASTM A 569 (ASTM A 569M).
- B. Cold-Rolled Steel Sheets: Carbon steel complying with ASTM A 366 (ASTM A 366M), commercial quality, or ASTM A 620 (ASTM A 620M)
- C. Galvannealed Steel Sheets: Galvannealed Steel Sheet: ASTM A 653/ A 653M, commercial quality, hot dipped. Coating Thickness: A60 coating.
- D. Supports and Anchors: Fabricated from not less than 0.0478-inch- (1.2-mm-) thick steel sheet; 0.0516-inch- (1.3-mm-) thick galvanized steel where used with galvanized steel frames.
- E. Inserts, Bolts, and Fasteners: Manufacturer's standard units. Where items are to be built into exterior walls, hot-dip galvanize complying with ASTM A 153, Class C or D as applicable.

2.3 DOORS

- A. Steel Doors: Provide 1-3/4-inch- (44-mm-) thick doors of materials and ANSI/SDI 100 grades and models specified below, or as indicated on Drawings or schedules:
 - 1. Interior Doors: Grade 2, heavy-duty, Model 1, visible edge seam design, 18 gauge / minimum 0.0478-inch thick cold-rolled steel sheet faces.

2. Exterior Doors: Grade 3, heavy-duty, Model 1, visible edge seam design, 16 gauge / minimum 0.0635-inch thick A60 galvanized steel sheet faces.
- B. Door Louvers: Provide louvers according to SDI 111C for interior doors where indicated, with blades or baffles formed of 0.0239-inch- (0.6-mm-) thick cold-rolled steel sheet set into minimum 0.0359-inch- (0.9-mm-) thick steel frame.
 1. Sight-Proof Louvers: Stationary louvers constructed with inverted V- shaped or Y-shaped blades.
- C. Low Profile Lite Kits: All lite kits must be minimum 18 ga. cold rolled steel, mitered and welded corners, welded reinforcing clips at corners, counter-sunk mounting screw- holes.

2.4 FRAMES

- A. Provide metal frames for doors, transoms, sidelights, borrowed lights, and other openings, according to ANSI/SDI 100, and of types and styles as shown on Drawings and schedules.
- B. Conceal fastenings, unless otherwise indicated. Fabricate frames as follows:
 1. Fabricate frames with mitered or coped and face welded corners.
 2. Interior Frames: 16 gage cold rolled steel
 3. Exterior Frames: 14 gage A60 galvanized steel.
- C. Door Silencers: Except on weather stripped frames, drill stops to receive 3 silencers on strike jambs of single-door frames and 2 silencers on heads of double-door frames.
- D. Plaster Guards: Provide minimum 0.0179-inch- (0.45-mm-) thick steel plaster guards or mortar boxes at back of hardware cutouts where mortar or other materials might obstruct hardware operation and to close off interior of openings.
- E. Grout: When required in masonry construction, as specified in Division 4 Section "Unit Masonry."

2.5 FABRICATION

- A. Fabricate steel door and frame units to be rigid, neat in appearance, and free from defects, warp, or buckle. Where practical, fit and assemble units in manufacturer's plant. Clearly identify work that cannot be permanently factory assembled before shipment, to assure proper assembly at Project site. Comply with ANSI/SDI 100 requirements.
 1. Internal Construction: One of the following manufacturer's standard core materials according to SDI standards:
 - a. Interior Doors: 3/4" Cell Honeycomb
 - b. Exterior Doors: Insulated Polystyrene
 2. Clearances:
 - a. Not more than 1/8 inch (3.2 mm) at jambs and heads, except not more than 1/4 inch (6.4 mm) between non-fire-rated pairs of doors.
 - b. Not more than 3/4 inch (19 mm) at bottom.
 - c. Fire Doors: Provide clearances according to NFPA 80.
 3. Tolerances: Comply with SDI 117 "Manufacturing Tolerances Standard Steel Doors and Frames."
- B. Galvanized Steel Doors, Panels, and Frames: For the following locations, fabricate doors, panels, and frames from galvanized steel sheet according to SDI 112.
 1. At exterior locations.
 2. Where indicated.
- C. Close top and bottom edges of doors flush as an integral part of door construction or by addition of minimum 0.0635-inch- (1.6-mm-) thick galvanized steel channels, with channel webs placed even with top and bottom edges. Seal joints in top edges of doors against water penetration.

- D. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat or oval heads for exposed screws and bolts.
- E. Thermal-Rated (Insulating) Assemblies: At exterior locations and elsewhere as shown or scheduled, provide doors fabricated as thermal-insulating door and frame assemblies and tested according to ASTM C 236 or ASTM C 976 on fully operable door assemblies.
 - 1. Unless otherwise indicated, provide thermal-rated assemblies with U- value rating of 0.41 Btu/sq. ft. x h x deg F (2.33 W/sq. m x K) or better
- F. Hardware Preparation: Prepare doors and frames to receive mortised and concealed hardware according to final door hardware schedule and templates provided by hardware supplier.
- G. Comply with applicable requirements of SDI 107 and ANSI A115 Series specifications for door and frame preparation for hardware.
 - 1. For concealed overhead door closers, provide space, cutouts, reinforcing, and provisions for fastening in top rail of doors or head of frames, as applicable.
- H. Reinforce doors and frames to receive surface-applied hardware. Drilling and tapping for surface-applied hardware may be done at Project site.
- I. Locate hardware as indicated on Shop Drawings or, if not indicated, according to the Door and Hardware Institute's (DHI) "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
- J. Glazing Stops: Minimum 0.0359-inch- (0.9-mm-) thick steel or 0.040-inch- (1-mm-) thick aluminum.
 - 1. Provide non-removable stops on outside of exterior doors and on secure side of interior doors for glass, louvers, and other panels in doors.
 - 2. Provide screw-applied, removable, glazing beads on inside of glass, louvers, and other panels in doors.

2.6 FINISHES, GENERAL

- A. Comply with NAAMM's "Metal Finishes Manual" for recommendations relative to applying and designating finishes.
- B. Comply with SSPC-PA 1, "Paint Application Specification No. 1," for steel sheet finishes. Apply primers and organic finishes to doors and frames after fabrication.

2.7 GALVANIZED STEEL SHEET FINISHES

- A. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in galvanized steel, with dry film containing not less than 94 percent zinc dust by weight, and complying with DOD-P-21035 or SSPC- Paint 20.
- B. Factory Priming for Field-Painted Finish: Where field painting after installation is indicated, apply air-dried primer specified below immediately after cleaning and pretreatment.
 - 1. Shop Primer: Zinc-dust, zinc-oxide primer paint complying with performance requirements of FS TT-P-641, Type II.

2.8 STEEL SHEET FINISHES

- A. Surface Preparation: Solvent-clean surfaces to comply with SSPC-SP 1 to remove dirt, oil, grease, and other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel to comply with SSPC-SP 5 (White Metal Blast Cleaning) or SSPC-SP 8 (Pickling).
- B. Pretreatment: Immediately after surface preparation, apply a conversion coating of type suited to organic coating applied over it.
- C. Factory Priming for Field-Painted Finish: Apply shop primer that complies with ANSI A224.1 acceptance criteria, is compatible with finish paint systems indicated, and has capability to provide a sound foundation for field-applied topcoats. Apply primer immediately after surface preparation and pretreatment.

PART 3 – EXECUTION

3.1 INSTALLATION

- A. General: Install steel doors, frames, and accessories according to Shop Drawings, manufacturer's data, and as specified.
- B. Placing Frames: Comply with provisions of SDI 105, unless otherwise indicated. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is completed, remove temporary braces and spreaders, leaving surfaces smooth and undamaged.
 - 1. Except for frames located in existing concrete, masonry, or gypsum board assembly construction, place frames before constructing enclosing walls and ceilings.
 - 2. In masonry construction, install at least 3 wall anchors per jamb adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Acceptable anchors include masonry wire anchors and masonry T-shaped anchors.
 - 3. At existing concrete or masonry construction, install at least 3 completed opening anchors per jamb adjacent to hinge location on hinge jamb and at corresponding heights on strike jamb. Set frames and secure to adjacent construction with bolts and masonry anchorage devices.
 - 4. Install fire-rated frames according to NFPA 80.
- A. Door Installation: Fit hollow-metal doors accurately in frames, within clearances specified in ANSI/SDI 100.
 - 1. Fire-Rated Doors: Install with clearances specified in NFPA 80.
 - 2. Smoke-Control Doors: Comply with NFPA 105.

3.2 ADJUSTING AND CLEANING

- A. Prime Coat Touchup: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply touchup of compatible air-drying primer.
- B. Protection Removal: Immediately before final inspection, remove protective wrappings from doors and frames.

END OF SECTION

SECTION 08211 - WOOD DOORS

PART 1 - GENERAL

1.1 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.

1.2 SUMMARY

- A. This Section includes the following:
 - 1. Solid core doors with wood veneer faces.
 - 2. Factory finishing of flush wood doors.
 - 3. Louvers for flush wood doors.

1.3 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.
- B. Product data for each type of door, including details of core and edge construction, trim for openings and louvers, and factory-finishing specifications.
- C. Shop drawings indicating location and size of each door, elevation of each kind of door, details of construction, location and extent of hardware blocking, fire ratings, requirements for veneer matching and factory finishing and other pertinent data.
 - 1. For factory-machined doors, indicate dimensions and locations of cutouts for locksets and other cutouts adjacent to light and louver openings.
- D. Samples for initial selection in the form of color charts consisting of actual materials in small sections for the following:
 - 1. Faces of factory-finished doors with transparent finish. Show the full range of colors available for stained finishes.
 - 2. Faces of factory-finished doors with opaque finish. Show the full range of colors available.
- E. Samples for verification in the form and size indicated below:
 - 1. Corner sections of doors approximately 12 inches (300 mm) square with door faces and edgings representing the typical range of color and grain for each species of veneer and solid lumber required. Finish sample with same materials proposed for factory-finished doors.

1.4 QUALITY ASSURANCE

- A. Quality Standard: Comply with the following standard:
 - 1. NWWDA Quality Standard: I.S.1-A, "Architectural Wood Flush Doors," of the National Wood Window and Door Association.
 - 2. AWI Quality Standard: "Architectural Woodwork Quality Standards" of the Architectural Woodwork Institute for grade of door, core, construction, finish, and other requirements.
- B. Fire-Rated Wood Doors: Provide wood doors that comply with NFPA 80; are identical in materials and construction to units tested in door and frame assemblies per ASTM E 152; and are labeled and listed by UL, Warnock Hersey, or another testing and inspection agency acceptable to authorities having jurisdiction.
 - 1. Oversized Fire-Rated Wood Doors: For door assemblies exceeding sizes of tested assemblies, provide manufacturer's certificate stating that doors conform to all standard construction requirements of tested and labeled fire-door assemblies except for size.
 - 2. Temperature Rise Rating: At stairwell enclosures, provide doors that have a temperature rise rating of 450 deg F (250 deg C) maximum in 30 minutes of fire exposure.

3. Temperature Rise Rating: At stairwell enclosures, provide doors that have a temperature rise rating of 250 deg F (139 deg C) maximum in 30 minutes of fire exposure.

- C. Single-Source Responsibility: Obtain doors from one source and by a single manufacturer.

1.5 DELIVERY, STORAGE & HANDLING

- A. Protect doors during transit, storage, and handling to prevent damage, soiling, and deterioration. Comply with requirements of referenced standard and manufacturer's instructions.
 1. Comply with Technical Bulletin 420-R for delivery, storage, and handling of doors.
- B. Identify each door with individual opening numbers as designated on shop drawings, using temporary, removable, or concealed markings.

1.6 PROJECT CONDITIONS

- A. Conditioning: Do not deliver or install doors until building is enclosed, wet work is complete, and HVAC system is operating and will maintain temperature and relative humidity at occupancy levels during the remainder of the construction period.

1.7 WARRANTY

- A. General Warranty: Door manufacturer's warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Door Manufacturer's Warranty: Submit written agreement on door manufacturer's standard form signed by manufacturer, Installer, and Contractor, agreeing to repair or replace defective doors that have warped (bow, cup, or twist) more than 1/4 inch (6.35 mm) in a 42-by-84-inch (1067-by-2134-mm) section or that show telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch (0.25 mm in a 75-mm) span, or do not conform to tolerance limitations of referenced quality standards.
 1. Warranty shall also include installation and finishing that may be required due to repair or replacement of defective doors where defect was not apparent prior to hanging.
 2. Warranty shall be in effect during the following period of time after date of Substantial Completion.
 - a. Solid Core Interior Doors: Life of installation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering doors that may be incorporated in the Work (No other Manufacturer to be used unless prior approved by addenda)
- B. Manufacturer: Subject to compliance with requirements, provide doors by one of the following:
 1. Oshkosh Door Company; 2501 Universal Street, P.O. Box 2468, Oshkosh, WI 54904; Ph.: 920.233.6161; www.oshkoshdoor.com.
 2. VT Industries; 1000 Industrial Park, P.O. Box 490, Holstein, IA 51025; Ph.: 712.368.4381; www.vtindustries.com.
 3. Haley Brothers, Inc.; 6291 Orangethorpe Ave., Buena Park, CA 90620; Ph.: 714.670.2112; www.haleybros.com.

2.2 INTERIOR FLUSH WOOD DOORS

- A. Solid Core Doors for Transparent Finish: Comply with the following requirements:
 1. Faces: Plain Sliced White Birch, Book/Run Matching
 2. Grade: Premium "A"

3. Construction: 5 ply, Hot Pressed
 4. Core: Particleboard Core to meet or exceed ANSI/A208.1 for 1-LD-1 or 1-LD-2 door core
 5. Bonding: Stiles and rails bonded to core, then entire unit abrasive planed before veneering.
 6. Pair Matching: Required at all pairs of doors.
- B. Fire-Rated Solid Core Doors: Comply with the following requirements:
1. Faces and Grade: Provide faces and grade to match non-fire-rated doors in same area of building, unless otherwise indicated.
 2. Construction: Manufacturer's standard core construction as required to provide fire-resistance rating indicated.
 3. Edge Construction: Provide manufacturer's standard laminated-edge construction for improved screw-holding capability and split resistance compatible hardwood
 4. Pairs: Furnish formed-steel edges and astragals for pairs of fire-rated doors, unless otherwise indicated.
 5. Pairs: Provide fire-rated pairs with fire-retardant stiles that are labeled and listed for kinds of applications indicated without formed-steel edges and astragals.

2.3 FABRICATION

- A. Fabricate flush wood doors to comply with following requirements:
1. In sizes indicated for job-site fitting.
 2. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels:
 - a. Comply with clearance requirements of referenced quality standard for fitting. Comply with requirements of NFPA 80 for fire-resistance-rated doors.
 3. Factory machine doors for hardware that is not surface applied. Locate hardware to comply with DHI-WDHS-3. Comply with final hardware schedules, door frame shop drawings, DHI A115-W series standards, and hardware templates.
 - a. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before proceeding with factory machining.
 - b. Metal Astragals: Pre-machine astragals and formed-steel edges for hardware for pairs of fire-rated doors.
- B. Openings: Cut and trim openings through doors to comply with applicable requirements of referenced standards for kind(s) of door(s) required.
1. Light Openings: Trim openings with moldings of material and profile indicated.
 2. Louvers: Factory install louvers in prepared openings.

2.4 SHOP PRIMING

- A. Transparent Finish: Shop-seal faces and edges of doors for transparent finish with stain (if required), other required pretreatments, and first coat of finish as specified.

2.5 FACTORY FINISHING

- A. General: Comply with referenced quality standard's requirements for factory finishing.
- B. Finish wood doors at factory.
- C. Transparent Finish: Comply with requirements indicated for grade, finish system, staining effect, and sheen.
1. Grade: Premium.
 2. Finish: AWI System TR-6 or better in Factory standard color as directed by the Architect.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine installed door frames prior to hanging door:
 - 1. Verify that frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with plumb jambs and level heads.
 - 2. Reject doors with defects.
- B. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Hardware: For installation see Division 8 Section "Door Hardware."
- B. Manufacturer's Instructions: Install wood doors to comply with manufacturer's instructions and referenced quality standard and as indicated.
 - 1. Install fire-rated doors in corresponding fire-rated frames according to requirements of NFPA 80.
- C. Job-Fit Doors: Align and fit doors in frames with uniform clearances and bevels as indicated below; do not trim stiles and rails in excess of limits set by manufacturer or permitted with fire-rated doors. Machine doors for hardware. Seal cut surfaces after fitting and machining.
 - 1. Fitting Clearances for Non-Fire-Rated Doors: Provide 1/8 inch (3.2 mm) at jambs and heads, 1/16 inch (1.6 mm) per leaf at meeting stiles for pairs of doors, and 1/8 inch (3.2 mm) from bottom of door to top of decorative floor finish or covering. Where threshold is shown or scheduled, provide 1/4-inch (6.4-mm) clearance from bottom of door to top of threshold.
 - 2. Fitting Clearances for Fire-Rated Doors: Comply with NFPA 80.
 - 3. Bevel non-fire-rated doors 1/8 inch in 2 inches (3-1/2 degrees) at lock and hinge edges.
 - 4. Bevel fire-rated doors 1/8 inch in 2 inches (3-1/2 degrees) on lock edge; trim stiles and rails only to extent permitted by labeling agency.
- D. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- E. Factory-Finished Doors: Restore finish after installation, if fitting or machining is required at the job site.

3.3 ADJUSTING AND PROTECTION

- A. Operation: Re-hang or replace doors that do not swing or operate freely.
- B. Finished Doors: Refinish or replace doors damaged during installation.
- C. Protect doors as recommended by door manufacturer to ensure that wood doors will be without damage or deterioration at the time of Substantial Completion.

END OF SECTION

SECTION 08410 - ALUMINUM STOREFRONTS

PART 1 - GENERAL

1.1 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.

1.2 DESCRIPTION OF WORK

- A. Extent of aluminum entrances and storefronts is indicated on drawings and schedules.
- B. Types of aluminum entrances required include the following:
 - 1. Frames for exterior entrances
 - 2. Frames for Exterior Glazed Windows.
- C. Glazing: Refer to "Glass and Glazing" section of Division 8 for glazing requirements for aluminum entrances and storefronts specified herein to be factory pre-glazed.

1.3 SYSTEM PERFORMANCES

- A. General: Provide exterior entrance and storefront assemblies that have been designed and fabricated to comply with requirements for system performance characteristics listed below as demonstrated by testing manufacturer's corresponding stock systems according to test methods designated. System shall be of design styles indicated. System components and accessories shall be from the same manufacturer, to the maximum extent possible.
- B. Thermal Movement: Allow for expansion and contraction resulting from ambient temperature range of 120 degree F.
- C. Wind Loading: Provide capacity to withstand loading indicated below, tested per ASTM E 330.
 - 1. Uniform pressure of 20 psf inward and 20 psf outward.
- D. Transmission Characteristics of Fixed Framing: Comply with requirements indicated below for transmission characteristics and test methods.
 - 1. Air and Water Leakages: Air infiltration of not more than 0.06 CFM per sq. ft. of fixed area per ASTM E 283 and no uncontrolled water penetration per ASTM E 331 at pressure differential of 6.24 psf (excluding operable door edges).
 - 2. Condensation Resistance: Not less than 51 CRF per AAMA 1502.7.
 - 3. Thermal Transmittance: U-value of not more than 0.65 Btu/(hr x sf x degree F) per AAMA 1503.1.
- E. Transmission Characteristics of Entrances: Provide entrance doors with jamb and head frames which comply with requirements indicated below for transmission characteristics and test methods.
 - 1. Air Leakage: Air infiltration per linear foot of perimeter crack of not more than 0.50 CFM for single doors and 1.0 CFM for pairs of doors per ASTM E 283 at pressure differential of 1.567 psf.
 - 2. Condensation Resistance: Not less than 48 CRF per AAMA 1502.7.
 - 3. Thermal Transmittance: U-value of not more than 0.93 Btu/(hr x sf x degree F) per AAMA 1503.1.

1.4 QUALITY ASSURANCE

- A. Drawings: Plans, elevations and details show spacings of members as well as profile and similar dimensional requirements of aluminum entrances and storefront work. Minor deviations will be accepted in order to utilize manufacturer's standard products when, in Architect's sole judgment, such deviations do not materially detract from design concept or intended performances.

1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's specifications, standard details, and installation recommendations for components of aluminum entrances and storefronts required for project, including test reports certifying that products have been tested and comply with performance requirements.
- B. Samples: Submit samples of each type and color of aluminum finish on 12" long sections of extrusions or formed shapes and on 6" square sheets. Where normal color and texture variations are to be expected, include 2 or more units in each set of samples showing limits of such variations.

PART 2 - PRODUCTS

2.1 ALUMINUM DOORS, FRAMES & STOREFRONTS

- A. Manufacturers: The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function:
 - 1. Kawneer North America
 - 2. Tubelite, Inc.
 - 3. Coral Industries, Inc./Coral Architectural Products
 - 4. YKK AP America, Inc.
 - 5. Oldcastle
 - 6. Record
- B. Equal products of other manufacturers may be used in the work, provided such products have been approved by the Architect, not less than Ten (10) days prior to scheduled bid opening.

2.2 MATERIALS AND ACCESSORIES

- A. Aluminum Members: Alloy and temper recommended by manufacturer for strength, corrosion resistance, and application of required finish; ASTM B 221 for extrusion, ASTM B 209 for sheet/plate.
- B. Fasteners: Aluminum, non-magnetic stainless steel, or other materials warranted by manufacturer to be noncorrosive and compatible with aluminum components.
 - 1. Do not use exposed fasteners except where unavoidable for application of hardware. Match finish of adjoining metal.
 - 2. Provide Phillips flat-head machine screws for exposed fasteners.
- C. Concealed Flashing: Dead-soft stainless steel, 26 gauge minimum, or extruded aluminum, 0.062" minimum, of an alloy and type selected by manufacturer for compatibility with other components.
- D. Brackets and Reinforcements: Manufacturer's high-strength aluminum units where feasible; otherwise, non-magnetic stainless steel or hot-dip galvanized steel complying with ASTM A 386.
- E. Concrete/Masonry Inserts: Cast-iron, malleable iron, or hot-dip galvanized steel complying with ASTM A 386.
- F. Bituminous Coatings: Cold-applied asphalt mastic complying with SSPC-PS 12, compounded for 30-mil thickness per coat.
- G. Compression Weatherstripping: Manufacturer's standard replaceable stripping of either molded neoprene gaskets complying with ASTM D 2000 or molded PVC gaskets complying with ASTM D 2287.
- H. Sliding Weatherstripping: Manufacturer's standard replaceable stripping of wool, polypropylene, or nylon woven pile, with nylon fabric or aluminum strip backing, complying with AAMA 701.2.

- I. Glass and Glazing Materials: Provide glass and glazing materials which comply with requirements of "Glass and Glazing" section of these specifications.

2.3 HARDWARE

- A. General: Hardware shall comply with requirements of the "Americans with Disabilities Act". Refer to hardware section of Division 8 for requirements for hardware items other than those indicated herein to be provided by manufacturer of aluminum entrances.
 1. Push/Pull Handles: CO-9 design, by Kawneer. Finish as per the Door Schedule.
 2. All other hardware shall be as per Section 08700, Finish Hardware.

2.4 FRAMING

- A. Types:
 1. Storefront type framing system for insulated exterior applications:
 - a. Framing system shall be equal to TriFab Versaglaze 451, by Kawneer.
- B. General:
 1. Support Members: Extruded aluminum alloy 6063-T6 or 6061-T6 complying with ASTM B-221.
 2. Flashing/Closures: Formed aluminum 5005-H34 alloy, min. thickness .040", complying with ASTM B-209.
 3. Cap System: Manufacturer's standard cap glazing system consisting of rectangular (rafter) and beveled (horizontal) glazing gaps which will secure all sides of each light of glass against negative and positive loads.
 4. Fasteners: A300 stainless steel.
 5. Sealant: Silicone (FS TT-S-0015 43A and TT-S-0023 o.c.)

2.5 FABRICATION

- A. Sizes and Profiles: Required sizes for door and frame units, including profile requirements, are indicated on drawings. Any variable dimensions are indicated, together with maximum and minimum dimensions required to achieve design requirements and coordination with other work.
- B. Prefabrication: To greatest extent possible, complete fabrication, assembly, finishing, hardware application, and other work before shipment to project site. Disassemble components only as necessary for shipment and installation.
 1. Preglaze door and frame units to greatest extent possible, in coordination with installation and hardware requirements.
 2. Do not drill and tap for surface-mounted hardware items until time of installation at project site.
 3. Perform fabrication operations, including cutting, fitting, forming, drilling and grinding of metal work in manner which prevents damage to exposed finish surfaces. For hardware, perform these operations prior to application of finishes.
- C. Welding: Comply with AWS recommendations to avoid discoloration; grind exposed welds smooth and restore mechanical finish.
- D. Reinforcing: Install reinforcing as necessary for performance requirements; separate dissimilar metals with bituminous paint or other separator which will prevent corrosion.
- E. Continuity: Maintain accurate relation of planes and angles, with hairline fit of contacting members.
- F. Fasteners: Conceal fasteners wherever possible.
- G. Weatherstripping: For exterior doors, provide compression weatherstripping against fixed stops; at other edges, provide sliding weatherstripping retained in adjustable strip mortised into door edge.

1. Provide EPDM/vinyl blade gasket weatherstripping in bottom door rail, adjustable for contact with threshold.

2.6 STOREFRONT FRAMING SYSTEM

- A. General: Provide inside-outside matched center glazed system with provisions for glass replacement. Shop-fabricate and preassemble frame components where possible.

2.7 ALUMINUM DOOR FRAMES

- A. Fabricate tubular and channel frame assemblies, as indicated, with either welded or mechanical joints in accordance with manufacturer's standards, reinforced as necessary to support required loads.

2.8 STILE-AND-RAIL TYPE ALUMINUM DOORS

- A. Frame: Provide tubular frame members, fabricated with mechanical joints using heavy inserted reinforcing plates and concealed tie-rods or j-bolts, or fabricate with structurally welded joints, at manufacturer's option.
- B. Design:
 1. **Provide doors equal to Model 500 by Kawneer, wide stile design with 8" high horizontal crossrail.**
- C. Glazing: Fabricate doors to facilitate replacement of glass or panels, without disassembly of door stiles and rails. Provide snap-on extruded aluminum glazing stops, with exterior stops anchored for non-removal.

2.9 FINISHES

- A. Baked Enamel Finish: Premium color selection equal to Kawneer #22 Stock Permafluor Architectural Coating (Hylar 5000 or Kynar 500), factory applied and oven baked for a topcoat thickness of 1.0 - 1.3 mils.
 1. Color to be selected by Architect after bid date from manufacturer standards
 2. Color selections MUST include "White".

PART 3 - EXECUTION

3.1 PREPARATION

- A. Field Measurement: Wherever possible, take field measurements prior to preparation of shop drawings and fabrication, to ensure proper fitting of work.

3.2 INSTALLATION

- A. Comply with manufacturer's instructions and recommendations for installation of aluminum entrances.
- B. Set units plumb, level, and true to line, without warp or rack of framing members, doors, or panels. Anchor securely in place, separating aluminum and other corrodible metal surfaces from sources of corrosion or electrolytic action at points of contact with other materials.
- C. Drill and tap frames and apply surface-mounted hardware items, complying with hardware manufacturer's instructions and template requirements. Use concealed fasteners wherever possible.
- D. Set sill members and other members in bed of sealant as indicated, or with joint fillers or gaskets as indicated to provide weathertight construction. Comply with requirements of Division 7 for sealants, fillers, and gaskets.
- E. Refer to "Glass and Glazing" section of Division 8 for installation of glass and spandrel panels indicated to be glazed into framing, and not preglazed by manufacturer.

3.3 ADJUST AND CLEAN:

- A. Adjust operating hardware to function properly, without binding, and to prevent tight fit at contact points and weatherstripping.
- B. Clean completed systems, inside and out, promptly after erection and installation of glass and sealants. Remove excess glazing and joint sealants, dirt, and other substances from aluminum surfaces.
- C. Institute protective measures and other precautions required to assure that aluminum entrances and storefronts will be without damage or deterioration, other than normal weathering, at time of acceptance.

END OF SECTION

SECTION 08700 - FINISH HARDWARE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract including General and Supplementary Conditions and Division 1 Specification Sections apply to this Section.

1.2 SUMMARY

- A. This Section includes items known commercially as finish or door hardware that are required for swing, sliding, and folding doors, except special types of unique hardware specified in the same sections as the doors and door frames on which they are installed.
- B. This Section includes the following:
 - 1. Hinges.
 - 2. Key control system.
 - 3. Lock cylinders and keys.
 - 4. Lock and latch sets.
 - 5. Bolts.
 - 6. Exit devices.
 - 7. Push/pull units.
 - 8. Closers.
 - 9. Overhead holders.
 - 10. Miscellaneous door control devices.
 - 11. Door trim units.
 - 12. Protection plates.
 - 13. Weather-stripping for exterior doors.
 - 14. Sound stripping for interior doors.
 - 15. Astragals or meeting seals on pairs of doors.
 - 16. Thresholds.
- C. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Division 8 Section "Standard Steel Doors and Frames" for silencers integral with hollow metal frames.
 - 2. Division 8 Section "Flush Wood Doors" for factory pre-fitting and factory pre-machining of doors for door hardware.
 - 3. Division 8 Section "Aluminum Entrances and Storefronts" for aluminum entrance door hardware, except cylinders.

1.3 HARDWARE ALLOWANCE

- A. Allowance of \$1,250.00 for Certified AHC (Architectural Hardware Consultant) – (document of certification from DHI must be provided) to visit job site upon substantial completion as directed by Architect. A written report will be required for the Owner, Architect, and Contractor

1.4 QUALITY ASSURANCE

- A. Door hardware supplier's responsibilities shall be as follows:
 - 1. Submittals: Submit through Contractor required product data, final hardware schedule;

separate keying schedule, and samples as specified in this Section, unless otherwise indicated.

2. **Hardware Review Meeting:** Hardware Supplier shall attend a scheduled "Hardware Review Meeting" with the Contractor, Owner and Architect representative. All Hardware products, hardware installation locations, finishes, color selections, ratings and keying is to be reviewed and discussed. The Hardware Supplier understands the Hardware Submittal is not deemed "Fully Approved" until the Owner has completed their review and given "Approval".
 3. **Construction Schedule:** Inform Contractor promptly of estimated times and dates that will be required to process submittals, to furnish templates, to deliver hardware, and to perform other work associated with furnishing door hardware for purposes of including this data in construction schedule. Comply with this schedule.
 4. **Coordination and Templates:** Assist Contractor as required to coordinate hardware with other work in respect to both fabrication and installation. Furnish Contractor with templates and deliver hardware to proper locations.
 5. **Product Handling:** Package, identify, deliver, and inventory door hardware specified in this Section.
 6. **Discrepancies:** Based on requirements indicated in Contract Documents in effect at time of door hardware selection, furnish types, finishes, and quantities of door hardware, including fasteners, and Owner's maintenance tools required to comply with specified requirements and as needed to install and maintain hardware. Furnish or replace any items of door hardware resulting from shortages and incorrect items at no cost to the Owner or Contractor. Obtain signed receipts from Contractor for all delivered materials.
- B. Contractor's responsibilities shall be as follows:
1. **Submittals:** Coordinate and process submittals for door hardware in same manner as submittals for other work.
 2. **Hardware Review Meeting:** Contractor is to schedule and attend a "Hardware Review Meeting" with the Owner, Hardware Supplier and Architect Representative. All Hardware products, hardware installation locations, finishes, color selections, ratings and keying is to be reviewed and discussed. The Contractor understands the Hardware Submittal is not deemed "Fully Approved" until the Owner has completed their review and given "Approval".
 3. **Construction Schedule:** Cooperate with door hardware supplier in establishing scheduled dates for submittals and delivery of templates and door hardware. Incorporate in construction schedule the times and dates related to furnishing hardware by door hardware supplier.
 4. **Coordination:** Coordinate door hardware with other Work. Furnish hardware supplier or manufacturer with shop drawings of other work where required or requested. Verify completeness and suitability of hardware with supplier. Coordinate all wiring, raceways, accesses and final connections to all electronic devices and components per manufacturer requirements for a fully functioning system.
 5. **Product Handling:** Provide secure lock-up for hardware delivered to the site. Inventory hardware jointly with representative of hardware supplier and issue signed receipts for all delivered materials.
 6. **Installation Information:** The general types and approximate quantities of hardware required for this Project are indicated at the end of this Section in order to establish Contractor's costs for installation and other work not included in allowance.
 7. No adjustments in Contract sum will be made for costs other than those covered by the allowances for subsequent increases or decreases in quantity of one or more hardware types that do not exceed 5 percent.

1.5 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification sections.

Renovations of the Arts Center To
Goshen High School for the
Pike County Schools
Troy, Alabama

FINISH HARDWARE
08700-2

- B. Product data including manufacturers' technical product data for each item of door hardware, installation instructions, maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
- C. Final hardware schedule coordinated with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.
 - 1. Upon return of the reviewed finish hardware schedule, arrange for a meeting with the Owner and representatives of Architect. A keying schedule will be established and submitted to the Architect and Owner. After review, the keying schedule will be returned to representatives of Finish Hardware Supplier so that permanent cylinders and keys can be prepared on a timely basis.

1.6 QUALITY ASSURANCE

- A. Substitutions: All substitution requests must be submitted before bidding and within the procedures and time frame as outlined in Division 1, General Requirements. Approval of products is at the discretion of the architect and his hardware consultant.
- B. Single Source Responsibility: Obtain each type of hardware (latch and lock sets, hinges, closers, etc.) from a single manufacturer.
- C. Supplier Qualifications: A recognized architectural door hardware supplier, with warehousing facilities in the Project's vicinity, that has a record of successful in-service performance for a minimum of 10 years, for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that employs an experienced " Certified "architectural hardware consultant (AHC)" as recognized by the Door and hardware Institute (DHI). All submittals shall be signed by an AHC who is available to Owner, Architect, and Contractor, at reasonable times during the course of the Work, for consultation.
- D. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and are identical to products tested by UL, Warnock Hersey, FM, or other testing and inspecting organization acceptable to authorities having jurisdiction for use on types and sizes of doors indicated in compliance with requirements of fire-rated door and door frame labels.

1.7 PRODUCT HANDLING

- A. Tag each item or package separately with identification related to final hardware schedule, and include basic installation instructions with each item or package.
- B. Packaging of door hardware is responsibility of supplier. As material is received by hardware supplier from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set number to match set numbers of approved hardware schedule. Two or more identical sets may be packed in same container.
- C. Inventory door hardware jointly with representatives of hardware supplier and hardware installer until each is satisfied that count is correct.
- D. Deliver individually packaged door hardware items promptly to place of installation (shop or Project site).
- E. Provide secure lock-up for door hardware delivered to the Project, but not yet installed. Control handling and installation of hardware items that are not immediately replaceable so that completion of the Work will not be delayed by hardware losses both before and after installation.

1.8 MAINTENANCE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

PART 2 - PRODUCTS

2.1 HINGES

A. MANUFACTURERES

1. Ives
2. McKinney
3. Bommer

B. MATERIAL:

1. Provide only template produced units
2. Provide Phillips flat-head or machine screws for installation of units, except furnish Phillips flat-head wood screws for installation of units in to wood. Finish screw heads to match surface of hinges or pivots.
3. Hinge pins, except as noted, are to be provided as follows:
 - a. Steel Hinges: Steel pins
 - b. Non-ferrous Hinges: Stainless steel pins
 - c. Exterior Doors: Use Non-Removable Pins
 - d. Interior Doors: Non-rising pins
 - e. Electric Hinges: Non-removable pins
4. Tips shall be flat button and matching plug, finished to match leaves.
5. Provide number of hinges indicated but not less than three (3) hinges for door leaf of 90" or less in height and one additional hinge for each 30" of additional height.
6. Provide ball bearing hinges of the type and weight suggested by the hinge manufacturer for each type of door application.

2.2 LOCK CYLINERS AND KEYING:

A. Manufacturers:

1. Falcon to match existing

B. Material:

1. Existing System: Grandmaster key the locks to the Owner's existing Falcon master key system. All lock cylinders shall be standard 6-pin Falcon. Match existing Falcon keyway. New key bittings created shall be an extension of existing Falcon factory key records. All lock cylinders shall be factory keyed by Falcon. All keys shall be factory cut by Falcon.
2. All lock cylinders shall be construction master keyed using drop ball method. Provide 10 construction master keys. General contractor shall void the construction key system at the completion of the project.
3. Review the keying system with the Owner and provide the type required (master, grandmaster or great-grandmaster), integrated into Owner's existing Falcon key system.
4. Metals: Construct lock cylinder parts from brass or bronze, stainless steel, or nickel silver.
5. Comply with Owner's instructions for master keying and, except as otherwise indicated, provide individual change key for each lock that is not designated to be keyed alike with a group of related locks.
6. Permanently inscribe each key with number of lock that identifies cylinder manufacturer's key symbol.
7. Key Material: Provide keys of nickel silver only.
8. Key Quantity: Furnish (4) change keys for each lock, (5) master keys for each master system, (5) grandmaster keys for each grandmaster system.
 - a. Deliver permanent keys to Owner via certified method, return receipt requested.

2.3 LOCKSETS AND LATCHSETS

A. MANUFACTURERES

1. Falcon MA Series, QG Design
2. Schlage L9000 Series, 17A Design
3. Sargent 8200 Series LNP Design

B. MATERIAL

1. Locksets and latch-sets of all manufacturers must conform to the requirements of Sub paragraphs 2 and be approved by the Architect.
2. Mortise Lock Type
 - a. Locksets and latch sets must conform to ANSI A156.2 Series 1000, Operational Grade 1, and be UL Listed.

2.4 EXIT DEVICES

A. MANUFACTURERES

1. Von Duprin 98 Series
2. Sargent 19-43-GL-8000 Series
3. Detex 10 Series

B. MATERIAL

1. All exit devices to be of one manufacturer and provided in same finish design as locksets.
2. Provide sex nuts and bolts for attachment of surface applied items to doors.
3. Devices shall be UL listed. Devices for fire rated openings shall bear factory installed UL markings that indicate approval for fire rated openings.
4. All exit devices shall be touch-bar type design.
5. All exit devices shall comply with ANSI A156.3, Grade 1.
6. Exit device lever trim shall be equal to Von Duprin break away vandal resistant #996L.
7. All exit devices shall be equipped with flush end caps.
8. All exit devices shall be equipped with guarded (deadlocking) latch bolts.
9. Security Indicators for "Keyed Cylinder Dogging" - Provide Von Duprin "CDSI", dogging indicator provides an at-a-glance verification of the status of the door from inside of the room. Visible "LOCKED" and "UNLOCKED" indicators show whether the device is undogged or dogged.
10. Security Indicators for "-2SI-Classroom Exit Device Locking Lever Trim". The "-2SI" Security Indicator provides an at-a-glance verification of the LOCKED/UNLOCKED status of the door from inside of the room. Facility staff to be able to lock/unlock outside exit device lever trim from classroom side of door, avoiding corridor exposure.
11. All exit devices shall be provided with anti-microbial coated stainless steel touch bars. Plastic touch pads or plastic covered touch pads will not be accepted.
12. All exit devices are to be installed using through-bolts. All exit devices and exit device strikes shall be installed using manufacturer's supplied fasteners. Substitution of manufacturer's fasteners will not be allowed.

2.5 CLOSERS

A. MANUFACTURERES

1. LCN 4000 series

Renovations of the Arts Center To
Goshen High School for the
Pike County Schools
Troy, Alabama

FINISH HARDWARE
08700-5

2. Corbin DC8000 Series
3. Norton 9500 Series

B. MATERIAL

1. Size of units: Except as otherwise specifically indicated, comply with the manufacturer's recommendations for size of door control unit, depending upon size of door, exposure to weather and anticipated frequency of use.
 - a. Where parallel arms are indicated for closers, provide closer unit one size larger than recommended for use with standard arms.
 - b. Where manual closers are indicated for doors required to be accessible to the physically handicapped, provide adjustable units, ANSI opening force and delayed action closing.
2. Closers are to be fully hydraulic, rack and pinion action with high strength cast iron cylinders and one piece forged steel pistons. Closer Piston diameter for all closers shall be minimum 1½". Hydraulic regulation to be controlled by tamper-proof, non-critical screw valves, adjustable with a hex by tamper-proof, non-critical screw valves, adjustable with a hex wrench. Separate adjustments for back check, general speed, and latch speed. Where detailed in the door hardware sets, provide delayed action feature to delay closing up to one minute for maximum opening to approximately 75. Back check shall be properly located for protection of the door, frame and applied hardware.
3. All door closers shall comply with ANSI A156.4 Grade 1 and meet the standards of ANSI A117.1 for barrier-free accessibility.
4. Provide closers with full metal covers.
5. All closers are to be through bolt mounted. All door closers are to be installed using manufacturer supplied fasteners. Substitution of manufacturers supplied fasteners is not permitted.
6. All surface door closers are to be provided with required mounting brackets, mounting plates, drop plates, shims, spacers, arms, special templating, etc. as required for the specified closer and arm function, whether specified in the door hardware sets or not.

2.6 OVERHEAD STOPS AND HOLDERS

A. MANUFACTURERES

1. Glynn Johnson
2. Sargent
3. Rixson

B. MATERIAL

1. Conform to ANSI A156.8 Grade 1.

2.7 PUSH/PULLS & PROTECTION PLATES

A. MANUFACTURERES

1. Ives
2. Trimco
3. Burns

B. MATERIAL

1. Provide manufacturers standard exposed fasteners for installation, through bolted for matched pairs, but not of single units.
2. Provide 16 gauge minimum thickness for plates.
3. Where specified in the schedule, push/pulls shall have an antimicrobial coating.

2.8 THRESHOLDS, WEATHERSTRIPPING & GASKETING

A. MANUFACTURERES

1. Zero
2. National Guard
3. Pemko

B. MATERIAL

1. Provide continuous weather-stripping at each edge of every exterior door leaf, except as otherwise indicated.
2. Provide type, size and profile shown as scheduled.
3. Provide non-corrosive fasteners as recommended by manufacturer for application indicated. Do not specify adhesive backed weather-strip or gasket material.
4. Where replaceable seal strips are scheduled, provide only those units where resilient or flexible seal strip is easily replaceable from stocks maintained by manufacturer.
5. Proved standard metal threshold unit of type, size and profile shown as scheduled.

2.9 FINISHES

- A. Hardware finishes shall conform to ANSI and shall be as listed below for aluminum, FRP, hollow metal and wood doors:

B. Finishes Table:

Butt Hinges	Exterior Doors: 630. Interior Doors: 652, satin chrome on plain steel.
Continuous Geared Aluminum Hinges	Wood Doors: DKB finish. Hollow Metal Doors: 628 Finish. Aluminum Doors: Provide custom color anodized aluminum or custom color Kynar paint finish as req'd to match finish specified for frame and door.
Flush Bolts	626 Satin Chrome Plated
Locksets	626 Satin Chrome Plated
Exit Devices	626 Satin Chrome Plated with 630 Satin Stainless Steel touch bars
Door Closers	689 Powder Coat Aluminum
Push Plates	630 Satin Stainless Steel
Anti-Vandal Pulls	630 Satin Stainless Steel
Pull Plates	630 Satin Stainless Steel
Offset Pulls	629-316 Polished Stainless Steel
Protective Plates	630 Satin Stainless Steel
Door Stops	626 Satin Chrome Plated
Overhead Holders	630 Satin Stainless Steel

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install each hardware item in compliance with manufacturer's instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, install each item completely and then remove and store in a secure place during the finish application. After completion of the finishes, reinstall each item.
1. Do not install surface mounted items until finishes have been completed on the substrate.

- B. Conform to ANSI A117.1 for positioning requirements for the handicapped.

3.2 PROTECTION AND CLEANING

- A. After installation, clean metal surfaces on both interior and exterior of all mortar, paint and other contaminants. After cleaning, protect work against damage.

3.3 FINAL ADJUSTMENT

- A. Whenever hardware is installed more than one month prior to occupancy or acceptance, return during the week prior to acceptance or occupancy and make a final inspection and adjustment of all hardware items in such space or area.

3.4 SCHEDULE

HARDWARE SET: 01

DOOR NUMBER:

102A

EACH TO HAVE:

2	CONTINUOUS GEAR HINGES	224XY 628	IVE
1	KEYED REMOVABLE MULLION	KR4954	VON
1	EXIT DEVICE W/VISIBLE AT DISTANCE LOCKED/UNLOCKED SECURITY INDICATORS	CDSI-98-DT-990DT-SNB	VON
1	EXIT DEVICE W/VISIBLE AT DISTANCE LOCKED/UNLOCKED SECURITY INDICATORS	CDSI-98-NL-990NL-SNB	VON
1	RIM CYLINDER	951P6	FAL
3	MORTISE CYLINDERS	985/986 P6 AS REQ'D	FAL
2	SURFACE CLOSERS W/DEAD STOP AND HOLD OPEN	4111 SHCUSH 30 61 TBSRT	LCN
2	ARMOR PLATES	8400 34" X 1 ½" LDW B-CS	IVE
1	MULLION SEAL	139N PSA	ZER
1	THRESHOLD	65A	ZER
2	SWEEPS	8192AA	ZER
1	WEATHER STRIP	8144S-BK-PSA	ZER
2	MEETING EDGE SEALS	326AA	ZER

HARDWARE SET: 02

DOOR NUMBER:

106

EACH TO HAVE:

1	CONTINUOUS GEAR HINGES	224XY	IVE
1	CLASSROOM SECURITY LOCKSET W/INSIDE SECURITY INDICATOR	MA441P6 SI	FAL
1	SURFACE CLOSERS	4011 TBSRT	LCN
1	KICK PLATE	8400 10" X 1 ½" LDW B-CS	IVE
1	MOP PLATE	8400 6" X 1" LDW B-CS	IVE
1	SURFACE OVERHEAD STOP	90S SNB	GLY
1	GASKET SEAL	188S-BK-PSA	ZER

Renovations of the Arts Center To
Goshen High School for the
Pike County Schools
Troy, Alabama

FINISH HARDWARE
08700-8

HARDWARE SET: 03

DOOR NUMBER:

106A

106B

ALL HARDWARE PROVIDED BY DOOR SUPPLIER/MFG

HARDWARE SET: 04

DOOR NUMBER:

108

108A

111

EACH TO HAVE:

3	BUTT HINGES	5BB1 4.5 X 4.5 NRP	IVE
1	LOCKSET	MA581P6	FAL
1	SURFACE CLOSERS	4111 30 61 TBSRT (OMIT AT DOOR 111)	LCN
1	KICK PLATE	8400 10" X 1 ½" LDW B-CS	IVE
1	MOP PLATE	8400 6" X 1" LDW B-CS	IVE
1	WALL STOP	WS401/402CVX	IVE
3	SILENCERS	SR64	IVE

HARDWARE SET: 05

DOOR NUMBER:

107

110

EACH TO HAVE:

1	CONT. HINGES	224XY	IVE
1	PUSH / PULL LATCH	HL6-5-B-E1-A	SCH
1	SURFACE CLOSER	4011 TBSRT	LCN
1	KICK PLATE	8400 10" X 1 ½" LDW B-CS	IVE
1	MOP PLATE	8400 6" X 1" LDW B-CS	IVE
1	WALL STOP	WS401/402CVX	IVE
1	GASKET SEAL	188S-BK-PSA	ZER

HARDWARE SET: 06

DOOR NUMBER:

109

112

EACH TO HAVE:

1	CONT. HINGES	224XY	IVE
1	PUSH PLATE	8200 8" X 16"	IVE
1	PULL PLATE	8303 8" PULL, 4" X 16" PLATE	IVE
1	SURFACE CLOSER	4011 TBSRT	LCN
1	KICK PLATE	8400 10" X 1 ½" LDW B-CS	IVE
1	MOP PLATE	8400 6" X 1" LDW B-CS	IVE
1	WALL STOP	WS401/402CVX	IVE
3	SILENCERS	SR64	IVE

HARDWARE SET: 07

DOOR NUMBER:

101

101A

EACH TO HAVE:

3	BUTT HINGES	5BB1 4.5 X 4.5	IVE
1	PASSAGE SET	MA101	FAL
1	SURFACE CLOSER	4020T TBSRT	LCN
1	CLOSER MOUNT BRACKET	4020T-18 TBSRT	LCN
1	KICK PLATE	8400 10" X 1 ½" LDW B-CS	IVE
1	MOP PLATE	8400 6" X 1" LDW B-CS	IVE
1	WALL STOP	WS401/402CVX	IVE
3	SILENCERS	SR64	IVE

HARDWARE SET: 08

DOOR NUMBER:

104

EACH TO HAVE:

2	CONT. HINGES	224XY	IVE
2	FLUSH BOLTS	458-12	IVE
1	DUSTR PROOF STRIKE	DP2	IVE
1	CLASSROOM FUNCTION LOCKSET	MA561P6	FAL
2	KICK PLATE	8400 10" X 1 ½" LDW B-CS	IVE
2	MOP PLATES	8400 6" X 1" LDW B-CS	IVE
2	WALL STOP/HOLDERS	WS445/449-TYPE AS REQ'D	IVE
2	SILENCERS	SR64	IVE

HARDWARE SET: 09

DOOR NUMBER:

103

106C

EACH TO HAVE:

3	BUTT HINGES	5BB1 4.5 X 4.5	IVE
1	OFFICE LOCKSET	MA521P6	FAL
1	KICK PLATE	8400 10" X 1 ½" LDW B-CS	IVE
1	MOP PLATE	8400 6" X 1" LDW B-CS	IVE
1	WALL STOP	WS401/402CVX	IVE
3	SILENCERS	SR64	IVE

HARDWARE SET: 10

DOOR NUMBER:

100A

EACH TO HAVE:

2	CONTINUOUS GEAR HINGES	224XY DKB	IVE
1	KEYED REMOVABLE MULLION	KR4954	VON
1	EXIT DEVICE W/QUIET MOTION	QM-98-EO-996EO-SNB	VON
1	EXIT DEVICE W/CLASSROOM SECURITY OPTION AND QUIET MOTION	QM-98-L-2SI-QM996L-SNB	VON
2	RIM CYLINDER	951P6	FAL
1	MORTISE CYLINDER	985/986 P6 AS REQ'D	FAL
2	SURFACE CLOSERS	4111 30 61 TBSRT	LCN
2	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	IVE
2	MOP PLATE	8400 6" X 1" LDW B-CS	IVE
2	WALL STOP	WS401/402CVX	IVE
2	SILENCERS	SR64	IVE
1	MULLION SEAL	139N PSA	ZER
1	GASKET SEAL	188S-BK-PSA	ZER
2	MEETING EDGE SEALS	326AA	ZER

HARDWARE SET: 11

DOOR NUMBER:

100

EACH TO HAVE:

2	CONTINUOUS GEAR HINGES	224XY DKB	IVE
1	KEYED REMOVABLE MULLION	KR9954	VON
1	EXIT DEVICE W/QUIET MOTION	QM-98-EO-F-996EO-SNB	VON
1	EXIT DEVICE W/CLASSROOM SECURITY OPTION AND QUIET MOTION	QM-98-L-F-2SI-996L-SNB	VON
2	RIM CYLINDER	951P6	FAL
1	MORTISE CYLINDER	985/986 P6 AS REQ'D	FAL
2	SURFACE CLOSERS	4111 30 61 TBSRT	LCN
2	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	IVE
2	MOP PLATE	8400 6" X 1" LDW B-CS	IVE
2	WALL STOP	WS401/402CVX	IVE
1	MULLION SEAL	139N PSA	ZER
1	GASKET SEAL	188S-BK-PSA	ZER
2	MEETING EDGE SEALS	326AA	ZER

Renovations of the Arts Center To
Goshen High School for the
Pike County Schools
Troy, Alabama

FINISH HARDWARE
08700-11

HARDWARE SET: 12

DOOR NUMBER:

105

EACH TO HAVE:

2	CONTINUOUS GEAR HINGES	224XY DKB	IVE
1	EXIT DEVICE W/QUIET MOTION	9827-EO-F-LBR-996EO-SNB	VON
1	EXIT DEVICE W/CLASSROOM SECURITY OPTION AND QUIET MOTION	9827-L-F-2SI-LBR-996L-SNB	VON
2	RIM CYLINDER	951P6	FAL
1	MORTISE CYLINDER	985/986 P6 AS REQ'D	FAL
2	SURFACE CLOSERS	4111 30 61 TBSRT	LCN
2	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	IVE
2	WALL MOUNTED ELECTRO-MAGNETIC DOOR HOLDERS	SEM-7850 PROVIDE EXTENSIONS AS REQUIRED GIVEN WALL CONDITIONS. HARDWARE SUPPLIER SHALL COORDINATE	LCN
1	GASKET SEAL	188S-BK-PSA	ZER
2	MEETING EDGE SEALS	326AA	ZER

HARDWARE SET: 13

DOOR NUMBER:

101B

EACH TO HAVE:

6	BUTT HINGES	5BB1HW 4.5 X 4.5 NRP	IVE
1	EXIT DEVICE W/CLASSROOM SECURITY OPTION AND QUIET MOTION	QM-9827-L-2SI-LBR-QM996L-SNB	VON
1	EXIT DEVICE W/QUIET MOTION	QM-9827-EO-LBR-996EO-SNB	VON
2	RIM CYLINDER	951P6	FAL
2	SURFACE CLOSERS	4111 30 61 TBSRT	LCN
2	KICK PLATE	8400 10" X 1 1/2" LDW B-CS	IVE
2	MOP PLATE	8400 6" X 1" LDW B-CS	IVE
2	WALL STOP	WS401/402CVX	IVE
2	SILENCERS	SR64	IVE
1	MULLION SEAL	139N PSA	ZER
1	GASKET SEAL	188S-BK-PSA	ZER
2	MEETING EDGE SEALS	326AA	ZER

HARDWARE SET: 14

DOOR NUMBER:

102

EACH TO HAVE:

6	BUTT HINGES	5BB1HW 4.5 X 4.5 NRP	IVE
2	FLUSH BOLTS	458-12	IVE
1	MORTISE EXIT DEVICE W/CLASSROOM SECURITY OPTION AND QUIET MOTION	QM-9875-L-2SI-996L-SNB	VON
2	CYLINDERS	RIM/MORTISE TYPE AS REQ'D	FAL
1	SURFACE CLOSER	4111 30 61 TBSRT (ACTIVE LEAF ONLY)	LCN
2	KICK PLATE	8400 10" X 1 ½" LDW B-CS	IVE
2	MOP PLATE	8400 6" X 1" LDW B-CS	IVE
2	WALL STOPS	WS401/402CVX	IVE
1	GASKET SEAL	188S-BK-PSA	ZER

HARDWARE SET: 15

DOOR NUMBER:

100B

EACH TO HAVE:

3	BUTT HINGES	5BB1HW 4.5 X 4.5 NRP	IVE
1	EXIT DEVICE W/CLASSROOM SECURITY OPTION AND QUIET MOTION	QM-98-L-2SI-QM996L-SNB	VON
2	RIM CYLINDER	951P6	FAL
1	SURFACE CLOSER	4111 30 61 TBSRT	LCN
1	KICK PLATE	8400 10" X 1 ½" LDW B-CS	IVE
1	MOP PLATE	8400 6" X 1" LDW B-CS	IVE
1	WALL STOP	WS401/402CVX	IVE
1	GASKET SEAL	188S-BK-PSA	ZER

HARDWARE SET: AL-01

DOOR NUMBER:

113B

EACH TO HAVE:

2	CONTINUOUS GEAR HINGES	112XY	IVE
1	KEYED REMOVABLE MULLION	KR4954	VON
1	EXIT DEVICE W/VISIBLE AT DISTANCE LOCKED/UNLOCKED SECURITY INDICATORS	CDSI-35A-EO-299	VON
1	EXIT DEVICE W/VISIBLE AT DISTANCE LOCKED/UNLOCKED SECURITY INDICATORS	CDSI-35A-NL-OP-388-299	VON
1	RIM CYLINDER	951P6	FAL
3	MORTISE CYLINDERS	985/986 P6 AS REQ'D	FAL
2	SPECIAL OFFSET VERTICAL PULLS	8190EZHD-18-O MOUNT (INSTALL TOP FASTENER CENTERLINE 2" ABOVE TOP OF EXIT HEAD OR EXTERIOR 388 CYLINDER PLATE, WHICHEVER IS TALLER)	IVE
2	SURFACE CLOSERS TOP JAMB MOUNT	4021 TBSRT	LCN
2	CLOSER MOUNT PLATE	4020-18G TBSRT	LCN
1	MULLION SEAL	139N PSA	ZER
1	THRESHOLD	65A	ZER
1	WEATHER SEALS	PROVIDED BY FRAME/DOOR SUPPLIER/MFG	

HARDWARE SET: AL-02

DOOR NUMBER:

113A

EACH TO HAVE:

2	CONTINUOUS GEAR HINGES	112XY	IVE
2	DUMMY PUSH BARS	350	VON
2	SPECIAL OFFSET VERTICAL PULLS	8190EZHD-18-O MOUNT (INSTALL SAME MOUNTING HEIGHT AS DOOR 113B)	IVE
2	SURFACE CLOSERS TOP JAMB MOUNT	4021 TBSRT	LCN
2	CLOSER MOUNT PLATE	4020-18G TBSRT	LCN
1	WEATHER SEALS	PROVIDED BY FRAME/DOOR SUPPLIER/MFG	

END OF SECTION

SECTION 09250 - GYPSUM DRYWALL

PART 1 - GENERAL

1.1 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.

1.2 DESCRIPTION OF WORK

- A. Types of work include:
 - 1. Gypsum drywall at walls and ceilings.
 - 2. Drywall finishing (joint tape-and-compound treatment).

1.3 QUALITY ASSURANCE

- A. Fire-Resistance Ratings: Where gypsum drywall systems with fire- resistance ratings are indicated, provide materials and installations which are identical with those of applicable assemblies tested per ASTM E 119 by fire testing laboratories acceptable to authorities having jurisdiction.
 - 1. Provide fire-resistance rated assemblies identical to those indicated by reference to GA File No.'s. in GA "Fire Resistance Design Manual" or to design designations in UL "Fire Resistance Directory" or in listing of other testing and agencies acceptable to authorities having jurisdiction.
- B. Gypsum Board Terminology Standard: GA-505 by Gypsum Association.
- C. Single-Source Responsibility: Obtain gypsum board products from a single manufacturer, or from manufacturers recommended by the prime manufacturer of gypsum boards.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's product specifications and installation instructions for each gypsum drywall component, including other data as may be required to show compliance with these specifications.

1.5 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials in original packages, containers or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store material inside under cover and in manner to keep them dry, protected from weather, direct sunlight, surface contamination, corrosion and damage from construction traffic and other causes. Neatly stack gypsum boards flat to prevent sagging.
- C. Handle gypsum boards to prevent damage to edges, ends or surfaces. Protect metal corner beads and trim from being bent or damaged.

1.6 PROJECT CONDITIONS

- A. Environmental Requirements, General: Comply with requirements of referenced gypsum board application standards and recommendations of gypsum board manufacturer, for environmental conditions before, during and after application of gypsum board.
- B. Cold Weather Protection: When ambient outdoor temperatures are below 55 degrees F maintain continuous, uniform, comfortable building working temperatures of not less than 55 degrees F for a minimum period of 48 hours prior to, during and following application of gypsum board and joint treatment materials or bonding of adhesives.
- C. Ventilation: Ventilate building spaces as required to remove water in excess of that required for drying of joint treatment material immediately after its application. Avoid drafts during dry, hot weather to prevent too rapid drying.

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function:
 - 1. Gypsum Board and Related Products:
 - a. Georgia-Pacific Corp.
 - b. Gold Bond Building Products Div., National Gypsum Co.
 - c. United States Gypsum Co.
 - d. CertainTeed Corporation
 - e. Lafarge North America
- B. Equal products of other manufacturers may be used in the work, provided such products have been approved by the Architect, not less than Ten (10) days prior to scheduled bid opening.

2.2 MATERIALS

- A. Gypsum Wallboard: ASTM C 36, of types, edge configuration and thickness indicated below; in maximum lengths available to minimize end-to-end butt joints.
 - 1. Provide Type "X" fire-resistant at all locations unless otherwise where identified by a UL Listing or Classification or as denoted on the drawings.
 - 2. Provide Type "C", fire-resistant where identified by a UL Listing or Classification where denoted on the drawings.
 - 3. Impact/Penetration Resistant Type "X" fire-resistant at locations as identified on the drawings. Equal to Hi-Impact Brand 2000 Fire Shield by National Gypsum. Tested in accordance with ASTM C36/C 1396 Type X, ASTM E 695, ASTM D 1037, ASTM D4977 and ASTM D 4060.
 - 4. Provide Type "MR" moisture resistant, where gypsum board is shown at all wet areas (Restrooms, etc.) install 5/8" moisture resistant gypsum board at all wet walls where plumbing fixtures are shown.
 - 5. Thickness: 5/8" unless otherwise indicated.
 - 6. Edges: Manufacturer's standard.

2.3 TRIM ACCESSORIES

- A. General: Provide manufacturer's standard trim accessories of types indicated for drywall work, formed of galvanized steel unless otherwise indicated, with either knurled and perforated or expanded flanges for nailing or stapling, and beaded for concealment of flanges in joint compound. Provide corner beads, L-type edge trim-beads, U-type edge trim-beads, special L-kerf-type edge trim-beads, and one-piece control joint beads.
- B. Non-Beaded Trim: Non-beaded trim shall not be used, except with specific approval by the Architect.

2.4 JOINT TREATMENT MATERIALS

- A. General: ASTM C 475; type recommended by the manufacturer for the application indicated, except as otherwise indicated.
- B. Joint Tape: Paper reinforcing tape.
- C. Joint Compound: Ready-mixed vinyl-type for interior use.
 - 1. Grade: A single multi-purpose grade, for entire application.

2.5 MISCELLANEOUS MATERIALS

- A. General: Provide auxiliary materials for gypsum drywall work of the type and grade recommended by the manufacturer of the gypsum board.

- B. Gypsum Board Screws: Comply with ASTM C 646.
- C. Gypsum Board Nails: Comply with ASTM C 514.
- D. Concealed Acoustical Sealant: Nondrying, nonhardening, nonskinning, nonstaining, nonbleeding, gunnable sealant for concealed applications per ASTM C 919.
- E. Exposed Acoustical Sealant: Nonoxidizing, skinnable, paintable, gunnable sealant for exposed applications per ASTM C 919.
- F. Water-Resistant Adhesive: Type I organic adhesive for ceramic tile complying with ANSI A136.1.

PART 3 - EXECUTION

3.1 GENERAL GYPSUM BOARD INSTALLATION REQUIREMENTS

- A. Gypsum Board Application and Finishing Standards: ASTM C 840 and GA 216.
- B. Locate exposed end-butt joints as far from center of walls possible, and stagger not less than 1'-0" in alternate courses of board.
- C. Install wall/partition boards vertically to avoid end-butt joints wherever possible.
- D. Install exposed gypsum board with face side out. Do not install imperfect, damaged or damp boards. Butt boards together for a light contact at edges and ends with not more than 1/16" open space between boards. Do not force into place.
- E. Locate all edge and end joints over supports. Stagger vertical joints over different studs on opposite sides of partitions.
- F. Attach gypsum board to supplementary framing and blocking provided for additional support at openings and cutouts.
- G. Form control joints and expansion joints with space between edges of boards, prepared to receive trim accessories.
- H. Cover both faces of stud framing with gypsum board in concealed spaces (above ceilings, etc.), except in chase walls which are braced internally.
 - 1. Except where concealed application is required for sound, fire, air or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. area and may be limited to not less than 75% of full coverage.
- I. Isolate perimeter of non-load-bearing drywall partitions at structural abutments. Provide 1/4" to 1/2" space and trim edge with J-type semi-finishing edge trim. Seal joints with acoustical sealant.
- J. Space fasteners in gypsum boards in accordance with referenced standards and manufacturer's recommendations, except as otherwise indicated.

3.2 METHODS OF GYPSUM DRYWALL APPLICATION

- A. Single-Layer Application: Install gypsum wallboard.
- B. On partitions/walls apply gypsum board vertically unless otherwise indicated and provide sheet lengths which will minimize end joints.

3.3 INSTALLATION OF DRYWALL TRIM ACCESSORIES

- A. General: Where feasible, use the same fasteners to anchor trim accessory flanges as required to fasten gypsum board to the supports. Otherwise, fasten flanges by nailing or stapling in accordance with manufacturer's instructions and recommendations.
- B. Install metal corner beads at external corners of drywall work.
- C. Install metal edge trim whenever edge of gypsum board would otherwise be exposed or semi-exposed, and except where plastic trim is indicated. Provide type with face flange to receive joint compound except where semi-finishing type is indicated. Install L-type trim where work is tightly abutted to other work and install special kerf-type where other work is kerfed to receive long leg of L-type trim. Install U-type trim where edge is exposed, revealed, gasketed, or

sealant-filled (including expansion joints).

- D. Install semi-finishing trim where indicated, and where exterior gypsum board edges are not covered by applied moldings or indicated to receive trim with face flanges covered with joint compound.
- E. Provide control joints horizontally and/or vertically at no less than 24'-0" o.c. max. Refer to plans for specific location or installed as directed by Architect.
- F. Install H-molding in exterior gypsum drywall work where control joints are indicated.

3.4 FINISHING OF DRYWALL

- A. General: Apply treatment at gypsum board joints (both directions), flanges of trim accessories, penetrations, fastener heads, surface defects and elsewhere as required to prepare work for decoration. Prefill open joints and rounded or beveled edges, if any, using type of compound recommended by manufacturer.
 - 1. Apply joint tape at joints between gypsum boards, except where trim accessories are indicated.
 - 2. Apply joint compound in 3 coats (not including prefill of openings in base), and sand between last 2 coats and after last coat.
 - 3. Tape and finish gypsum board in accordance with ASTM C 840, GA 214 and GA 216.
 - 4. Provide joint, fastener depression, and corner treatment. Do not use fiber glass mesh tape with conventional drying type joint compounds; use setting or hardening type compounds only. Provide treatment for water-resistant gypsum board as recommended by the gypsum board manufacturer.
 - 5. Where gypsum surfaces are to be finished to Level 5 in accordance with GA 214, apply a thin skim coat of joint compound to the entire gypsum board surface, after the two-coat joint and fastener treatment is complete and dry.
 - 6. **All Exposed gypsum board surfaces** shall be finished to a minimum **Level 4** in accordance with GA 214.
 - 7. Where gypsum board is to receive eggshell, semi-gloss or gloss paint finish, or where severe, up or down lighting conditions occur, shall be finished to **Level 5** in accordance to GA 214 Level 5, unless indicated otherwise.
 - 8. All gypsum board surfaces at **all Corridors** shall be finished to **Level 5** in accordance to GA 214 Level 5.
 - 9. Plenum areas above ceilings shall be finished to **Level 1** in accordance with GA 214.
 - 10. Water resistant gypsum backing board, ASTM C 630/C 630M, to receive ceramic tile shall be finished to **Level 2** in accordance with GA 214.
 - 11. Walls and ceilings to receive a heavy-grade wall covering or heave textured finish before painting shall be finished to **Level 3** in accordance with GA 214.
- B. Partial Finishing: Omit third coat and sanding on concealed drywall work which is indicated for drywall finishing or which requires finishing to achieve fire-resistance rating, sound rating or to act as air or smoke barrier.
- C. Refer to section on painting in Division 9 for decorative finishes to be applied to drywall work.

3.5 PROTECTION OF WORK

- A. Provide final protection and maintain conditions, in a manner suitable to Installer, which ensures gypsum drywall work being without damage or deterioration at time of substantial completion.

END OF SECTION

SECTION 09301 - PORCELAIN TILE

PART 1 - GENERAL

1.1 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.

1.2 DESCRIPTION OF WORK

- A. Definition: Tile includes ceramic surfacing units made from clay or other ceramic materials.
- B. Extent of tile work is indicated on drawings and schedules.
- C. Types of tile work in this section include the following:
 - 1. Wall Tile.
 - 2. Floor Tile.
 - 3. Wainscot Accent Tile.
 - 4. Wainscot Tile Cap.
 - 5. Base.
 - 6. Stone Thresholds.
- D. Portland cement plaster scratch coat on wall surfaces indicated to receive tile is work of this section.
- E. Sealing expansion and other joints in tile work with elastomeric joint sealers is work of this section.

1.3 QUALITY ASSURANCE

- A. Source of Materials: Provide materials obtained from one source for each type and color of tile, grout, and setting materials.
- B. Mock-Up: Contractor shall provide mock-up panels for evaluation of materials, surface preparation techniques and application workmanship.
 - 1. Mock-up panel shall be no less than 4'-0" x 4'-0" panel as follows:
 - a. One (1) panel per room, per surface. (i.e. 1 panel for wall surface and 1 panel for floor surface for each room of different selection).
 - b. Mock-up panels shall be marked identifying room location and product manufacturer, type, style, size and color information.
 - c. Do not proceed with work until materials, workmanship, color, and sheen are approved by Architect.
 - d. Provide additional mock-up panels as required to produce acceptable work.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical information and installation instructions for materials required, except bulk materials.
- B. Samples for Selection Purposes: Submit manufacturer's color charts consisting of actual tiles or sections of tile showing full range of colors, textures and patterns available for each type of tile indicated. Include samples of grout and accessories involving color selection.

1.5 PRODUCT HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Prevent damage or contamination to materials by water, freezing, foreign matter or other causes.

1.6 PROJECT CONDITIONS

- A. Maintain environmental conditions and protect work during and after installation to comply with referenced standards and manufacturer's printed recommendations.
- B. Vent temporary heaters to exterior to prevent damage to tile work from carbon dioxide buildup.
- C. Maintain temperatures at not less than 50 degrees F in tiled areas during installation and for 7 days after completion, unless higher temperatures required by referenced installation standard or manufacturer's instructions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function:
 - 1. Porcelain Tile:
 - a. StonePeak (Basis of Design)
 - b. American Olean Tile Co.
 - c. Marazzi
- B. Equal products of other manufacturers may be used in the work, provided such products have been approved by the Architect, not less than Ten (10) days prior to scheduled bid opening.

2.2 PRODUCTS, GENERAL

- A. ANSI Standard for Ceramic Tile: Comply with ANSI A137.1 "American National Standard Specifications for Ceramic Tile" for types and grades of tile indicated.
 - 1. Furnish tile complying with "Standard Grade" requirements unless otherwise indicated.
- B. ANSI Standard for Tile Installation Materials: Comply with ANSI standard referenced with installation products and materials indicated.
- C. Colors, Textures and Patterns: For tile and other products requiring selection of colors, surface textures or other appearance characteristics, provide products to match characteristics indicated or, if not otherwise indicated, as selected by Architect from manufacturer's standards.
 - 1. Provide tile trim and accessories which match color and finish of adjoining flat tile.
- D. Mounting: Where factory-mounted tile is required provide back- or edge-mounted tile assemblies as standard with manufacturer unless another mounting method is indicated.
 - 1. Where tile is indicated for installation on exteriors or in wet areas, do not use back or edge-mounted tile assemblies unless tile manufacturer specifies that this type of mounting is suitable for these kinds of use and has been successfully used on other projects.

2.3 TILE PRODUCTS

- A. Provide tile complying with the following requirements:
 - 1. Manufacturer/Series:
 - a. **StonePeak "Simply Modern" Collection.**
 - 2. Type:
 - a. Porcelain
 - 3. Wearing Surface for Floors:
 - a. "stable, firm and slip resistant", (exceeds 0.60 on the ASTM C-1028 test, wet and dry).
 - 4. Nominal Thickness:
 - a. 3/8"

5. Nominal Facial Dimensions as follows:
 - a. Floor Tile
 1. **12" x 24" Floor Tile** - "Simply Modern" Series, Unglazed, with 1/4" grout joints.
 - b. Wall Tile
 1. **12" x 24" Wall Tile** - "Simply Modern" Series, Unglazed, with 1/4" grout joints.
 2. **4" x 12" "Adamas" Series Wall Tile Accent Band – 3 layers high located 6'-0" AFF.** Glazed, with 1/8" grout joints.
 - c. Base:
 1. **6" x 12" Coved Base** – "Schluter Dilex" Series.
 - d. Wainscot Cap:
 1. **3" x 12" Bullnose** – "Simply Modern" Series.
6. Face: Plain with cushion edges.
- B. Trim Units: Provide tile trim units to match characteristics of adjoining flat tile and to comply with following requirements:
 1. Size:
 - a. As indicated, coordinated with sizes and coursing of adjoining flat tile, where applicable.
 2. Shapes:
 - a. Selected from manufacturer's standard shapes.
 3. External Corners for Portland Cement Mortar Installations:
 - a. Bullnose shape with a radius of not less than 3/4" unless otherwise indicated.
 4. Internal Corners:
 - a. Field-buttet square corners, except use internal cove and cap angle pieces designed to member with stretcher shapes.

2.4 STONE THRESHOLDS

- A. General: Provide stone which is uniform in color and finish, fabricated to sizes and profiles indicated or required to provide transition between tile surfaces and adjoining finished floor surfaces.
- B. Marble Thresholds: Provide marble thresholds complying with ASTM C 503 requirements for exterior use and abrasion resistant for uses subject to heavy foot traffic.
 1. Provide white, bonded marble complying with MIA Group "A" requirements for soundness.

2.5 SETTING MATERIALS

- A. Portland Cement Mortar Installation Materials: Provide materials to comply with ANSI A108.1 as required for installation method designated, unless otherwise indicated.

2.6 GROUTING MATERIALS – FLOOR & WALL

- A. High Performance Epoxy grout that offers color uniformity, durability and stain resistance with extraordinary ease of use.
 1. Laticrete "Spectralock Pro Grout".
 2. Color to be selected by architect after the bid date from manufacturer standards
- B. Epoxy grout is to be installed per manufacturer's instructions.

2.7 MISCELLANEOUS MATERIALS

- A. Single-Component Sealants: ASTM C 920, Type S, Grade NS, use NT (for use in joints in non-traffic areas).
- B. Two-Component Sealants: ASTM C 920, Type M, Grade P, Class 25, use T (for use in joints subject to pedestrian traffic).
- C. Tile Cleaner: Product specifically acceptable to manufacturer of tile and grout manufacturer for application indicated and as recommended by National Tile Promotion Federation, 112 North Alfred St., Alexandria, VA 22134 or Ceramic Tile Institute, 700 N. Virgil Ave., Los Angeles, CA 90029.

2.8 TILE BACKING PANELS

- A. Fiber-Cement Backer Board: ASTM C1288, in maximum lengths available to minimize end-to-end butt joints.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. CertainTeed Corporation.
 - b. Custom Building Products.
 - c. James Hardie Building Products, Inc.
 - 2. Thickness: 1/2 inch (12.7 mm) unless otherwise indicated on drawings.
- B. Install panels and treat joints in accordance with ANSI A108.11, APA guidelines, and manufacturer's written instructions for type of application indicated

2.9 WATERPROOF MEMBRANE

- A. General: Manufacturer's standard product that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.
- B. Polyethylene Sheet: Polyethylene faced on both sides with fleece webbing; 0.008-inch (0.2-mm) nominal thickness.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. Schluter Systems L.P.
 - b. Equal products of other manufacturers may be used in the work, provided such products have been approved by the Architect, not less than Ten (10) days prior to scheduled bid opening.
- C. Install waterproof membrane to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness that is bonded securely to substrate.
 - 1. Allow waterproof membrane to cure and verify by testing that it is watertight before installing tile or setting materials over it.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine surfaces to receive tile work and conditions under which tile will be installed. Do not proceed with tile work until surfaces and conditions comply with requirements indicated in referenced tile installation standard.

3.2 PRE-INSTALLATION CONFERENCE

- A. A pre-installation conference is required before any tiling materials are installed. This conference shall be conducted by a representative of the Architect and attended by the General Contractor and Tile Contractor. Provide at least 72 hours advance notice to participants prior to convening pre-installation conference.

- B. The pre-installation conference is intended to clarify demolition and application requirements for work to be completed before tiling operations can begin. This would include a detailed review of the specifications, plans, finish schedules and approved shop drawings, submittal data, samples and mock-ups. If this pre-installation conference cannot be satisfactorily concluded without further inspection and investigation by any of the parties present, it shall be reconvened at the earliest possible time to avoid delay of the work. In no case should the work proceed without inspection of all tiling areas and substantial agreement on all requirements.
- C. The following are to be accomplished during the conference:
 - 1. To review all requirements listed in the specifications and resolve any questions or conflicts that may arise.
 - 2. To establish trade-related job schedules.
 - 3. To establish tiling schedule and work methods that will prevent progress of other trades.
 - 4. Require that all surface preparations and conditions be complete prior to installing tile work.
 - 5. To establish those areas on the job site that will be designated as work and storage areas for tiling operations.
 - 6. To establish acceptable methods of protecting the finished tile surfaces if any trades must travel across or work on, above or around any areas of the finished tile work.
- D. The Architect shall prepare a written report indicating actions taken and decisions made at this pre-installation conference. This report shall be made a part of the project record and copies furnished to the General Contractor and the Owner.

3.3 INSTALLATION, GENERAL

- A. ANSI Tile Installation Standard: Comply with applicable parts of ANSI 108 series of tile installation standards included under "American National Standard Specifications for the Installation of Ceramic Tile".
- B. TCA Installation Guidelines: TCA "Handbook for Ceramic Tile Installation"; comply with TCA installation methods indicated or, if not otherwise indicated, as applicable to installation conditions shown.
- C. Setting beds:
 - 1. Floor tile: Thinset.
 - 2. Wall tile: Thinset.
- D. Extend tile work into recesses and under or behind equipment and fixtures, to form a complete covering without interruptions, except as otherwise shown. Terminate work neatly at obstructions, edges and corners without disrupting pattern or joint alignments.
- E. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures and other penetrations so that plates, collars, or covers overlap tile.
- F. Jointing Pattern: Unless otherwise shown, lay tile in grid pattern. Align joints when adjoining tiles on floor, base, walls and trim are same size. Layout tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise shown.
 - 1. For tile mounted in sheets make joints between tile sheets same width as joints within tile sheets so that extent of each sheet is not apparent in finished work.
- G. Lay out tile wainscots to next full tile beyond dimensions indicated.
- H. Expansion Joints: Locate expansion joints and other sealant filled joints, including control, contraction and isolation joints, where indicated, or if not indicated, at spacing and locations recommended in TCA "Handbook for Ceramic Tile Installation", and approved by Architect.

1. Prepare joints and apply sealants to comply with requirements of referenced standards and sealant manufacturer.
- I. Grout tile to comply with referenced installation standards, using grout materials indicated.

3.4 FLOOR INSTALLATION METHODS

- A. Porcelain Tile: Install tile to comply with requirements indicated below for setting bed methods, TCA installation methods related to types of subfloor construction, and grout types:
 1. Concrete Subfloors, Interior: TCA F113 with isolation membrane equal to Nobleseal CIS.
- B. Grout:
 1. High Performance Epoxy grout is to be installed per manufacturer's instructions.
- C. Stone Thresholds: Install stone thresholds at locations indicated; set in same type of setting bed as abutting field tile unless otherwise indicated.
- D. Metal Edge Strips: Install at locations indicated or where exposed edge of tile flooring meets carpet, wood or other flooring which finishes flush with top of tile.

3.5 WALL TILE INSTALLATION METHODS

- A. Install types of tile designated for wall application to comply with requirements indicated below for setting bed methods, TCA installation methods related to subsurface wall conditions, and grout types:
 1. Solid Backing, Interior: TCA W221 in wet areas and W213 or W223 25
 - a. applicable in other areas.
- B. Grout:
 1. High Performance Epoxy grout is to be installed per manufacturer's instructions.

3.6 CLEANING AND PROTECTION

- A. Cleaning: Upon completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
 1. Unglazed tile shall be cleaned with non-acid solutions only recommended by tile and grout manufacturer's printed instructions, but no sooner than 14 days after installation. Protect metal surfaces, cast iron and vitreous plumbing fixtures from effects of tile cleaning. Flush surface with clean water after cleaning.
- B. Finished Tile Work: Leave finished installation clean and free of cracked, chipped, broken, unbonded, or otherwise defective tile work.
- C. Protection: When recommended by tile manufacturer, apply a protective coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage and wear.
- D. Prohibit foot and wheel traffic from using tiled floors for at least 7 days after grouting is completed. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

3.7 EXTRA STOCK

- A. Deliver stock of maintenance materials to Owner. Furnish maintenance materials from same manufactured lot as materials installed and enclosed in protective packaging with appropriate identifying labels.
 1. Tile Flooring: Furnish not less than one box for each type, color, pattern and size installed.

END OF SECTION

SECTION 09510 - ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.1 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.

1.2 SUMMARY

- A. Extent of acoustical ceilings specified in this section include the following:
 - 1. Acoustical lay-in panel ceilings in an exposed suspended metal grid system.

SUBMITTALS

- A. Product Data: Submit manufacturer's technical data for each type of acoustical ceiling unit and suspension system required.
 - 1. Full size sample of each acoustical panel type, pattern and color.
 - 2. Set of 12" long samples of exposed runners and moldings for each color and system type required.
- B. Certificates: Submit certificates from manufacturers of acoustical ceiling units and suspension systems attesting that their products comply with specification requirements.

1.3 QUALITY ASSURANCE

- A. Fire Performance Characteristics: Provide acoustical ceiling components that are identical to those tested for the following fire performance characteristics, according to ASTM test method indicated, by UL or other testing and inspecting agency acceptable to authorities having jurisdiction. Identify acoustical ceiling components with appropriate marking of applicable testing and inspecting agency.
 - 1. Surface Burning Characteristics: As follows, tested per ASTM E 84.
 - 2. Flame Spread: 25 or less.
 - 3. Smoke Developed: 50 or less.
- B. Fire Resistance Ratings: As indicated by reference to design designation in UL "Fire Resistance Directory" for floor, roof or beam assemblies in which acoustical ceilings function as a fire protective membrane; tested per ASTM E 119. Provide protection materials for lighting fixtures and air ducts to comply with requirements indicated for rated assembly.
- C. Coordination of Work: Coordinate layout and installation of acoustical ceiling units and suspension system components with other work supported by, or penetrating through, ceilings, including light fixtures, HVAC equipment, fire-suppression system components (if any), and partition system (if any).
- D. Single-Source Responsibility: Provide acoustical panel units and grid components by a single manufacturer.

1.4 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 or 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 damaging units in any way.

1.5 PROJECT CONDITIONS

- A. Space Enclosures: Do not install interior acoustical ceilings until space is enclosed and weatherproof, wet-work in space is completed and nominally dry, work above ceilings is complete

and ambient conditions of temperature and humidity will be continuously maintained at values near those indicated for final occupancy.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function:

USG Interiors, LLC. (Basis of Design) | www.usg.com | Ph: 1.800.950.3839

1. Certaineed Corporation | www.certainteed.com | Ph: 1.800.233.8990
2. Armstrong World Industries Inc. | www.armstrongceilings.com | Ph: 877.276.7876

- B. Equal products of other manufacturers may be used in the work provide such products have been approved, by the Architect, not less than Ten (10) days prior to scheduled bid opening.

2.2 GENERAL ACOUSTICAL CEILING TILE UNITS

- A. Standard for Acoustical Ceiling Tile Units: Provide manufacturer's standard units of configuration indicated which are prepared for mounting method designated and which comply with FS SS-S-118 requirements, including those indicated by reference to type, form, pattern, grade (NRC or NIC' as applicable), light reflectance coefficient (LR), edge detail, and joint detail (if any).

1. Mounting Method for Measuring NRC: No. 7 (mechanically mounted on special metal support), FS SS-S-118; or Type E-400 mounting as per ASTM E 795.

- B. Sound Attenuation Performance: Provide acoustical ceiling units with ratings for ceiling sound transmission class (STC) of range indicated as determined according to AMA 1-II "Ceiling Sound Transmission Test by Two-Room Method" with ceilings continuous at partitions and supported by a metal suspension system of type appropriate for ceiling unit of configuration indicated (concealed for tile, exposed for panels).

- C. Colors, Textures and Patterns: Provide products to match appearance characteristics indicated or, if not otherwise indicated, as selected by Architect from manufacturer's standard colors, surface textures, and patterns available for acoustical ceiling units and exposed metal suspension system members of quality designated.

2.3 ACOUSTICAL TILES

A. Acoustical Panel Type: Vinyl Covered Ceiling Panels

1. USG "Sheetrock Brand Clean Room Lay-In Gypsum Panels".
2. Classification: Provide ceiling panels complying with ASTM E 1264 for type, form and pattern as follows:
 - a. Type XX, mineral based with membrane faced overlay. Vinyl face, back and sides covered gypsum ceiling panels.
 - b. Form: Not Applicable
 - c. Pattern: Smooth
3. Color: Flat White 050.
4. LR: Not less than 0.77
5. NRC: Not less than: N/A
6. CAC: Not less than 35
7. Edge / Joint Detail:
 - a. Square (Typical if not indicated on drawings).
 - b. SLT Beveled Reveal (Only if indicated on drawings).
8. Panel Thickness: 1/2 inch (12.7 mm).

9. Modular Size: 24 by 24 inches (610 by 610 mm).
10. Recycled Content: 80%.
11. Panel Features: Washable, scrubbable, soil and impact resistant finish. Meets USDA/FSIS guidelines for use in food processing areas.
12. Clean room performance: Acceptable in applications up to Class 100 Clean rooms.
13. ClimaPlus™ 30 year limited system warranty. Contains a broad spectrum antimicrobial additive on the face and back of the panel that provides resistance against the growth of mold and mildew. Includes sag resistance performance.
14. Suspension Grid/Width: USG Donn ZXLA; 15/16".

B. Acoustical Panel Type: Lay-In Acoustical Ceiling Panels

1. USG "Radar" Acoustical Panels
2. Classification: Provide ceiling panels complying with ASTM E 1264 for type, form and pattern as follows:
 - a. Type III, mineral base with painted finish
 - b. Form: 2, water felted.
 - c. Pattern: Perforated, small holes and light texture.
3. Color: Flat White 050.
4. LR: Not less than 0.84
5. NRC: Not less than 0.45
6. CAC: Not less than 33
7. Edge / Joint Detail:
 - a. SQ Square (Typical if not indicated on drawings).
 - b. SLT Beveled Reveal (Only if indicated on drawings).
8. Panel Thickness: 5/8 inch (15.8mm).
9. Modular Size: 24 by 24 inches (600 by 600 mm).
10. Recycled Content: Up to 59%.
11. Panel Features:
 - a. Biobased product that is USDA certified.
 - b. Abuse Resistant, high durability and can be cleaned easily with a soft brush & vacuummed.
12. ClimaPlus™ 30 year limited system warranty. Contains a broad spectrum antimicrobial additive on the face and back of the panel that provides resistance against the growth of mold and mildew. Includes sag resistance performance.
13. Suspension Grid/Width: USG Donn DX; 15/16" (24mm).

2.4 GENERAL METAL SUSPENSION SYSTEMS

- A. Standard for Metal Suspension Systems: Provide metal suspension systems of type, structural classification and finish indicated which comply with applicable STM C 635 requirements.
- B. Finishes and Colors: Provide manufacturer's standard factory applied finish for type of system indicated. For exposed suspension members and accessories with painted finish, provide color indicated or, if not otherwise indicated, as selected by Architect from manufacturer's full range of standard colors.
 1. White.

- C. Attachment Devices: Size for 5 times design load indicated in ASTM C 635, Table 1, Direct Hung.
- D. Hanger Wire: Galvanized carbon steel wire, ASTM A 641, soft temper, prestretched, Class 1 coating, sized so that stress at 3- times hanger design load (ASTM C 635, Table 1, Direct Hung), will be less than yield stress of wire, but provide not less than 12 gage.
- E. Edge Moldings and Trim: Formed steel section; exposed surfaces prefinished to match suspension system components.
 - 1. Provide shadow molding for edges equal to MS174; 9/16" thick exposed flange; 3/8" x 3/8" reveal; 7/8" vertical flange.
 - 2. At penetrations of ceiling install manufacturer's standard molding which fits with type of edge detail and suspension system indicated.
 - 3. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.
- F. Hold-Down/Impact Clips: Where indicated provide manufacturer's standard impact clip system design to absorb impact forces against lay-in panels. Install hold down clips at all ceiling panels within 10'-0" of and exterior door.

2.5 METAL SUSPENSION SYSTEMS

A. USG Donn Brand ZXLA 15/16" Acoustical Suspension System

- 1. Double-web design; Intermediate Duty as defined by ASTM C635. Bottom face with 15/16" (24mm) exposed flange with pre-painted aluminum cap; cross tee holes and hanger wire holes at 6 in oc; integral reversible splices, commercial quality pretreated and painted, exposed surfaces prefinished in manufacturer's enhanced corrosion resistant polyester paint finish. Cross tees; roll-formed into double-web design with rectangular bulb; 15/16 (24mm) in exposed flange with pre-painted aluminum cap; Stainless Steel clips clenched to the web. Main tees and cross tees shall be positively locked yet shall be removable without the use of tools.
- 2. Structural Classification: Intermediate Duty.
- 3. Tee Profile: 15/16" (24mm) wide.
- 4. Color: White

2.6 SEALANT

- A. Acoustical Sealant: Resilient, non-staining, non-shrinking, non-hardening, non-skinning, non-drying, non-sag sealant intended for interior sealing of concealed construction joints.
- B. Manufacturers: The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function:
 - 1. BA-98; Pecora Corp.
 - 2. Tremco Acoustical Sealant; Tremco
 - 3. Equal products of other manufacturers may be used in the work provided such products have been approved by the Architect, not less than Ten (10) days prior to schedule bid opening.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Coordination: Furnish layouts for inserts, clips, or other supports required to be installed by other trades for support of acoustical ceilings.
 - 1. Furnish concrete inserts and similar devices to other trades for installation well in advance of time needed for coordination of other work.
- B. Measure each ceiling area and establish layout of acoustical units to balance border widths at opposite edges of each ceiling. Coordinate ceiling layout with lighting layout. Avoid use of less-than-half width units at borders, and comply with reflected ceiling plans.

3.2 INSTALLATION

- A. General: Install materials in accordance with manufacturer's printed instructions, and to comply with governing regulations, fire-resistance rating requirements as indicated, and CISCA standards applicable to work.
- B. Arrange acoustical units and orient directionally-patterned units (if any) in manner shown by reflected ceiling plans.
- C. Install suspension systems to comply with ASTM C 636, with hangers supported only from building structural members.
 - 1. Locate hangers within 6" inches from each end and spaced 4'-0" along each carrying channel or direct-hung runner, unless otherwise indicated, leveling to tolerance of 1/8" in 12'-0".
 - 2. Locate hangers on all 4 corners of the ceiling grid where a projector is installed
- D. Secure wire hangers by looping and wire-tying, either directly to structures or to inserts, eye-screws, or other devices which are secure and appropriate for substrate, and which will not deteriorate or fail with age or elevated temperature.
- E. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum which are not part of supporting structural or ceiling suspension system. Splay hangers only where required to miss obstructions and offset resulting horizontal force by bracing, counter-splaying or other equally effective means.
- F. Install edge moldings of type indicated at perimeter of acoustical ceiling area and at locations where necessary to conceal edges of acoustical units.
- G. Sealant Bed: Apply continuous ribbon of acoustical sealant, concealed on back of vertical leg before installing moldings.
- H. Screw-attached moldings to substrate at intervals not over 16" o.c. and not more than 3" from ends, leveling with ceiling suspension system to tolerance of 1/8" in 12'-0". Miter corners accurately and connect securely.
- I. Install acoustical panels in coordination with suspension system with edges concealed by support of suspension members. Scribe and cut panels to fit accurately at borders and at penetrations.
- J. Install hold-down clips on panels, within 10'-0" of exterior door openings, where panels are other than horizontal, and in areas where required by governing regulations or for fire-resistance ratings; space as recommended by panel manufacturer, unless otherwise indicated or required.

3.3 EXTRA STOCK

- A. Deliver stock of maintenance materials to Owner. Furnish maintenance materials from same manufactured lot as materials installed and enclosed in protective packaging with appropriate identifying labels.
 - 1. Ceiling Tile: Furnish not less than one box for each type, color, pattern and size installed.

END OF SECTION

SECTION 09550 - WOOD FLOORING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes Wood Flooring at the following locations:

- 1. Wood flooring for Stage.

- B. Related Sections include the following:

- 1. Section 03300, Concrete; Substrates.
 - 2. Section 07260, Under Slab Vapor Barrier

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Supplier shall be a firm established in the field. See requirements.

- 1. Installer's Responsibilities: Installer shall be a company exhibiting a minimum of ten (10) years continuous experience in the wood and theatrical flooring field and approved by the manufacturer. Submit a list of at least five completed projects of similar magnitude and complexity where this specific flooring system was installed. Include owner references with this submittal.
 - 2. Maintenance Literature: Submit Three copies of Care and Maintenance of wood floors.
 - 3. Certification: If required by the owner, manufacturer shall provide certification that all materials meet grade, quality and treatment if applicable.

- B. Guarantee: Manufacturer hereby warrants the floor system material specified herein to be free from manufacturing defects for a period of (1) one year. This warranty is in lieu of all other warranties, expressed or implied, including but not limited to any warranty of merchantability or fitness for a particular purpose, and any other obligation on the part of the manufacturer. In the event of the breach of any warranty, the liability of manufacturer shall be limited to repair or replacing the floor material and system components supplied by manufacturer and proven to be defective in manufacture, and shall not include any other damages, either direct or consequential.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver wood-flooring materials in unopened cartons or bundles.
- B. Protect wood flooring from exposure to moisture. Do not deliver wood flooring until after concrete, masonry, plaster, ceramic tile, and similar wet work is complete and dry.
- C. Store wood-flooring materials in a dry, warm, well-ventilated, weather-tight location.
- D. Move wood flooring into spaces where it will be installed at least seven days before installation.

1.6 PROJECT CONDITIONS

- A. Conditioning: Maintain relative humidity conditions planned for building occupants, but not greater or less than the relative humidity range recommended by MFMA, and an ambient temperature between 55 and 80 deg F in spaces to receive wood flooring for at least seven days before installation, during installation, and for at least seven days after installation. After post-installation period, maintain relative humidity conditions and ambient temperature planned for building occupants.

- 1. Open sealed packages to allow wood flooring to acclimatize.

2. Do not install flooring until it adjusts to the relative humidity of and is at the same temperature as the space where it is to be installed. Relative humidity of 35-50% is to be maintained.
3. Close spaces to traffic during flooring installation and for time period after installation recommended in writing by flooring and finish manufacturer, but not less than 10 days.
4. Materials shall not be delivered to the jobsite until all masonry, painting, plastering, tilework, is complete.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Manufacturer's products shall meet all NOFMA and MFMA flooring guidelines to establish minimum standards for materials, workmanship and function and must meet all requirements called out in the specifications.

2.2 MATERIALS

- A. Membrane: 6 mil polyethylene sheeting.
- B. Subfloor Layer: 3/4" x 48" x 96" CDX plywood. Exterior grade Fir on SYP.
- C. Subfloor fasteners: Steel anchors shall be air-actuated pins designed and recommended by the manufacturer to anchor the subfloor to the concrete substrate.
- D. Flooring fasteners – Powernail or equal floor cleats or staples, as recommended by the flooring manufacturer.
- E. Stage flooring – White Oak, Select, 3/4" x 2-1/4" in random lengths.
- F. All flooring to be tongue & grooved and kiln-dried.

2.3 FINISHING MATERIALS

- A. Floor Finish - Bona MFMA-Approved finish or approved equal.
 1. Stain: Penetrating Stain. Color to be selected by Architect.
 2. Finish: Polyurethane. Sheen to be selected by Architect.

2.4 ACCESSORY MATERIALS

- A. Expansion joint cover at edge of all wood and concrete: Pemko 271-A or equal. Aluminum 5" width. Equal approved by the flooring manufacturer may also be used.
- B. Perimeter base: As indicated on drawings.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Inspect existing floor for proper dryness and tolerance and report any discrepancies to the owner in writing.
- B. All work required to put the existing floor in acceptable order shall be the responsibility of this contractor.
- C. Subfloor shall be provided to the contractor free of all equipment and broom cleaned.

3.2 INSTALLATION

- A. Install polyethylene sheeting over entire area with edges overlapped and edges turned up 3" at walls and vertical obstruction.
- B. Subfloor: "Fasten plywood subfloor shall be installed in accordance with manufacturer's guidelines. Plywood to be installed in a 45 degree angle or perpendicular to the long direction of the finish flooring.
- C. Machine nail strip flooring to plywood subfloor in straight lay pattern. All end joints shall be driven up tightly and proper spacing allowed for humidity changes affecting the floor. Flooring contractor

shall be allowed to incorporate spacer joints in the floor to insure adequate expansion and to adjust for pattern creep.

- D. Provide 1-1/2" expansion voids at all walls and vertical obstructions.

3.3 **SANDING AND FINISHING**

- A. Allow installed flooring to acclimate to ambient conditions for at least 10 days before sanding.
- B. Sand floor using coarse, medium, and fine paper. After sanding, run 100 grit screen over entire floor with rotary sander.
- C. Clean floor to remove all dust and debris prior to sealing wood.
- D. Finish: Apply one coat of oil-modified sealer. Let dry and apply three additional coats of oil-modified finish. Allow to dry before use.
- E. Install vented rubber base at all walls with screws or adhesive. Use pre-formed outside corners and neatly miter all inside corners.

3.4 **PROTECTION**

- A. General Contractor shall protect wood flooring during remainder of construction period to allow finish to cure and to ensure that flooring and finish are without damage or deterioration at time of Substantial Completion and acceptance by owner.

END OF SECTION

SECTION 09650 – RUBBER BASE, STAIR TREAD, AND RISER

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. Resilient Rubber Base
 - 2. Resilient Rubber Stair Tread with Riser.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Samples for Initial Selection: For each type of product indicated.
- C. Samples for Verification: For each type of product indicated, in manufacturer's standard-size samples of each resilient product color, texture, and pattern required.
- D. Product Schedule: For resilient products. Use same designations indicated on Drawings.

1.4 QUALITY ASSURANCE

- A. Mockups: Provide resilient products with mockups specified in other Sections.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by Johnsonite, but not less than 55 deg F (13 deg C) or more than 85 deg F (29 deg C).

1.6 PROJECT CONDITIONS

- A. Install resilient products after other finishing operations, including painting, have been completed.
- B. Maintain ambient temperatures within range recommended by Johnsonite, but not less than 65 deg F (18 deg C) or more than 85 deg F (29 deg C) in spaces to receive resilient products during the following time periods:
 - 1. 48 hours before installation.
 - 2. During installation.
 - 3. 48 hours after installation.
- C. Maintain the ambient relative humidity between 40% and 60% during installation.
- D. Until Substantial Completion, maintain ambient temperatures within range recommended by Johnsonite, but not less than 55 deg F (13 deg C) or more than 85 deg F (29 deg C).

PART 2 - PRODUCTS

2.1 MANUFACTURERES

The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function:

- 1. Tarkett USA Inc. (Basis of Design; 30000 Aurora Road, Solon, OH 44139; 800.899.8916; www.tarkettna.com).
- 2. Mannington Commercial, 1844 U.S. Highway 41 S.E. Calhoun, GA 30701; PH: 800.241.2262; www.manningtoncommercial.com.

3. Roppe Corporation, U.S.A.; 1602 North Union Street, Fostoria, Ohio 44830-1158; Ph: 1.800.537.9527 or 419.435.8546; www.roppe.com.
4. Flexco Corporation; 1401 East 6th Street, Tuscumbia, AL 35674; PH: 800.633.315; www.flexcofloors.com.
5. Armstrong Flooring Commercial; 2500 Columbia Avenue, Lancaster, PA 17604; Ph:1.888.276.7876; www.armstrongflooring.com/commercial.

2.2 MATERIALS – RUBBER BASE

- A. Material Physical Characteristics: Provide rubber base complying with FS SS-W-40, Type II, with matching end stops and pre-formed or molded corner units and as follows:
 1. Manufactured from a proprietary thermoplastic rubber formulation.
 2. Meets performance requirements for ASTM F 1861 Standard Specification for Resilient Wall Base, Type TP, Group 1.
 3. ASTM E 648, Standard Test Method for Critical Radiant Flux of 0.45 watts/cm² or greater, Class I.
 4. ASTM E 84, Standard Test Method for Surface Burning Characteristics of Building Materials, Class A, Smoke <450.
 5. Flexibility: Does not crack, break, or show any signs of fatigue when bent around a 1 1/4" diameter cylinder when tested according to ASTM F 137 Standard Test Method for Flexibility of Resilient Flooring Materials protocols.
 6. Color Stability: Meets or exceeds ASTM F 1861 requirements for color stability when tested to ASTM F 1515 Standard Test Method for Measuring Light Stability of Resilient Flooring protocols.
- B. RUBBER WALL BASE:
 1. Height: 4"
 2. Thickness: 1/8"
 3. Style: Standard Top-Set Cove
 4. Finish: Matte
 5. Colors and Patterns: As selected by Architect from manufacturer's standards after the bid.

2.3 MATERIALS - RUBBER INTEGRATED STAIR TREAD WITH RISER:

- A. Material Physical Characteristics:
 1. Manufactured from a homogeneous composition of 100% synthetic rubber.
 2. Complies with requirements for ASTM F 2169 Standard Specification for Resilient Stair Treads, Type TS, Class 1 and 2, Group 1 and 2.
 3. Hardness: ASTM D 2240 – Not less than 85 Shore A.
 4. Abrasion Resistance: ASTM D 3389 – less than 1 gram weight loss.
 5. ASTM D 2047, Standard Test Method for Static Coefficient of Friction of Polish- Coated Flooring of 0.6 or greater.
 6. ASTM E 648, Standard Test Method for Critical Radiant Flux of 0.45 watts/cm² or greater, Class I.
 7. Integrated tread and riser.
 8. Visually Impaired treads meet ADA and are California Title 24 Accessibility requirements.
 9. Visually Impaired treads will have 2" wide co-extruded contrasting color insert or 2" wide contrasting color grit tape insert.

B. RUBBER INTEGRATED STAIR TREAD WITH RISER:

1. Visually Impaired Solid Color Rubber Integrated Stair Tread and Riser with Contrasting Color Insert
 - a. For Raised Round surface, solid color integrated stair tread and riser, 2" height hinged Square Nose, tapering .210" to .113", with 2" contrasting color grit tape insert.
 - b. Color to be selected by Architect after the bid date.
 - c. Round Pattern

2.4 MATERIALS - RESILIENT RUBBER STAIR TREAD

A. Material Physical Characteristics:

1. ASTM E 648, Standard Test Method for Critical Radiant Flux of 0.45 watts/cm² or greater, Class I.
2. Meets or exceeds the performance requirements for resistance to heat/light aging, chemicals, and dimensional stability when tested to the methods, as described, in ASTM F-1861.
3. Flexibility: Will not crack, break, or show any signs of fatigue when bent around a 1/4" (6.35 mm) diameter cylinder.

B. RUBBER STAIR STRINGER:

1. Rubber Stringers are manufactured from a proprietary thermoplastic rubber formulation designed specifically to meet the performance and dimensional requirements of ASTM F-1861, Type TP, Group 1 (solid) Standard Specification for Resilient Wall Base.
 - a. Thickness of 0.080" (2mm)
 - b. 10" (25.4 cm) height x 6 ft. (1.83 cm) long.
 - c. Color to be selected by Architect after the bid date.

2.4 INSTALLATION MATERIALS

- A. Trowelable Leveling and Patching Compounds:** Latex-modified, Portland cement based formulation manufactured and warranted by a reputable manufacturer.
1. Flooring and Tread Adhesives: Premium, Waterproof, stabilized type as recommended by flooring manufacturer to suit material and substrate conditions.
- B. Stair Tread and Nose Filler:** Two-Part Epoxy Caulking Compound to fill nosing substrates that do not conform to tread contours.

PART 3 - EXECUTION

3.1 EXAMINATION

- A.** Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the work.
- B.** Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- C.** Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A.** Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.
1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.

2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
 3. Mechanically remove contamination on the substrate that may cause damage to the resilient flooring material. Permanent and non-permanent markers, pens, crayons, paint, etc., must not be used to write on the back of the flooring material or used to mark the substrate as they could bleed through and stain the flooring material.
 4. Prepare Substrates according to ASTM F 710 including the following:
 - a. Moisture Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
 - 1) Perform anhydrous calcium chloride test, ASTM F 1869. Results must not exceed 5 lbs. Moisture Vapor Emission Rate per 1,000 sq. ft. in 24 hours.
 - or –
 - 2) Perform relative humidity test using in situ probes, ASTM F 2170. Must not exceed 80%.
 - b. A pH test for alkalinity must be conducted. Results should range between 7 and 9. If the test results are not within the acceptable range of 7 to 9, the installation must not proceed until the problem has been corrected.
 - c. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer.
 5. Wood steps/substrates:
 - a. The substrate must be rigid, free of movement.
 - b. Single wood and tongue and groove substrate should be covered with 1/4" (6.4 mm) or 1/2" (12.7 mm) APA approved underlayment plywood.
 - 1) Use 1/4" (6.4 mm) thick underlayment panels for boards with a face width of 3" (76 mm) or less.
 - 2) Use 1/2" (12.7 mm) thick underlayment panels for boards with a face width wider than 3" (76 mm).
 - c. Do not install over OSB (Oriented Strand Board), particle board, chipboard, lauan or composite type underlayments.
 - B. Fill cracks, holes, depressions and irregularities in the substrate with good quality Portland cement based underlayment leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
 - C. Floor covering shall not be installed over expansion joints.
 - D. Do not install resilient products until they are same temperature as the space where they are to be installed.
 1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- 3.3** Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.4 INSTALLATION – RUBBER BASE

- A. Apply wall base to walls, columns, pilasters, casework and other permanent fixtures in rooms or areas where base is required.
- B. Install base in lengths as long as practicable without stretching base.
- C. Install base at outside corners using preformed corner units. If preformed unit is not available, then fabricate outside corners from base material utilizing a "V" shape top-set or pull-type gouge tool to make a shallow V-shape notch on back-side of wall base. Field-fabricated outside corners

must have a minimum return length around each corner of 3 feet. Adhere to corner of walls so that no "whitening" (discoloration of base material) occurs at the bends.

- D. Install base at inside corners using preformed corner units or fabricated from base materials with mitered or coped inside corners.
- E. Tightly bond base to substrate throughout length of each piece, with continuous contact at horizontal and vertical surfaces.
 - 1. On masonry surfaces, or other similar irregular substrates, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.
- F. Place resilient edge strips tightly butted to flooring and secure with adhesive. Install edging strips at edges of flooring which would otherwise be exposed.

3.5 INSTALLATION - RESILIENT STAIR TREAD AND RISER

- A. Comply with manufacturer's written instructions for installing resilient accessories.
- B. Resilient Stair Tread and Nosing:
 - 1. Use manufacturer Epoxy Caulking Compound to strengthen nosing and fill irregularities in substrates to conform to tread nosing.
 - 2. Tightly adhere to substrates throughout length of each piece.
 - 3. For treads installed as separate, equal-length units, install to produce a flush joint between units.

3.4 CLEANING AND PROTECTION

- C. Comply with manufacturer's written instructions for cleaning and protection of resilient products.
- D. Perform the following operations immediately after completing resilient product installation:
 - 1. Remove adhesive and other blemishes from exposed surfaces.
 - 2. Sweep and vacuum surfaces thoroughly.
 - 3. Damp-mop surfaces to remove marks and soil.
- E. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

END OF SECTION

SECTION 09651 – LUXURY VINYL TILE FLOORING (LVT)

PART 1 – GENERAL

1.1 DESCRIPTION OF WORK

- A. Luxury Vinyl Tile flooring and accessories as indicated on drawings and in schedules.

1.2 RELATED REQUIREMENTS

- A. Section 09650 – Rubber Base.

1.3 QUALITY ASSURANCE

- A. Manufacturer: Provide each type of Luxury Vinyl Tile flooring and accessories as produced by a single manufacturer, including recommended primers, adhesives, sealants and leveling compounds.
 - 1. Wherever possible, provide required Luxury Vinyl Tile flooring and accessories produced by a single manufacturer.

1.4 SUBMITTALS

- A. Product Data: Submit 2 copies of manufacturer's technical data and installation instructions for each type of Luxury Vinyl Tile flooring and accessory.
- B. Samples: Submit, for verification purposes, samples of each type, color, and pattern of Luxury Vinyl Tile, including accessories, required, indicating full range of color and pattern variation.

1.5 JOB CONDITIONS

- A. Store Luxury Vinyl Tile flooring products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by the manufacture, but not less than 55 deg F (13 deg C) or more than 85 deg F (29 deg C).
- B. Maintain minimum temperature of 65°F in spaces to receive Luxury Vinyl Plank Tile flooring for at least 48 hours prior to installation, during installation, and for not less than 48 hours after installation. Store Luxury Vinyl Tile materials in spaces where they will be installed for at least 48 hours before beginning installation.
- C. Maintain the ambient relative humidity between 40% and 60% during installation.
- D. Until Substantial Completion, maintain ambient temperatures within range recommended by the manufacture but not less than 55 deg F (13 deg C) or more than 85 deg F (29 deg C).
- E. Install Luxury Vinyl Tile flooring and accessories after other finishing operations, including painting, have been completed. Do not install Luxury Vinyl Tile Flooring over concrete slabs until the latter have been cured and are sufficiently dry to achieve bond with adhesive as determined by manufacturer's recommended bond and moisture test.

PART 2 – PRODUCTS

2.1 MANUFACTURER

- A. The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function:
 - 1. Mannington Commercial, 1844 U.S. Highway 41 S.E. Calhoun, GA 30701; PH: 800.241.2262; www.manningtoncommercial.com.
 - 2. Patcraft *CMYK or Stratified + (20 mil wear layer/2.5 overall thickness)*; P.O. Box 2128, Dalton, GA 30722; PH: 334.462.9547; www.patcraft.com.
- B. Equal products of other manufacturers may be used in the work, provided such products have been approved by the Architect, not less than Ten (10) days prior to scheduled bid opening.

2.2 MATERIALS

Renovations of the Arts Center To
Goshen High School for the
Pike County Schools
Troy, Alabama

LUXURY VINYL TILE FLOORING (LVT)
09651-1

- A. LVT: "Spacia" Collection; "Abstract" Series
 - 1. Construction High Performance Luxury Vinyl Tile flooring
 - 2. Class / ASTM F 1700 Class III Printed Film Vinyl Tile, Type B (embossed)
 - 3. Wear layer Thickness 20 mil or 0.020" (0.5 mm) Quantum Guard Elite
 - 4. Overall Thickness 4.0 mm or nominal
 - 5. Nominal Dimensions: 4" wide x 36" long
 - 6. Backing Class Commercial Grade
 - 7. Installation Glue Down
 - 8. Slip Resistance / ASTM D 2047 >0.65 (wet/dry)
 - 9. Warranty: 15 year limited commercial wear warranty.
 - 10. Colors as selected by the Owner.
- B. Concrete Slab Primer: Non-staining type as recommended by flooring manufacturer.
- C. Leveling Compound: ProSpec Feather Edge, premium, polymer modified, rapid setting, trowelable underlayment that results in a very smooth, ultra thin finish or as recommended by the flooring manufacture.
- D. Surfaces must be solid, completely clean, free of oil, gypsum compounds, wax, grease, sealers, curing compounds, asphalt, paint, dirt, loose surface material and any contaminants that act as a bond breaker. Weak concrete surfaces must be cleaned down to solid sound concrete by mechanical means. Acid etching or chemical cleaning is not acceptable. Remove all dirt by vacuuming. All subfloors must be clean, dry and at least 40° F (4° C) prior to applying ProSpec Feather Edge.
- E. Installation: ProSpec Feather Edge will accept standard floor coverings such as VCT, vinyl sheet goods, tile and carpeting in approximately 15-30 minutes after placement.
- F. Materials: Extruded rubber accessories as required (i.e. nosings, reducer strip.)

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the work.
- B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Prepare substrates according to manufactures written instructions to ensure adhesion of Luxury Vinyl Tile Flooring.
 - 1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
 - 2. Remove substrate paint, coatings and other substances that are incompatible with adhesives or contain soap, wax, oil, solvents, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
 - 3. Mechanically remove contamination on the substrate that may cause damage to the resilient flooring material. Permanent and non-permanent markers, pens, crayons, paint, etc., must not be used to write on the back of the flooring material or used to mark the substrate as they could bleed through and stain the flooring material.

4. Prepare Substrates according to ASTM F 710 including the following:
 - a. Moisture Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.
 - i. Perform anhydrous calcium chloride test, ASTM F 1869. Results must not exceed 5 lbs. Moisture Vapor Emission Rate per 1,000 sq. ft. in 24 hours.
 - or**
 - ii. Perform relative humidity test using in situ probes, ASTM F 2170. Results must not exceed 80%.
 - b. A pH test for alkalinity must be conducted. Results should range between 7 and 9. If the test results are not within the acceptable range of 7 to 9, the installation must not proceed until the problem has been corrected.
 - c. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer.
- B. Fill cracks, holes, depressions and irregularities in the substrate with good quality Portland cement based underlayment leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.
- C. Floor covering shall not be installed over expansion joints.
- D. Do not install resilient products until they are the same temperature as the space where they are to be installed.
- E. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.
- F. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.3 FLOORING INSTALLATION

- A. Comply with manufacturer's written instructions for installing resilient tile flooring.
 1. Install with manufacturer's adhesive specified for the site conditions and follow adhesive label for proper use.
 2. Follow manufacturer's recommendation and lay tiles so graining follows the same direction.
 3. Roll the flooring in both directions using a 100 pound three-section roller.
- B. Lay tile from center marks established with principal walls, discounting minor offsets, so that tile at opposite edges of room area of equal width. Adjust as necessary to avoid use of cut widths less than 1/2 tile at room perimeters. Lay tile square to room axis, from wall to wall and under all casework or other fixed equipment. Where construction joints in concrete slab occur, lay tile joint with construction joint.
- C. Match tiles for color and pattern by using tile from cartons in same sequence as manufactured and packaged if so numbered. Cut tile neatly around all fixtures. Broken, cracked, chipped, or deformed tiles are not acceptable.
 1. Lay each color of tile with grain running in basket weave pattern.
- D. Adhere tile flooring to substrates using full spread of adhesive applied in compliance with flooring manufacturer's directions.
- E. Accessories: Apply wall base to walls, columns, pilasters, casework and other permanent fixtures in rooms or areas where base is required. Install base in lengths as long as practicable, with preformed corner units, or fabricated from base materials with mitered or coped inside corners. Tightly bond base to substrate throughout length of each piece, with continuous contact at horizontal and vertical surfaces.

1. On masonry surfaces, or other similar irregular substrates, fill voids along top edge of resilient wall base with manufacturer's recommended adhesive filler material.
- F. Place resilient edge strips tightly butted to flooring and secure with adhesive. Install edging strips at edges of flooring which would otherwise be exposed.

3.4 CLEANING AND PROTECTION

- A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.
- B. Perform the following operations immediately after completing resilient product installation:
1. Remove adhesive and other blemishes from exposed surfaces.
 2. Sweep and vacuum surfaces thoroughly.
 3. Damp-mop surfaces to remove marks and soil.
- C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.
- D. No heavy traffic, rolling loads, or furniture placement for 72 hours after installation.
- E. Cover resilient products until Substantial Completion.
- F. Wait 72 hours after installation before performing initial cleaning.
- G. A regular maintenance program must be started after the initial cleaning.

3.5 EXTRA STOCK

- A. Deliver stock of maintenance materials to Owner. Furnish maintenance materials from same manufactured lot as materials installed and enclosed in protective packaging with appropriate identifying labels.
1. Flooring: Furnish not less than one box for each type, color, pattern and size installed.

END OF SECTION

SECTION 09843 – FIXED SOUND ABSORPTIVE PANELS (FIBERGLASS)

PART 1 GENERAL

1.1 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.

1.2 SECTION INCLUDES

- A. Acoustical Wall Panels custom-fabricated and fabric-finished. (Fiberglass).

1.3 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.

1.4 SYSTEM DESCRIPTION

- A. Performance Requirements:
 - 1. Surface Burning Characteristics (ASTM E84):
 - a. Flamespread: 25 maximum.
 - b. Smoke Developed: 450 maximum.
 - c. Fire ratings for all fabric covered panels is based on testing of the panel wrapped with the standard in-stock fabric, Guilford of Maine Model FR 701 Style 2100.

1.5 SUBMITTAL

- 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, edge profiles and panel components, including anchorage, accessories, finish colors and textures.
- D. Samples: Submit selection and verification samples of finishes, colors and textures.
- E. Test Reports: Certified test reports showing compliance with specified performance requirements.
 - 1. Standard Systems: Submit certified copies of previous test reports substantiating performance of system in lieu of retesting.

1.6 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.

1.7 PROJECT CONDITIONS

- A. Environmental Requirements: Do not install panels 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. All products constructed with wood or wood fiber content must be stored for at

least 72 hours in the controlled environment specified herein prior to installation to allow the materials to stabilize.

PART 2 - PRODUCTS

2.1 SOUND-ABSORBING WALL PANELS

A. MANUFACTURER

1. Kinetics Noise Control, Inc. (Basis of Design and Quality); PO Box 655, 6300 Irelan Place, Dublin, OH 43017; Telephone: (614) 889-0480; Fax: (614) 889-0540; E-mail: intsales@kineticsnoise.com; Web site: www.kineticsnoise.com.
2. Acoustical Solutions; 2420 Genoble Road, Richmond, VA 23294; Phone: 800.782.5742; www.acousticalsolutions.com.
3. Acoustics First; 2247 Tomlyn Street, Richmond, VA 23230-3334; 888.765.2900 or 804.342.2900; www.acousticsfirst.com.
4. MBI Products Company, Inc. | 801 Bond Street, Elyria, OH 44035 | Ph.: 440.322.6500 | www.mbiproducs.com.

2.2 MANUFACTURED UNITS

A. HARDSIDE PANELS

1. Location: **Type AWP-2.**
2. Thickness:
 - a. 2 inches (51 mm).
 - b. 4 inches (102 mm).
3. Size: As indicated on the drawings up to a maximum 48 inches (1219 mm) x 120 inches (3048 mm) panel.
4. Core:
 - a. 2 inches (51 mm) thick fiberglass, 6 - 7 pcf (96 - 112 kg/m³) density.
 - b. 4 inches (102 mm) thick fiberglass, 6 - 7 pcf (96 - 112 kg/m³) density.
5. Edge Detail: Pencil hardened with a Class A hardening solution.
6. Facing: 100% polyester fabric, FR 701 Style 2100 by Guilford of Maine.
 - a. Color: As selected by Architect from panel manufacturer's full range of colors after Bid Date.
7. Sound Absorption (ASTM C423): Noise Reduction Coefficient as follows:
 - a. 2 inches (51 mm) panel: 1.00, minimum.
 - b. 4 inches (102 mm) panel: 1.10, minimum, 125 Hz = 0.65 or greater.
8. Mounting Accessories: HS impaling clips or Z-clips.

B. HIGH IMPACT HARDSIDE PANELS

1. Location: **Type AWP-1.**
2. Thickness:
 - a. 2 1/8 inch (54 mm).
3. Size: As indicated on the drawings up to a maximum 48 inches (1219 mm) x 120 inches (3048 mm) panel.
4. Core:
 - a. 2 inches (51 mm) thick fiberglass, 6 - 7 pcf (96 - 112 kg/m³) density, with bonded facing layer of 10 pcf (192 kg/m³), with 1/8 inch (3.2 mm) thick impact resistant fiberglass layer.

- b. 4 inches (102 mm) thick fiberglass, 6 - 7 pcf (96 - 112 kg/m³) density, with bonded facing layer of 10 pcf (192 kg/m³), with 1/8 inch (3.2 mm) thick impact resistant fiberglass layer.
- 5. Edge Detail: Pencil hardened with non-resin, Class A hardening solution.
- 6. Facing: 100% polyester fabric, FR 701 Style 2100 by Guilford of Maine.
 - a. Color: As selected by architect from panel manufacturer's full range of colors after Bid Date.
- 7. Sound Absorption (ASTM C423): Noise Reduction Coefficient as follows:
 - a. 2 1/8 inches (54 mm) panel: 1.05, minimum.
- 8. Mounting Accessories: HS impaling clips or Z-clips.

2.3 FABRICATION

- A. General: Treat fabric wrapped panels using heat shrink process to develop fully taut facing.
- B. Wrap panel edges and return facing fabric 1 - 2 inches (25.4 - 51 mm) on back of panel. Secure fabric with adhesive applied to edges and back of panel only.

PART 3 - EXECUTION

3.1 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.

3.2 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. Verify that stud spacing is 16 inches (406 mm) o.c., maximum, for panels installed over open studs.
 - 2. Do not install panels until unsatisfactory conditions are corrected.

3.3 CLEANING

- A. Follow manufacturer's instructions for cleaning panels soiled during installation. Replace panels that cannot be cleaned to as new condition.
- B. Keep site free from accumulation of waste and debris.

END OF SECTION

SECTION 09846-FIXED SOUND REFLECTIVE PANELS

PART 1 - GENERAL

1.1 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.

1.2 SUMMARY

- A. Section Includes: Custom fabricated Sound Diffusers.

1.3 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.

1.4 SYSTEM DESCRIPTION

- A. Performance Requirements:
 - 1. Surface Burning Characteristics (ASTM E84): Ceiling mounted Model Geometric Sound Diffusers shall be Class A rated, minimum.

1.5 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, edge profiles and panel components, including anchorage, accessories, finish colors and textures.
- D. Samples: Submit selection and verification samples of finishes, colors and textures.
- E. Test Reports: Certified test reports showing compliance with specified performance requirements.
- F. Standard Systems: Submit certified copies of previous test reports substantiating performance of system in lieu of retesting.

1.6 DELIVERY, STORAGE & HANDLING

- A. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- B. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.

1.7 PROJECT CONDITIONS

- A. Environmental Requirements: Do not install diffusers or reflectors 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 45%, respectively.

PART 2 – PRODUCTS

Renovations of the Arts Center To
Goshen High School for the
Pike County Schools
Troy, Alabama

FIXED SOUND REFLECTIVE PANELS
09846-1

2.1 MANUFACTURERS

- A. The following manufacturers' products have been used to established minimum standards for materials, workmanship and functions:
1. Kinetics Noise Control, Inc. (Basis of Design and Quality); PO Box 655, 6300 Irelan Place, Dublin, OH 43017; Telephone: (614) 889-0480; Fax: (614) 889-0540; E-mail: intsales@kineticsnoise.com; Web site: www.kineticsnoise.com.
 2. Acoustical Solutions; 2420 Genoble Road, Richmond, VA 23294; Phone:800.782.5742; www.acousticalsolutions.com.
 3. Acoustics First; 2247 Tomlyn Street, Richmond, VA 23230-3334; 888.765.2900 or 804.342.2900; www.acousticsfirst.com.
 4. MBI Products Company, Inc. | 801 Bond Street, Elyria, OH 44035 | Ph.: 440.322.6500 | www.mbiproducs.com.
 5. G&S Acoustics; 3555 Scarlet Oak Blvd, St. Louis, MO 63122; PH 800-737-0307 www.gsacoustics.com.
- B. Equal products of other manufacturers may be used in the work provided such products have been approved by the Architect not less than Ten (10) days prior to scheduled bid opening.

2.2 ACOUSTICAL DIFFUSERS

1. Geometric Sound Diffuser Panel, Thermo-molded:
 - a. Constructed from 0.125 inch (3.2 mm) thermo-molded co-polymer.
 - b. Location as indicated on the drawings.
 - c. Size: 2 x 2 ft. Offset Pyramidal
 - d. Edge Detail: Rounded pencil edge thermo-molded frame formed on an offset pyramidal shaped unit.
 - e. Finish: Fabric facing: Manufacturer's standard 100 percent polyester woven fabric, FR701 Style 2100 by Guilford of Maine
 - f. Color: As selected from manufacturer's full range of colors by Architect.
 - g. Sound Absorption (ASTM C423): Noise Reduction Coefficient shall be no greater than 10.
 - h. Mounting: Ceiling mounted in 15/16" standard grid suspension system.

PART 3 – EXECUTION

3.1 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.

3.2 EXAMINATION

- A. Site Verification of Conditions: Verify that substrate or supporting structure, which has been previously installed under other sections, is acceptable for product installation in accordance with manufacturer's instructions.

3.3 CLEANING

- A. Follow manufacturer's instructions for cleaning panels soiled during installation. Replace panels that cannot be cleaned to as new condition.
- B. Keep site free from accumulation of waste and debris.

END OF SECTION

SECTION 09900 - PAINTING

PART 1 - GENERAL

1.1 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.

1.2 DESCRIPTION OF WORK

- A. Extent of painting work is indicated on drawings and schedules, and as herein specified including accent painting.
- B. Work includes painting and finishing of interior and exterior exposed items and surfaces throughout project, except as otherwise indicated.
 - 1. Surface preparation, priming and coats of paint specified are in addition to shop-priming and surface treatments specified under other sections of work.
- C. Work includes field painting of exposed bare and covered pipes, conduits and ducts (including color coding), and of hangers, exposed steel and iron work, and conduits and primed metal surfaces of equipment installed under mechanical and electrical work, except as otherwise indicated.
- D. "Paint" as used herein means all coating systems materials, including primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.
- E. Surfaces to be Painted: Except where natural finish of material is specifically noted as a surface not to be painted, paint exposed surfaces whether or not colors are designated in "schedules". Where items or surfaces are not specifically mentioned, paint the same as similar adjacent materials or areas. If color or finish is not designated, Architect will select these from standard colors or finishes available.
- F. Following categories of work are not included as part of field-applied finish work.
 - 1. Pre-Finished Items: Unless otherwise indicated, do not include painting when factory-finishing or installer finishing is specified for such items as (but not limited to) metal toilet enclosures, prefinished partition systems, acoustic materials, elevator entrance doors and frames, elevator equipment, and finished mechanical and electrical equipment, including light fixtures, switchgear and distribution cabinets.
 - 2. Concealed Surfaces: Unless otherwise indicated, painting is not required on surfaces such as walls or ceilings in concealed areas and generally inaccessible areas, foundation spaces, furred areas, utility tunnels, pipe spaces, duct shafts and elevator shafts.
 - 3. Finished Metal Surfaces: Unless otherwise indicated, metal surfaces of anodized aluminum, stainless steel, chromium plate, copper, bronze and similar finished materials will not require finish painting.
 - 4. Operating Parts: Unless otherwise indicated, moving parts of operating units, mechanical and electrical parts, such as valve and damper operators, linkages, sinkages, sensing devices, motor and fan shafts will not require finish painting.
- G. Following categories of work are included under other sections of these specifications.
 - 1. Shop Priming: Unless otherwise specified, shop priming of ferrous metal items is included under various sections for structural steel, metal fabrications, hollow metal work and similar items.
 - 2. Unless otherwise specified, shop priming of fabricated components such as shop-fabricated or factory-built mechanical and electrical equipment or accessories is included under other sections of these specifications.
- H. Do not paint over any code-required labels, such as Underwriters' Laboratories and Factory Mutual, or any equipment identification, performance rating, name, or nomenclature plates.

1.3 QUALITY ASSURANCE

- A. Single Source Responsibility: Provide primers and other undercoat paint produced by same manufacturer as finish coats. Use only thinners approved by paint manufacturer and use only within recommended limits.
- B. Coordination of Work: Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates. Upon request from other trades, furnish information or characteristics of finish materials provided for use, to ensure compatible prime coats are used.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical information including paint label analysis and application instructions for each material proposed for use.
- B. Samples: Prior to beginning work, Architect will furnish color chips for surfaces to be painted. Use representative colors when preparing samples for review. Submit samples for Architect's re- view of color and texture only.
- C. Provide a listing of material and application for each coat of each finish sample. Provide a 4' x 4' sample application of each color paint for Architect's approval prior to final ordering of product. Sample application shall be applied in an inconspicuous place, satisfactory to the Architect.

1.5 DELIVERY AND STORAGE

- A. Deliver materials to job site in original, new and unopened packages and containers bearing manufacturer's name and label, and following information:
 - 1. Name or title of material.
 - 2. Fed. Spec. number, if applicable.
 - 3. Manufacturer's stock number and date of manufacturer.
 - 4. Manufacturer's name.
 - 5. Contents by volume, for major pigment and vehicle constituents.
 - 6. Thinning instructions.
 - 7. Application instructions.
 - 8. Color name and number.
- B. Store materials not in actual use in tightly covered containers. Maintain containers used in storage of paint in a clean condition, free of foreign materials and residue.
 - 1. Protect from freezing where necessary. Keep storage area neat and orderly. Remove oily rags and waste daily. Take all precautions to ensure that workmen and work areas are adequately protected from fire hazards and health hazards resulting from handling, mixing and application of paints.

1.6 JOB CONDITIONS

- A. Apply water-base paints only when temperature of surfaces to be painted and surrounding air temperatures are between 50 degree F and 90 degrees F, unless otherwise permitted by paint manufacturer's printed instructions.
- B. Apply solvent-thinned paints only when temperature of surfaces to be painted and surrounding air temperatures are between 45 degree F and 95 degree F, unless otherwise permitted by paint manufacturer's printed instructions.
- C. Do not apply paint in snow, rain, fog or mist, or when relative humidity exceeds 85% or to damp or wet surfaces, unless otherwise permitted by paint manufacturer's printed instructions.
 - 1. Painting may be continued during inclement weather if areas and surfaces to be painted are enclosed and heated within temperature limits specified by paint manufacturer during application and drying periods.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. The following manufacturers are listed as acceptable substitutions to the establish minimum standards. Sherwin Williams Products are listed as the standard of product performance and quality.
 - 1. Sherwin Williams Paint Company (SW)
 - 2. Benjamin Moore and Co. (Moore).
 - 3. Pittsburgh Paints (PPG).
- B. Equal products of other manufacturers may be used in the work, provided such products have been approved by the Architect, not less than Ten (10) days prior to scheduled bid opening.

2.2 MATERIALS

- A. Material Quality: Provide best quality grade of various types of coatings as regularly manufactured by acceptable paint materials manufacturers. Materials not displaying manufacturer's identification as a standard, best-grade product will not be acceptable.
 - 1. Proprietary names used to designate colors or materials are not intended to imply that products of named manufacturers are required to exclusion of equivalent products of other manufacturers.
 - 2. Federal Specifications establish minimum acceptable quality for paint materials. Provide written certification from paint manufacturer that materials provided meet or exceed these minimums.
 - 3. Manufacturer's products which comply with coating qualitative requirements of applicable Federal Specifications, yet differ in quantitative requirements, may be considered for use when acceptable to Architect. Furnish material data and manufacturer's certificate of performance to Architect for any proposed substitutions.
- B. Color Pigments: Pure, non-fading, applicable types to suit substrates and service indicated.

PART 3 – EXECUTION

3.1 INSPECTION

- A. **Applicator must examine areas and conditions under which painting work is to be applied and notify Contractor in writing of conditions detrimental to proper and timely completion of work. Do not proceed with work until unsatisfactory conditions have been corrected in a manner acceptable to Applicator. If work is begun before satisfactory conditions are met, then it shall be the Applicators' responsibility for the finish surfaces conditions.**
- B. Starting of painting work will be construed as Applicator's acceptance of surfaces and conditions within any particular area.
- C. Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to formation of a durable paint film.

3.2 SURFACE PREPARATION

- A. General: Perform preparation and cleaning procedures in accordance with paint manufacturer's instructions and as herein specified, for each particular substrate condition.
 - 1. Provide barrier coats over incompatible primers or remove and reprime as required. Notify Architect in writing of any anticipated problems in using the specified coating systems with substrates primed by others.
 - 2. Remove hardware, hardware accessories, machined surfaces, plates, lighting fixtures, and similar items in place and not to be finish-painted or provide surface-applied protection prior to surface preparation and painting operations. Remove, if necessary, for complete painting of items and adjacent surfaces. Following completion of painting of each space or area, reinstall removed items.

3. Contractor MUST remove ALL foreign matter/material not pertinent to new paint from all surfaces before application of any new paint. Foreign matter/material includes, but is not limited to, flaking paint, tape, tacks, nails, poster gum, adhesives of any kind etc.
 4. Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning. Program cleaning and painting so that contaminants from cleaning process will not fall onto wet, newly-painted surfaces.
- B. Cementitious Materials: Prepare cementitious surfaces of concrete, concrete block, cement plaster and cement-asbestos board to be painted by removing efflorescence, chalk, dust, dirt, grease, oils, and by roughening as required to remove glaze.
1. Determine alkalinity and moisture content of surfaces to be painted by performing appropriate tests. If surfaces are found to be sufficiently alkaline to cause blistering and burning of finish paint, correct this condition before application of paint. Do not paint over surfaces where moisture content exceeds that permitted in manufacturer's printed directions.
 2. Clean concrete floor surfaces scheduled to be painted with a commercial solution of muriatic acid, or other etching cleaner. Flush floor with clean water to neutralize acid and allow to dry before painting.
- C. Wood: Clean wood surfaces to be painted of dirt, oil, or other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sandpaper smooth those finished surfaces exposed to view and dust off. Scrape and clean small, dry, seasoned knots and apply a thin coat of white shellac or other recommended knot sealer, before application of priming coat. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood-filler. Sandpaper smooth when dried.
1. Prime, stain, or seal wood required to be job-painted immediately upon delivery to job. Prime edges, ends, faces, undersides, and backsides of such wood, including cabinets, counters, cases, paneling.
 2. When transparent finish is required, use spar varnish for backpriming.
 3. Backprime all exposed exterior wood. Backprime paneling on interior partitions only where masonry, plaster, or other wet wall construction occurs on backside.
 4. Seal tops, bottoms, and cut-outs of unprimed wood doors with a heavy coat of varnish or equivalent sealer immediately upon delivery to job.
- D. Ferrous Metals: Clean ferrous surfaces, which are not galvanized or shop-coated, of oil, grease, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning.
1. Touch-up shop-applied prime coats wherever damaged or bare. Clean and touch-up with same type shop primer.
- E. Galvanized Surfaces: Clean free of oil and surface contaminants with non-petroleum based solvent.

3.3 MATERIALS PREPARATION

- A. Mix and prepare painting materials in accordance with manufacturer's directions.
- B. Maintain containers used in mixing and application of paint in a clean condition, free of foreign materials and residue.
- C. Stir materials before application to produce a mixture of uniform density and stir as required during application. Do not stir surface film into material. If film exists, remove film and strain paint material.

3.4 APPLICATION

- A. General: Apply paint in accordance with manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied. Paint colors, surface treatments, and finishes, are indicated in "schedules" of the contract documents.
 1. Provide finish coats which are compatible with prime paints used.

2. Apply additional coats when undercoats, stains or other conditions show through final coat of paint, until paint film is of uniform finish, color and appearance. Give special attention to insure that surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness not less than specified thickness.
 3. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Paint surfaces behind permanently-fixed equipment or furniture with prime coat only before final installation of equipment.
 4. Paint interior surfaces of ducts, where visible through registers or grilles, with a flat, non-specular black paint.
 5. Paint back sides of access panels, and removable or hinged covers to match exposed surfaces.
 6. Finish exterior doors on tops, bottoms and side edges same as exterior faces, unless otherwise indicated.
 7. Sand lightly between each succeeding enamel or varnish coat.
 8. Omit first coat (primer) on metal surfaces which have been shop-primed and touch-up painted, unless otherwise indicated.
- B. Scheduling Painting: Apply first-coat material to surfaces that have been cleaned, pretreated or otherwise prepared for painting as soon as practicable after preparation and before subsequent surface deterioration.
1. Allow sufficient time between successive coatings to permit proper drying. Do not recoat until paint has dried to where it feels firm, does not deform or feel sticky under moderate thumb pressure, and application of another coat of paint does not cause lifting or loss adhesion of the undercoat.
- C. Minimum Coating Thickness: Apply materials at not less than manufacturer's recommended spreading rate, to establish a total dry film thickness as indicated or, if not indicated, as recommended by coating manufacturer.
- D. Prime Coats: Apply prime coat where required to be painted or finished, and which has not been primed coated by others.
1. Recoat primed and sealed surfaces where there is evidence of suction spots or unsealed areas in first coat, to assure a finish coat with no burn-through or other defects due to insufficient sealing.
- E. Pigmented (Opaque) Finishes: Completely cover to provide an opaque, smooth surface of uniform finish, color, appearance and coverage. Cloudiness, spotting, holidays, laps, brush marks, runs, sags, ropiness or other surface imperfections will not be acceptable.
- F. Transparent (Clear) Finishes: Use multiple coats to produce glass-smooth surface film of even luster. Provide a finish free of laps, cloudiness, color irregularity, runs, brush marks, orange peel, nail holes, or other surface imperfections.
1. Provide satin finish for final coats, unless otherwise indicated.
- G. Completed Work: Match approved samples for color, texture and coverage. Remove, refinish or repaint work not in compliance with specified requirements.

3.5 FIELD QUALITY CONTROL

- A. The right is reserved by Owner to invoke the following material testing procedure at any time, and any number of times during period of field painting:
1. Engage services of an independent testing laboratory to sample paint being used. Samples of materials delivered to project site will be taken, identified and sealed, and certified in presence of Contractor.
 2. Testing laboratory will perform appropriate tests for any or all of following characteristics: Abrasion resistance, apparent reflectivity, flexibility, washability, absorption, accelerated

weathering, dry opacity, accelerated yellowness, recoating, skinning, color retention, alkali resistance and quantitative materials analysis.

- B. If test results show that material being used does not comply with specified requirements, Contractor may be directed to stop painting work, and remove non-complying paint; pay for testing; repaint surfaces coated with rejected paint; remove rejected paint from previously painted surfaces if, upon repainting with specified paint, the two coatings are non-compatible.

3.6 CLEAN-UP AND PROTECTION

- A. Clean-Up: During progress of work, remove from site discarded paint materials, rubbish, cans and rags at end of each day.
- B. Upon completion of painting work, clean window glass and other paint-spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.
- C. Protection: Protect work of other trades, whether to be painted or not, against damage by painting and finishing work. Correct any damage by cleaning, repairing or replacing, and repainting, as acceptable to Architect.
 - 1. Provide "Wet Paint" signs as required to protect newly painted finishes. Remove temporary protective wrappings provided by others for protection of their work, after completion of painting operations.
- D. At completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces.

3.7 EXTRA STOCK

- A. Deliver stock of maintenance materials to Owner. Furnish maintenance materials from same manufactured lot as materials installed and enclosed in protective packaging with appropriate identifying labels.
 - 1. Paint: Furnish not less than one gallon for each type and color, applied.

3.8 EXTERIOR PAINT SCHEDULE

A. GENERAL

- 1. Paint all new roof penetrations at roof areas, including roof attic ventilators and exhaust fan housings.
- 2. General: Provide the following paint systems for the various substrates, as indicated.

B. EXTERIOR METALS

- 1. Zinc-Coated Metal.
 - a. Alkyd Gloss Enamel Finish.
 - i. 2 Coats over primer, with total dry film thickness not less than 2.5 mils.
 - ii. 1st Coat: S-W Pro Industrial Pro-Cryl® Universal Acrylic Primer, B66-01310 Series (5.0-10.0 mils wet, 1.9-3.8 mils dry per coat).
 - iii. 2nd Coat: S-W Industrial Enamel, Gloss Finish, B54 Series.
 - iv. 3rd Coat: S-W Industrial Enamel, Gloss Finish, B54 Series, (2-4 mils dry per coat).
 - b. *(Contractor Option)* Waterbased Alkyd Gloss Enamel Finish.
 - i. 2 Coats over primer, with total dry film thickness not less than 2.5 mils.
 - ii. 1st Coat: S-W Pro Industrial Pro-Cryl® Universal Acrylic Primer, B66-01310 Series (5.0-10.0 mils wet, 1.9-3.8 mils dry per coat).
 - iii. 2nd Coat: S-W Pro Industrial Waterbased Alkyd Urethane Enamel, Gloss Finish, B53 Series.

- iv. 3rd Coat: S-W Pro Industrial Waterbased Alkyd Urethane Enamel, Gloss Finish, B53 Series, (1.4 – 1.7 mils dry per coat).
- 2. Ferrous Metal.
 - a. Alkyd Gloss Enamel Finish.
 - i. 2 Finish Coats over primer, with total dry film thickness not less than 6.0 mils.
 - ii. 1st Coat: S-W Pro Industrial Pro-Cryl® Universal Acrylic Primer, B66-01310 Series (5.0-10.0 mils wet, 1.9-3.8 mils dry per coat).
 - iii. 2nd Coat: S-W Industrial Enamel, Gloss Finish, B54 Series.
 - iv. 3rd Coat: S-W Industrial Enamel, Gloss Finish, B54 Series, (2-4 mils dry per coat).
 - b. (*Contractor Option*) Waterbased Alkyd Gloss Enamel Finish.
 - i. 2 Finish Coats over primer, with total dry film thickness not less than 6.0 mils.
 - ii. 1st Coat: S-W Pro Industrial Pro-Cryl® Universal Acrylic Primer, B66-01310 Series (5.0-10.0 mils wet, 1.9-3.8 mils dry per coat).
 - iii. 2nd Coat: S-W Pro Industrial Waterbased Alkyd Urethane Enamel, Gloss Finish, B53 Series.
 - iv. 3rd Coat: S-W Pro Industrial Water-based Alkyd Urethane Enamel, Gloss Finish, B53 Series, (1.4 – 1.7 mils dry per coat).

3.9 INTERIOR PAINT SCHEDULE

A. GENERAL

1. Provide the following paint systems for the various substrates, as indicated on drawings, schedules and specifications.
2. Paint all exposed metals (steel framing, mechanical ducts, conduit, etc.) unless otherwise indicated on drawings.
3. Painter shall identify all fire and smoke partitions above lay in ceilings as follows: Wording shall be "FIRE AND SMOKE BARRIERS - PROTECT ALL OPENINGS" (4" high), to be applied every 8'- 0" on center.

B. INTERIOR METALS

1. Structural Steel / Metal Building Components.
 - a. Epoxy Egshel Finish.
 - i. 2 coats over primer with total dry film thickness not less than 6.0 mils.
 - ii. 1st Coat: S-W Pro Industrial Pro-Cryl Universal Primer, B66W01310 (5 – 10 mils wet, 1.9 – 3.8 mils dry per coat).
 - iii. 2nd Coat: S-W Pro Industrial Waterbased Catalyzed Epoxy EgShel Finish, B73-360 Series (5.0 – 12.0 mils wet, 2.0 – 5.0 mils dry per coat).
 - iv. 3rd Coat: S-W Pro Industrial Waterbased Catalyzed Epoxy EgShel Finish, B73-360 Series (5.0 – 12.0 mils wet, 2.0 – 5.0 mils dry per coat).
2. Zinc-Coated Metal
 - a. Alkyd Gloss Enamel Finish.
 - i. 2 Coats over primer, with total dry film thickness not less than 6.0 mils.
 - ii. 1st Coat: S-W Pro Industrial Pro-Cryl® Universal Acrylic Primer, B66-01310 Series (5.0-10.0 mils wet, 1.9-3.8 mils dry per coat) .
 - iii. 2nd Coat: S-W Industrial Enamel, Gloss Finish, B54 Series.
 - iv. 3rd Coat: S-W Industrial Enamel, Gloss Finish, B54 Series, (2-4 mils dry per coat).

- b. *(Contractor Option)* Waterbased Alkyd Gloss Enamel Finish.
 - i. 2 Coats over primer, with total dry film thickness not less than 6.0 mils.
 - ii. 1st Coat: S-W Pro Industrial Pro-Cryl® Universal Acrylic Primer, B66-01310 Series (5.0-10.0 mils wet, 1.9-3.8 mils dry per coat).
 - iii. 2nd Coat: S-W Pro Industrial Waterbased Alkyd Urethane Enamel, Gloss Finish, B53 Series.
 - iv. 3rd Coat: S-W Pro Industrial Waterbased Alkyd Urethane Enamel, Gloss Finish, B53 Series, (1.4 – 1.7 mils dry per coat).
3. Ferrous Metal
- a. Alkyd Gloss Enamel Finish.
 - i. 2 Finish Coats over primer, with total dry film thickness not less than 6.0 mils.
 - ii. 1st Coat: S-W Pro Industrial Pro-Cryl® Universal Acrylic Primer, B66-01310 Series (5.0-10.0 mils wet, 1.9-3.8 mils dry per coat).
 - iii. 2nd Coat: S-W Industrial Enamel, Gloss Finish, B54 Series.
 - iv. 3rd Coat: S-W Industrial Enamel, Gloss Finish, B54 Series, (2-4 mils dry per coat).
 - b. *(Contractor Option)* Waterbased Alkyd Gloss Enamel Finish..
 - i. 2 Finish Coats over primer, with total dry film thickness not less than 6.0 mils.
 - ii. 1st Coat: S-W Pro Industrial Pro-Cryl® Universal Acrylic Primer, B66-01310 Series (5.0-10.0 mils wet, 1.9-3.8 mils dry per coat).
 - iii. 2nd Coat: S-W Pro Industrial Waterbased Alkyd Urethane Enamel, Gloss Finish, B53 Series.
 - iv. 3rd Coat: S-W Pro Industrial Water-based Alkyd Urethane Enamel, Gloss Finish, B53 Series, (1.4 – 1.7 mils dry per coat).

C. INTERIOR MASONRY UNITS

- 1. Concrete Masonry Units (CMU).
 - a. Latex Semi-Gloss Enamel Finish
 - i. 2 Finish coats over filled surface with total dry film thickness of not less than 11.4 mils.
 - ii. 1st Coat: S-W Pro Industrial Heavy Duty Block Filler, B42W00150 (16.0 – 21.0 mils wet, 8.0 - 10.5 mils dry per coat).
 - iii. 2nd Coat: S-W ProMar 200 Zero VOC Latex Semi-Gloss, B31W12651 Series.
 - iv. 3rd Coat: S-W ProMar 200 Zero VOC Latex Semi-Gloss, B31W12651 Series (4 mils wet, 1.5 mils dry per coat).
 - v. Locations: Typical at all CMU unless otherwise indicated in the schedule.
 - b. Epoxy - Pre-Catalyzed Waterbased Semi-Gloss Finish.
 - i. 2 Finish coats over filled surface with total dry film thickness of not less than 11.4 mils.
 - ii. 1st Coat: S-W Pro Industrial Heavy Duty Block Filler, B42W00150 (16.0 – 21.0 mils wet, 8.0 - 10.5 mils dry per coat).
 - iii. 2nd Coat: S-W Pro Industrial® Pre-Catalyzed Waterbased Epoxy Semi-Gloss, K46-01151 Series (4 mils wet, 1.4 mils dry per coat).

- iv. 3rd Coat: S-W Pro Industrial® Pre-Catalyzed Waterbased Epoxy Semi-Gloss, K46-01151 Series (4 mils wet, 1.4 mils dry per coat).
- v. Locations: All Wet Areas in Athletic Facilities.
- c. Epoxy – Catalyzed Waterbased EgShel Finish.
 - i. 2 Finish coats over filled surface with total dry film thickness not less than 14.0 mils.
 - ii. 1st Coat: S-W Pro Industrial Heavy Duty Block Filler, B42W00150 (16.0 – 21.0 mils wet, 8.0 - 10.5 mils dry per coat).
 - iii. 2nd Coat: S-W Pro Industrial Catalyzed Waterbased Epoxy EgShel Finish, B73-360 Series.
 - iv. 3rd Coat: S-W Pro Industrial Catalyzed Waterbased Epoxy EgShel Finish, B73-360 Series (5.0 – 12.0 mils wet, 2.0 – 5.0 mils dry per coat).
 - v. Locations:
 - 1. All Showers Areas.
 - 2. Kitchens / Cafeterias / Servicing / Dining / Kitchen Storage / Dishwashing / Freezer-Coolers.
 - 3. FACS.
- 2. Existing Concrete Masonry Units (CMU).
 - a. If existing concrete block walls are covered with an enamel paint finish, the following shall be used:
 - i. 1st Coat: S-W Extreme Bond Primer, B51W00150 (3.1 mils wet, .9 mils dry).
 - ii. 2nd Coat: S-W ProMar 200 Zero VOC Latex Semi-Gloss, B31W12651 Series.
 - iii. 3rd Coat: S-W ProMar 200 Zero VOC Latex Semi-Gloss, B31W12651 Series (4 mils wet, 1.5 mils dry per coat) .
 - b. If the existing concrete block walls are covered with a latex paint finish, the following shall be used:
 - i. 1st Coat: S-W ProMar 200 Zero VOC Latex Primer, B28W02600 (4 mils wet, 1.0 mils dry).
 - ii. 2nd Coat: S-W ProMar 200 Zero VOC Latex Semi-Gloss, B31W12651 Series.
 - iii. 3rd Coat: S-W ProMar 200 Zero VOC Latex Semi-Gloss, B31W12651 Series (4 mils wet, 1.5 mils dry per coat).

D. GYPSUM DRYALL

- 1. Walls and Ceilings
 - a. Interior Acrylic Latex Semi-Gloss Finish.
 - i. 3 Coat system with dry film thickness not less than 3.8 mils.
 - ii. 1st Coat: S-W ProMar 200 Zero VOC Interior Latex Primer, B28W02600 (4 mils wet, 1.0 mils dry).
 - iii. 2nd Coat: S-W ProMar 200 Zero VOC Interior Latex Semi-Gloss Finish, B31W02651 Series.
 - iv. 3rd Coat: S-W ProMar 200 Zero VOC Interior Latex Semi-Gloss Finish, B31W02651 Series (4 mils wet, 1.5 mils dry per coat).
 - v. Locations: Typical at all Gypsum Drywall Walls and Ceilings unless otherwise indicated in the schedule.
 - b. Epoxy - Pre-Catalyzed Waterbased EgShel Finish.
 - i. 2 Finish coats over Primer with total dry film thickness not less than 14.0 mils.

- ii. 1st Coat: S-W ProMar 200 Zero VOC Latex Primer, B28W02600 (4 mils wet, 1.0 mils dry).
- iii. 2nd Coat: S-W Pro Industrial Pre-Catalyzed Waterbased Epoxy EgShel Finish, K45-01151.
- iv. 3rd Coat: S-W Pro Industrial Pre-Catalyzed Waterbased Epoxy EgShel Finish, K45-01151 (2-4 mils dry per coat).
- v. Locations: Walls and Ceilings at Showers Areas. *NOT in Shower Stalls.*
- c. *(Contractor Option)* Epoxy - Catalyzed Waterbased EgShel Finish.
 - i. 2 Finish coats over Primer with total dry film thickness not less than 14.0 mils.
 - ii. 1st Coat: S-W ProMar 200 Zero VOC Latex Primer, B28W02600 (4 mils wet, 1.0 mils dry).
 - iii. 2nd Coat: S-W Pro Industrial Catalyzed Waterbased Epoxy EgShel Finish, B73-360 Series.
 - iv. 3rd Coat: S-W Pro Industrial Catalyzed Waterbased Epoxy EgShel Finish, B73-360 Series (5.0 – 12.0 mils wet, 2.0 – 5.0 mils dry per coat).
 - v. Locations: Walls and Ceilings at Showers Areas. *NOT in Shower Stalls.*

E. INTERIOR WOODWORK

- 1. Painted Woodwork.
 - a. Interior Semi-Gloss Acrylic Latex with dry film thickness not less than 3.8 mils.
 - i. 1st Coat: S-W ProMar 200 Zero VOC Interior Latex Primer, B28W02600 (4 mils wet, 1.0 mils dry).
 - ii. 2nd Coat: S-W ProMar 200 Zero VOC Interior Latex Semi-Gloss Finish, B31W02651 Series.
 - iii. 3rd Coat: S-W ProMar 200 Zero VOC Interior Latex Semi-Gloss Finish, B31W02651 Series (4 mils wet, 1.5 mils dry per coat).
- 2. Stained Woodwork
 - a. Stained Varnish Rubbed Finish: 3 Finish Coats over stain plus filler on open grain wood.
 - i. 1st Coat: S-W MinWax Performance Series Tintable Interior Stain 550 VOC, (450-550 sq ft/gal) Available in 250 VOC Version.
 - ii. 2nd Coat: S-W MinWax Performance Series Fast-Dry Varnish.
 - iii. 3rd Coat: S-W MinWax Performance Series Fast-Dry Varnish (600-700 sq ft/gal) (available in Gloss, Semi-Gloss, Satin)
- 3. Wall Panels (Wood and Acoustical).
 - a. Interior Semi-Gloss Finish Acrylic Latex with dry film thickness not less than 3.8 mils.
 - i. 1st Coat: S-W ProMar 200 Zero VOC Interior Latex Primer, B28W02600(4 mils wet, 1.0 mils dry)
 - ii. 2nd Coat: S-W ProMar 200 Zero VOC Interior Latex Semi-Gloss, B31W02651 Series
 - iii. 3rd Coat: S-W ProMar 200 Zero VOC Interior Latex Semi-Gloss, B31W02651 Series (4 mils wet, 1.5 mils dry per coat)

END OF SECTION

SECTION 10160 - TOILET PARTITIONS

PART 1 - GENERAL

1.1 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.

1.2 DESCRIPTION OF WORK

- A. Extent of toilet partitions is indicated on drawings.
- B. Types of toilet partitions and screens required include the following:
 - 1. Solid phenolic with fused surface laminate, floor-supported, overhead-braced.
- C. Toilet accessories are specified elsewhere in Division 10.

1.3 QUALITY ASSURANCE

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication where possible, to ensure proper fitting of work. However, allow for adjustments within specified tolerances wherever taking of field measurements before fabrication might delay work.
- B. Coordination: Furnish inserts and anchorages which must be built into other work for installation of toilet partitions and related work; coordinate delivery with other work to avoid delay.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's detailed technical data for materials, fabrication, and installation, including catalog cuts of anchors, hardware, fastenings, and accessories.
- B. Shop Drawings: Submit shop drawings for fabrication and erection of toilet partition assemblies not fully described by product drawings, templates, and instructions for installation of anchorage devices built into other work.
- C. Samples: Submit full range of color samples for each type of unit required. Submit 6" square samples of each color and finish on same substrate to be used in work, for color selections.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function:
 - 1. Bobrick Washroom Equipment, Inc, 200 Commerce Drive, Clifton Park NY 12065-1350; Ph.: 518.877.7444; www.bobrick.com.
 - 2. General Partitions Mfg. Corp., 1702 Peninsula Drive, Erie, PA 16505-4243; Ph.: 814.833.1154; www.generalpartitions.com.
 - 3. ASI Global Partitions; 900 Clary Connector, Eastonollee, GA 30538; Ph.: 706.827.2700; www.asi-globalpartitions.com.
 - 4. ASI Accurate Partitions; 160 Tower Drive; Burr Ridge, IL 60527; Phone: 708.442.6800; www.asi-accuratepartitions.com.
 - 5. Bradley Partitions; W142N9101 Fountain Boulevard, Menomonee Falls, WI 53051; Ph.: 1.800.272.3539; www.bradleycorp.com.
 - 6. PSiSC - A Division of CSiSC; 9031 Farrow Road, Columbia, SC 29203; Ph.: 803.252.3020 Extension 106; www.psisc.com.
 - 7. Metpar; 95 State Street, Westbury, NY 11590; Ph: 516.333.2600; www.metpar.com.
- B. Equal products of other manufacturers may be used in the work, provided such products have been approved, by the Architect, not less than Ten (10) days prior to scheduled bid opening.

2.2 MATERIALS

- A. General: Provide materials which have been selected for surface flatness and smoothness. Exposed surfaces which exhibit pitting, seam marks, roller marks, stains, discolorations, telegraphing of core material, or other imperfections on finished units are not acceptable.
- B. Materials: Doors, panels and pilasters are composed of compressed cellulose fibers impregnated with resins. The surface laminate is fused to the resin-impregnated core. All edges are machined and finished smooth with beveled edge. Material will not delaminate even under extreme conditions. Materials are non-absorbent, impact and graffiti resistant. Materials are impervious to steam, soaps and detergents and will not mildew.
- C. Panels: Shall be 1/2" thick with eased edges uniformly machined to a 1/16" radius. Panels are 58" high and anchored to walls with 18 gauge stainless steel continuous brackets and continuous stainless steel brackets at panel to pilaster locations.
- D. Doors: Shall be 3/4" thick with eased edges uniformly machined to a 1/16" radius. Doors are 58" high and mounted to pilasters with continuous stainless steel surface mounted hinge. Pre-threaded inserts are to be provided for all door hardware. Each door is furnished with one coat hook/bumper, slide latches, stops and pulls (for outswing doors) to be made of stainless steel. Door hardware shall allow for lift up emergency access.
- E. Pilasters: Shall be 3/4" thick with eased edges uniformly machined to a 1/16" radius. Pilasters are 83" high (or as indicated on the drawings) and anchored to panels and walls with continuous stainless steel brackets. The pilasters contain no less than two level adjusting bolts on the bottom and attach to the floor with two 3/4" expansion bolts and are braced at the top with aluminum headrail.
- F. Stainless Steel Pilaster Shoes: Shall be 3" high, and constructed of 20-gauge stainless steel. Pilaster shoes are bolted onto pilaster with stainless steel, tamper resistant sex bolts and screws.
- G. Latches and Keepers: Shall be fabricated from stainless steel with a satin finish. Latch is mounted onto door with 1/4" stainless steel torx head bolts pre-threaded inserts and acts as the stop for inswing doors. Keepers are mounted on the pilasters with stainless steel toex head screws.
- H. Headrail: Shall be made of heavy-duty extruded aluminum (6463-T5 alloy) with bright-dip anodized finish. Headrail is anti-grip and attaches to the top of the pilasters with stainless steel, tamper resistant torx screws. Headrail is attached to the adjacent wall construction with a stainless steel headrail bracket.
- I. Headrail Bracket: Shall be made of 16 gauge stainless steel and is attached to the adjacent wall construction with #14 x 1 1/2" stainless steel phillips-head screws and plastic anchors.
- J. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel with pinhead, torx screws and bolts.

2.3 FABRICATION

- A. General: Furnish standard doors, panels, screens, and pilasters fabricated for partition system, unless otherwise indicated. Furnish units with cutouts, drilled holes, and internal reinforcement to receive partition-mounted hardware, accessories, and grab bars, as indicated.
- B. Door Dimensions: Unless otherwise indicated, furnish 24" wide inswinging doors for ordinary toilet stalls and 32" wide (clear opening) outswinging doors at stalls equipped for use by handicapped.
- C. Overhead-Braced Partitions: Furnish stainless steel supports and leveling bolts at pilasters, as recommended by manufacturer to suit floor conditions. Make provisions for setting and securing continuous aluminum overhead-bracing tube at top of each pilaster. Furnish shoe at each pilaster to conceal supports and leveling mechanism.
- D. Floor-Supported Partitions: furnish galvanized steel anchorage devices, complete with threaded rods, lock washers, and leveling adjustment nuts at pilasters, to permit structural connection at floor. Furnish shoe at each pilaster to conceal anchorage.

- E. Floor-Supported Over-Head Braced Screens: Furnish pilasters not less than 3/4" in thickness, panels and pilasters of same construction and finish as toilet partitions. Furnish galvanized steel anchorage devices, complete with threaded rods, lock washers, and leveling adjusting nuts at pilasters, to permit structural connection to floor. Furnish shoe at pilaster to conceal anchorage.
- F. Accessories: Furnish units with chromium-plated finish, unless otherwise indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. General: Comply with manufacturer's recommended procedures and installation sequences. Install partitions rigid, straight, plumb, and level.
- B. Provide clearances of not more than 1/2" between pilasters and panels, and not more than 1" between panels and walls. Secure panels to walls with full length stainless steel brackets. Secure panels to pilasters with not less than two stirrup brackets located to align with stirrup brackets at wall. Secure panels in position with manufacturer's recommended anchoring devices.
- C. Overhead-Braced Partitions and Screens: Secure pilasters to floor and level, plumb, and tighten installation with devices furnished. Secure overhead-brace to each pilaster with not less than two fasteners. Hang doors and adjust so that tops of doors are parallel with overhead-brace when doors are in closed position.
- D. Floor-Supported Partitions: Set pilaster units with anchorages having not less than 2" penetration into structural floor, unless otherwise recommended by partition manufacturer. Level, plumb and tighten installation with devices furnished. Hang doors and adjust so that tops of doors are level with tops partition when doors are in closed position.
- E. Screens: Attach with concealed anchoring devices, as recommended by manufacturer to suit supporting structure. Set units to provide support and to resist lateral impact.
- F. Accessories: Mount accessories to partition units in accordance with manufacturer's instructions.

3.2 ADJUST AND CLEAN

- A. Hardware Adjustment: Adjust and lubricate hardware for proper operation. Set hinges on inswinging doors to hold open approximately 30 degrees from closed position when unlatched. Set hinges on outswinging doors (and entrance swing doors) to return to fully closed position.
- B. Clean exposed surfaces of partition systems using materials and methods recommended by manufacturer and provide protection as necessary to prevent damage during remainder of construction period.

END OF SECTION

SECTION 10410 - IDENTIFYING DEVICES

PART 1 - GENERAL

1.1 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.

1.2 DESCRIPTION OF WORK

- A. Types of identifying devices specified in this section include the following:
 - 1. **Room Signs** (See Door Schedule)
- B. Note to the Contractor: If the Contract Sum (as awarded) is \$100,000.00 or more, the Contractor shall furnish and erect a project sign and interior plaques as shown in "Detail of Project Sign" (DCM Form C-15) and "Plaque Detail" bound in the Project Manual at the end of "General Conditions". The project sign shall be erected in a prominent location selected by the Architect and Owner and shall be maintained in good condition until completion of Work.
- C. Extent of signs and plaque is indicated on the drawings.

1.3 QUALITY ASSURANCE

- A. Drawings and Specifications are based on one manufacturer's standard products. Another standard system of a similar and equivalent nature may be acceptable when the differences do not materially detract from the design concept or intended performance as judged solely by the Architect.
- B. **General Contractor is responsible for verifying signage requirements and correct wording, names etc. with Owner and Architect before ordering.**

1.4 SUBMITTALS

- A. Shop Drawings: Submit shop drawings for each type of device. Include large scale sections of typical members and other components. Provide dimensioned elevations. Show anchorages, grounds and reinforcement and indicate finishes.

PART 2 - PRODUCTS

2.1 ROOM SIGNS

- A. MANUFACTURER:
 - 1. The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function.
 - a. ASI Sign Systems, Inc., 8181 Jetstar Drive, Suite 100, Irving, TX 75063; www.asisignage.com; 1-800-274-7732
 - b. Best Sign Systems, www.bestsigns.com; 1202 N. Park Avenue, Montrose, CO 81401-3171, Phone (970) 249-2378 or 1-800-235-2378; Fax (970) 249-0223
 - c. Leeds Architectural Letters of Alabama Inc, www.leedsletters.com; P.O. Box 40, Leeds, AL 35094; Phone (205) 699-5271; Fax (205) 699-3342
 - d. Bayuk Graphic Systems, Inc., www.bayukgraphics.com; 5005 Old Lincoln Highway Parkesburg, PA 19365; Phone: (717)-442-0274; Fax: (717)-442-1289
 - e. Mohawk Sign Systems; www.mohawksign.com; 5 Dandreaano Dr, Amsterdam, NY 12010; Ph. 518.842.5303.
 - 2. Substitutions: Equal products of other manufacturers may be used in the work, provided such products have been approved by the Architect, not less than Ten (10) days prior to scheduled bid opening.
- B. MATERIALS:

1. Provide 6" x 8" high laminated plastic with raised lettering complying with the Americans with Disabilities Act (ADA).
2. All Signs MUST include 1" Slide In Window Slot.
3. Color to be selected by the Architect after bid date from manufacturer standards.
4. Use International Symbols of accessibility for identifying facilities as accessible.
5. Letters and numerals shall be raised 1/32 in (0.8 mm) minimum, upper case, sans serif or simple serif type and shall be accompanied with Grade 2 Braille.
6. Raised characters shall be at least 5/8 in (16 mm) high, but no higher than 2 in (50 mm).
7. Pictograms shall be accompanied by the equivalent verbal description placed directly below the pictogram. The border dimension of the pictogram shall be 6 in (152 mm) minimum in height.
8. **See Door Schedule. If not shown provide 20 letter characters per room sign.**
9. **The Supplier will be required to meet with the Owner for exact wording for all room signs before preparation of the shop drawing submittal to the Architect for approval.)**
10. Tactile characters on signs shall be located 48 inches (1220 mm) minimum above the finish floor or ground surface, measured from the baseline of the lowest tactile character and 60 inches (1525 mm) maximum above the finish floor or ground surface, measured from the baseline of the highest tactile character.
 - a. Where a tactile sign is provided at a door, the sign shall be located alongside the door at the latch side.
 - b. Where a tactile sign is provided at double doors with one active leaf, the sign shall be located on the inactive leaf.
 - c. Where a tactile sign is provided at double doors with two active leafs, the sign shall be located to the right of the right hand door.
 - d. Where there is no wall space at the latch side of a single door or at the right side of double doors, signs shall be located on the nearest adjacent wall.
 - e. Signs containing tactile characters shall be located so that a clear floor space of 18 inches (455 mm) minimum by 18 inches (455 mm) minimum, centered on the tactile characters, is provided beyond the arc of any door swing between the closed position and 45 degree open position. Mounting devices shall be concealed.

2.2 PLAQUE

A. MANUFACTURER:

1. The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function.
 - a. Impact Architectural Signs, www.impactsigns.com; 26 E. Burlington Avenue, LaGrange, IL 60525; (708) 469-7178; impact@impactsigns.com
 - b. Leeds Architectural Letters of Alabama Inc, www.leedsletters.com; P.O. Box 40, Leeds, AL 35094; Phone (205) 699-5271; Fax (205) 699-3342
 - c. Matthews Architectural Products, www.matthewsid.com; 2 North Shore Pittsburgh, PA 15212; (412) 571-5500; (800) 950-1317
 - d. A.R.K. Ramos Architectural Signage, www.arkramos.com; 1321 S. Walker Ave., Oklahoma City, OK; Ph. 800.725.7266
2. Substitutions: Equal products of other manufacturers may be used in the work, provided such products have been approved by the Architect, not less than Ten (10) days prior to scheduled bid opening.

B. MATERIALS

1. Refer to *Detail Of Plaque (ABC Form C-16, August 2001)* at the front end of the project manual.
2. Size: 24" high x 30" wide.
3. Cast aluminum with bronze finish of standard alloy, hand tooled and chased.
4. Raised letters and border.
5. Satin finish.
6. Background pebbled finish and oxidized to a darker finish.
7. Casting to be free of pits and holes, square and true with no warping.
8. Border style to be single line.
9. Letters to be flat face classic design.
10. Furnish Rubbing to Architect for approval.

C. Wording on the plaque shall read as follows.

Renovations of the Arts Center To Goshen Arts Center For the Pike County Schools Troy, ALABAMA ERECTED (Year) STATE OF ALABAMA THE PIKE COUNTY BOARD OF EDUCATION MR. ERNEST GREEN, PRESIDENT DR. GREG PRICE, VICE PRESIDENT MR. SCOTT HARTLEY, BOARD MEMBER MRS. CATHY KECK, BOARD MEMBER DR. CLINT FOSTER, BOARD MEMBER MRS. AMANDA HUGHES, BOARD MEMBER DR. MARK BAZZELL, SUPERINTENDENT SUPERVISED BY Alabama Real Property Management, Division of Construction Management MCKEE AND ASSOCIATES ARCHITECTS, INC

2.3 PROJECT SIGN

A. MATERIALS

1. Refer to *Detail of Project Sign (DCM Form C-15, August 2021)* at the front end of the project manual.

STATE OF ALABAMA

THE PIKE COUNTY BOARD OF EDUCATION
MR. ERNEST GREEN, PRESIDENT
DR. GREG PRICE, VICE PRESIDENT
MR. SCOTT HARTLEY, BOARD MEMBER
MRS. CATHY KECK, BOARD MEMBER
DR. CLINT FOSTER, BOARD MEMBER
MRS. AMANDA HUGHES, BOARD MEMBER
DR. MARK BAZZELL, SUPERINTENDENT

KAY IVEY, GOVERNOR

"Investing in Alabama's Future"

RENOVATIONS OF THE ARTS CENTER TO GOSHEN ARTS CENTER TO
GOSHEN HIGH SCHOOL FOR THE
PIKE COUNTY SCHOOLS
TROY, ALABAMA

Alabama Real Property Management, Division of Construction Management

McKEE AND ASSOCIATES ARCHITECTS, INC

(COMPANY NAME), CONTRACTOR

B. Wording on the project sign shall read as follow.

2.4 FABRICATION

- A. General: Fabricate signs to comply with requirements indicated including, dimensions, design details, quality, thickness and finish of materials. Use materials and shapes of sufficient thickness, with reinforcing, if needed, to produce sufficient flatness, free of "oil canning", and to impart sufficient strength for size, design and application indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install units plumb and level, in locations and with mounting shown. Securely attach to the supporting structure with concealed fasteners, in accordance with the manufacturer's installation instructions.

3.2 CLEANING AND PROTECTION

- A. At completion of the installation, clean surfaces in accordance with the manufacturer's instructions. Protect units from damage until acceptance by the Owner.

END OF SECTION

SECTION 10800 - TOILET ACCESSORIES

PART 1 - GENERAL

1.1 GENERAL

- A. Drawings and general provisions of contract including General and Supplementary Conditions and Division 1 Specification sections apply to work of this section.

1.2 RELATED DOCUMENTS

- A. Section 06100, Rough Framing for Blocking

1.3 DESCRIPTION OF WORK

- B. Extent of each type of toilet accessory is indicated on drawings and schedules.
- C. **NOTE: Prior to placing any orders for items within this section, the General Contractor is responsible for verifying all toilet accessories with the Owner. Should the owner choose to provide/supply any of these toilet accessories, the General Contractor shall issue a deductive Change Order for material only. The General Contractor will maintain responsibility for installation.**
- D. Toilet Accessories **Furnished and Installed by the Contractor** as follows:
 - 1. Soap Dispensers
 - 2. Toilet Tissue Dispensers
 - 3. Paper Towel Dispensers
 - 4. Grab Bars
 - 5. Mirror Units
 - 6. Utility Shelf/Mop Rack
 - 7. Electric Hand Dryers
 - 8. Baby Changing Station

1.4 QUALITY ASSURANCE

- A. Inserts and Anchorages: Furnish inserts and anchoring devices which must be set in concrete or built into masonry; coordinate delivery with other work to avoid delay.
- B. Accessory Locations: Coordinate accessory locations with other work to avoid interference and to assure proper operation and servicing of accessory units.
- C. Products: Provide products of same manufacturer for each type of accessory unit and for units exposed in same areas, unless otherwise acceptable to Architect.

1.5 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data and installation instructions for each toilet accessory.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. The following manufacturer's products have been used to establish minimum standards for materials, workmanship and function.
 - 1. Soap Dispensers:
 - Wall Mounted over each sink
 - a. Approved Products:

Renovations of the Arts Center To
Goshen High School for the
Pike County Schools
Troy, Alabama

TOILET
ACCESSORIES
10800-1

- i. Bobrick #B-2112
 - ii. ASI #0345
 - iii. Bradley #6562
- 2. Toilet Tissue Dispensers:
 - a. Roll Type: (One each water closet)
 - b. Approved Products:
 - i. Bradley #5425
 - ii. ASI #0040
- 3. Paper Towel Dispensers:
 - a. Roll Type
 - b. Surface Mounted
 - c. Approved Products:
 - i. Bobrick #B52860
- 4. Grab Bars:
 - a. Where shown on Plans with Safety-Grip Finish.
 - b. Approved Products:
 - i. Bradley Corporation #8122
 - ii. Series ASI #3200P
 - iii. Bobrick #B6806.99
- 5. Mirror Units:
 - a. 18" x 36" One over each lavatory
 - b. 24" x 48" One at each Gang Toilet (if applicable)
 - c. Approved Products:
 - i. Bradley #780
 - ii. Bobrick #B290
 - iii. ASI #0600
- 6. Utility Shelf/Mop Rack:
 - a. Provide at all locations indicated on drawings.
 - b. Provide minimum of One (1) at each Janitor Closet if none are indicated on drawings.
 - c. Prior to installation of items within this section, the General Contractor is responsible for verifying actual installation locations with the Architect, regardless of locations indicated on drawings.
 - d. Approved Products:
 - i. ASI #1308-4 (44")
 - ii. Bradley #9934 (44')
 - iii. Bobrick #B239 x 44
- 7. Electrical Hand Dryers:
 - a. As shown on Plans at Gang Toilets
 - b. Approved Products:

- i. Excel – XL-BW
 - ii. World Dryer Corporation - SLIMdri
- 8. Baby Changing Station
 - a. At locations indicated on drawings.
 - b. Approved Products:
 - i. Koala Kare Model No. KB200
 - ii. Color to be selected by Architect after bid date from manufacturer's standards.
 - iii. Include 1 case of Bed Liners Model No. KB150-99.
- B. Equal products of other manufacturers may be used in the work provided such products have been approved by the Architect not less than Ten (10) days prior to scheduled bid opening.

2.2 MATERIALS, GENERAL

- A. Stainless Steel: AISI Type 302/304, with polished No. 4 finish, 22 gage minimum, unless otherwise indicated.
- B. Mirror Units: Mirror glass shall be FS DD-G-451, Type I, Class I, Quality q2, 1/4" thick, with silver coating, copper protective coating, and non-metallic paint coating complying with FS DD-M-411. Mirror shall be provided in stainless steel frames.
- C. Fasteners: Screws, bolts, and other devices of same material as accessory unit or of galvanized steel where concealed.

2.3 FABRICATION

- A. General: Stamped names or labels on exposed faces of toilet accessory units are not permitted, except where otherwise indicated; in obtrusive labels on surfaces not exposed to view are acceptable. Where locks are required for a particular type of toilet accessory, provide same keying throughout project.
- B. Furnish two keys for each lock.
- C. Surface Mounted Toilet Accessories General: Except where otherwise indicated, fabricate units with tight seams and joints, exposed edges rolled. Hang doors or access panels with continuous stainless steel piano hinge. Provide concealed anchorage wherever possible.
- D. Recessed Toilet Accessories, General: Except where otherwise indicated, fabricate units of all welded construction, without mitered corners. Hang doors or access panels with full-length stainless steel piano hinge. Provide anchorage which is fully concealed when unit is closed.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install toilet accessory units in accordance with manufacturer's instructions, using fasteners which are appropriate to substrate and recommended by manufacturer of unit. Install units plumb and level, firmly anchored in locations and at heights indicated.

3.2 ADJUSTING AND CLEANING

- A. Adjust toilet accessories for proper operation and verify that mechanisms function smoothly. Replace damaged or defective items.
- B. Clean and polish all exposed surfaces after removing labels and protective coatings.

END OF SECTION

SECTION 11520 – PROJECTORS

PART 1 - GENERAL

1.1 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. Section 09250, Gypsum Drywall.
- C. Section 09510, Acoustical Ceilings.

1.2 DESCRIPTION OF WORK

- A. Extent of Ceiling mounted LCD Projectors is shown on drawings.
- B. Types of products in this section include the following:
 - 1. Ceiling mounted LCD Projector (3 required).

1.3 QUALITY ASSURANCE

- A. Uniformity: Provide each type of projectors as produced by a single manufacturer, including necessary mounting accessories, fittings, and fastenings.

1.4 SUBMITTALS

- A. Product Data: Submit manufacturer's technical data and installation instructions for projectors.
- B. Shop Drawings: Submit shop drawings of projectors, verifying dimensions affecting installations.

1.5 JOB CONDITIONS

- A. Do not deliver projectors until building is enclosed and ready for installation. Protect projectors from damage during delivery, handling, storage, and installation. Deliver products in manufacturer's original, unopened, undamaged containers with labels intact.

PART 2 – PRODUCTS

2.1 MANUFACTURERS

- A. The following manufacturers products have been used to establish minimum requirements for materials, workmanship, and function:
 - 1. Dukane Audiovisual | 2900 Dukane Drive, St. Charles, IL 60174 | PH: 888.245.1966
- B. Equal products of other manufacturers may be used in the work, provided such products have been approved, by the Architect, not less than Ten (10) days prior to scheduled bid opening.

2.2 PROJECTORS

- A. Ceiling mounted projector, consisting of mounting accessories, and other components necessary for complete installation; equal to **Dukane ImagePro 8932WB**, LCD Projector. Projector shall meet the following requirements:

Specifications		
Display	Projection Technology	3LCD, 3 chip technology
	Resolution	WXGA - 1280 x 800
	White Light Output	3,200 ANSI lumens
	Color Light Output	3,200 ANSI lumens
	Colors	16.7 million colors
	Aspect Ratio	Native 4:3 and 16:9 / 16:10 / 14:9 / zoom compatible
	Contrast Ratio	20,000 : 1 (using active IRIS)
	Throw Ratio (distance : width)	1.5 - 1.8 : 1
	Focus Distance	35" - 453"
	Display Size	30" - 300"
Lens & Operation	Lens	f = 19 - 23 mm, x 1.2 manual zoom and focus
	Lamp Wattage	230W
	Expected Lamp Life*	Approximately 6,000 hours (standard mode) 12,500 hours (eco mode)
	Expected Filter Life**	Approximately 10,000 hours
	Speaker Output	16W
	Keystone	H and V: +/- 30
Compatibility	Computer	VGA, SVGA, XGA, WXGA, SXGA/SXGA+/HD/UXGA (compressed), Mac 16"
	H-Sync	15 kHz - 106 kHz
	V-Sync	56 Hz - 120 Hz
	Composite Video	NTSC, NTSC4.43, PAL, PAL-M, -N, SECAM
	Component Video	480i, 480p, 576i, 576p, 720p, 1080i, 1080p
	HDMI	480i, 480p, 576i, 576p, 720p, 1080i, 1080p Computer signal TMDS Clock 25 MHz - 162 MHz
Connectors	Digital Input	HDMI x 2 (HDCP compliant)
	Computer Input 1	15-pin mini D-sub x 1 (shared with analog component video input)
	Computer Input 2	15-pin mini D-sub x 1 (shared with analog component video input and monitor out)
	Computer Monitor Output	15-pin mini D-sub x 1 (shared with computer in 2 and analog component video input)
	Video Input	
	Composite Video	RCA jack x 1
	Component Video	15-pin mini D-sub x 2 (shared with computer in 1, in 2/monitor out)
	Audio Input	3.5 mm stereo mini jack x 2, RCA jack (L/R) x 1
	Audio Output	3.5mm stereo mini jack x 1
	Network LAN Wired	RJ-45 port (10 base-T/100 base-TX)
	Network LAN Wireless	USB-A, IEEE802.11 a/b/g/n/ac - optional wireless adapter required
	USB	Type A x 1 (PC-less presentation or wireless adapter) Type B x 1 (Remote control mouse or PC screen display)
	Control Terminals	9-pin D-sub x 1 (RS-232 control)

Ratings & Warranty	Power Supply	AC100-120V / AC220-240V, 50/60Hz
	Power Consumption	320W / 310W
	Operating Temperature	32°F - 95°F (0°C - 35°C)
	Dimensions (W x D x H)	13.7" x 10.4" x 3.5" (excluding protrusions) Shipping 17.0" x 15.0" x 8.0"
	Weight	Approximately 7.9 lbs. / Shipping 15.0 lbs.
	Approvals	UL 60950-1 / cUL FCC Part 15 subpart B class B
	Warranty	Five (5) year limited warranty plus Dukane's 1 year Peace of Mind Loaner Program. 5 years or 10,000 hours light source.
	UPC	605194006915

2.3 PROJECTOR MOUNT

- A. The Vector Pro Plus projector mount shall be a Peerless Model PJF UNV-S and shall be mounted where indicated on the plans. It shall feature 30° (±15°) pitch, 30° (±15°) roll, and 360° yaw. It shall have a 50 lb load capacity. It shall have a quick release spring loaded screw for easy removal and installation of the projector. It shall feature security screws. It shall be constructed of aluminum and nylon finished in black or silver. The main housing is constructed of aluminum. The connector, which locks into the steel adapter plate, is constructed of nylon and is secured to the aluminum ball joint with a 1/4 -20 1 1/2" long steel bolt. The nylon material can take direct heat up to 250° without any deformation. Its melting point is 500° F. The Vector Pro Plus is capable of holding up to 50 lb at the maximum 15° roll or pitch. Installation and assembly shall be done in accordance with the instructions provided by the manufacturer.

PART 3 – EXECUTION

3.1 PREPARATION

- A. Field Measurements: Take field measurements prior to preparation of shop drawings and fabrication of special components, when possible, to ensure proper fitting of work.

3.2 INSTALLATION

- A. Install at locations shown in accordance with manufacturer's instructions for plumb, level, and rigid installation.
- B. Install to comply with manufacturer's instructions.

3.3 ADJUST AND CLEAN

- A. Touch-up marred finishes but replace units which cannot be restored to factory-finished appearance. Use only materials and procedures recommended or furnished by projection screen manufacturer.

END OF SECTION

SECTION 11521 - PROJECTION SCREENS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: This Section specifies electrically operated front projection screens and accessories.

1.2 RELATED SECTIONS

- 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 09250 – Gypsum Drywall
- C. Section 09510 – Acoustical Ceilings
- D. Section 16000 – Electrical

1.3 DEFINITIONS

- A. Gain: Indication of screen's luminance or brightness, measured perpendicular to screen center and relative to magnesium carbonate block, which serves as standard for 1.0 gain. Higher numbers indicate greater brightness.
- B. Viewing Angle: Horizontal angle from perpendicular center of screen at which gain or brightness decreases by 50%.
- C. Format: Proportion of projection screen viewing area expressed as a ratio of width/height.
 - 1. NTSC or Video Format: 1.33:1.
 - 2. HDTV Format: 1.78:1.
 - 3. 16:10 Wide: 1.60:1.
 - 4. Cinemascope: 2.35:1.
 - 5. Letterbox: 1:85:1.
 - 6. Square: 1:1.

1.4 REFERENCES

- A. International Code Council (ICC):
 - 1. International Building Code.
- B. Society of Motion Picture and Television Engineers (SMPTE):
 - 1. SMPTE RP 94-2000, Gain Determination of Front Projection Screens.
- C. Underwriters Laboratories Inc. (UL).
- D. Underwriters' Laboratories of Canada (ULC).

1.5 ACTION SUBMITTALS

- A. General: Submit listed action submittals in accordance with Contract Conditions and Section 01330 - Submittal Procedures and 01600 – Product Requirements.
- B. Product Data: Submit product data, including manufacturer's technical product data sheet, for specified products.
 - 1. Material Safety Data Sheets (MSDS).
- C. Shop Drawings: Indicate dimensions, fabrication and installation details.
 - 1. Show screens in detail, method of installation, trim, screen, and accessories.
 - 2. Include electric wiring diagrams.

D. Samples: Submit [2] samples of screen finish material having dimensions of [6 inches × 6 inches

Renovations of the Arts Center To PROJECTION SCREENS
Goshen High School for the 11521-1
Pike County Schools
Troy, Alabama

(152 × 152 mm)].

1.6 INFORMATION SUBMITTALS

- A. Quality Assurance:
 - 1. Test Reports: Certified test reports showing compliance with specified performance characteristics and physical properties.
 - 2. Certificates: Product certificates signed by manufacturer certifying that materials comply with specified performance characteristics, criteria and physical requirements.
 - 3. Manufacturer's installation instructions.

1.7 CLOSEOUT SUBMITTALS

- A. Operation and Maintenance Data: Submit for products in accordance with Section [01 78 00 - Closeout Submittals]. Include:
 - 1. Manufacturer's instructions detailing maintenance requirements.
 - 2. Parts catalog that includes complete list of repair and replacement parts, with cuts and identifying numbers.

1.8 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Worker experienced in performing work of this section who has specialized in work similar to that required of this project.
- B. Regulatory Requirements:
 - 1. Comply with International Building Code (IBC), Building Code for State of Alabama and City and local codes and ordinances.
- C. Preinstallation Meetings: Conduct preinstallation meeting to verify project requirements and manufacturer's instructions. Attendees shall include Contractor, Projection Screen Manufacturer/Supplier representative and Architect representative.

1.9 DELIVERY, STORAGE & HANDLING

- A. Storage and Protection:
 - 1. Store electric projection screens in a dry, ventilated area, protected from exposure to harmful weather conditions, at a temperature less than 80 degrees F (27 degrees C).
- B. Handling: Handle electrically operated projection screen materials with care in order to prevent damage.
- C. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

1.10 JOB CONDITIONS

- A. Do not deliver projection screens until building is enclosed and ready for installation. Protect projection screens from damage during delivery, handling, storage, and installation.

1.11 SEQUENCING

- A. Sequence With Other Work: Comply with projection screen manufacturer's written recommendations for sequencing construction operations.

1.12 WARRANTY

- A. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and does not limit, other rights Owner may have under Contract Documents.
- B. Warranty: Commencing on date of acceptance by Owner.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. The following manufacturers products have been used to establish minimum requirements for materials, workmanship, and function:
 - 1. Da-Lite Screen Company, Inc.; Contact: P.O. Box 137, 3100 N. Detroit St., Warsaw, IN 46581-0137; Telephone: (800) 622-3737, (574) 267-8101; Fax: (877) 325-4832, (574) 267-7804; E-mail: info@da-lite.com; website: www.da-lite.com
- B. Equal products of other manufacturers may be used in the work, provided such products have been approved, by the Architect, not less than Ten (10) days prior to scheduled bid opening.

2.2 MATERIALS

- A. Acceptable Material: Da-Lite Screen Company, Inc. Large Advantage Electrol Projection Screen.
 - 1. Screen Viewing Surface:
 - a. Front projection, flame retardant, mildew resistant, vinyl coated fiberglass, black backed, [with] [without] standard black borders, easily cleaned with mild soap and water solution.
 - b. Seams: Seamless when screen heights are less than 16 feet (4.9 m).
 - c. Gain: To SMPTE RP 94-2000, 1.0.
 - d. Viewing angle: 60.
 - e. Format: 16:10 Wide - 1.60:1.
 - 2. Acceptable Viewing Surface: Da-Lite Screen Company, Inc.:
 - a. Matte White.
- B. Optional Accessories:
 - 1. Screen Drop: Extra drop in [black] [white] fabric. NONE
 - 2. Single Motor Low Voltage Control (LVC): [External] [Internal].
 - 3. Wireless Remote Control for LVC: 3-button handheld remote control for UP, DOWN and STOP functions, with single motor, low voltage control unit.
 - a. Type: Radio Frequency Remote with Frequency Range Extender.
 - 4. Key Locking Cover Plate: Hinged cover plate with brushed stainless steel finish provides keyed access to [120 V] [LVC] wall switch.
 - 5. Video Projector Interface Control: [Internal] [External], DC controls and low voltage 3-button switch with cover plate for wall switch operation.
 - 6. Key Operated Switch for 120 V: Flush mounted wall control switch with white cover plate, key activated for security.
 - 7. External SCB-100 Serial Control Board [with NET-100 Ethernet-Serial Adapter].
- C. Screen Operation: Electrically operated, UL and ULC listed, retractable, heavy duty, with rigid metal roller.
 - 1. Motor: Single motor, UL and ULC certified, 3-wire, permanently lubricated reversal-type, attached to header and including automatic thermal overload protection, integral gears, capacitor and electric brake to prevent coasting.
 - a. Voltage, Frequency: [115 V, 60 Hz] [220/240 V, 50 Hz].
 - b. Amperage: 2.4 amps.
 - c. Limit Switches: Preset and adjustable to automatically stop viewing surface in UP or DOWN position.
 - d. Housing: Inside metal roller.

- D. Screen Mounting: Ceiling recessed.
 - 1. Include mounting hardware.
- E. Screen Case: Designed to receive mounting hardware and sized to suit projection screen.
 - 1. Material: Single piece extruded aluminum.
 - 2. Length: [195 1/2] inches.
 - 3. Finish:
 - a. Powder coated [White] [Black]. To Be Selected by Architect.
- F. Screen Size:
 - 1. Viewing Area: H [110] inches × W [176] inches.

PART 3 – EXECUTION

3.1 INSTALLERS

- A. Provide experienced and qualified technicians to install electrically operated projection screens.

3.2 MANUFACTURER'S INSTRUCTIONS

- A. Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalog installation instructions, product carton installation instructions and Da-Lite Screen Company, Inc., technical data sheets.

3.3 EXAMINATION

- A. Site Verification of Conditions
 - 1. Verify that conditions of substrates previously installed under other sections or contracts are acceptable with electrically operated projection screen installation.
 - 2. Ensure electrical power supply is installed to meet electric projection screen requirements in accordance with Section 16000 - Electrical].
 - a. Verify type and location of power supply.
 - 3. Inform Owner and Architect of unacceptable conditions immediately upon discovery.
 - 4. Proceed with installation only after unacceptable conditions have been corrected.

3.4 COORDINATION

- A. Coordinate electric projection screen placement with placement of other ceiling and wall mounted components.

3.5 INSTALLATION

- A. Install electric projection screens in accordance with reviewed shop drawings at locations and heights indicated.
- B. Install screen housing and make electrical connections in conjunction with installation of ceiling system.
 - 1. Verify locations with [Owner] [Architect] prior to installation.
- C. Install viewing surface and drive assembly in housing only after interior construction is substantially complete.
- D. Securely install screens plumb and level to supporting substrate.

3.6 FIELD QUALITY CONTROL

- A. Manufacturer's Field Services: Have manufacturer's technical representative schedule site visits to review work as follows:
 - 1. At Pre-Installation Meeting when preparatory work for which work of this Section depends is complete, but before installation begins.

2. During progress of work as needed.
 3. Upon completion of work, after cleaning is carried out.
- B. Testing and Inspection: Operate each screen to ensure viewing surfaces extend and retract through full range of motion.
1. Verify controls, limit switches, [automatic doors] and other components function as designed and meet project requirements.
 2. Ensure viewing surface raising operation fully engages and lifts screen closure door into closed position.
 3. Adjust motors, controls and components to allow for smooth, unobstructed screen operation.

3.7 FINAL CLEANING

- A. Perform cleanup in accordance with Section [01 74 00 - Cleaning and Waste Management].
- B. Upon completion, remove surplus materials, rubbish, tools and equipment.

3.8 PROTECTION

- A. Protect electrically operated projection screens from damage during construction in accordance with Section [0170 - Protecting Installed Construction].
- B. Repair damage to adjacent materials caused by electrically operated projection screen work.

END OF SECTION

SECTION 11614 - STAGE CURTAIN AND ACCESSORIES

PART 1 - GENERAL

1.1 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.

1.2 SCOPE OF THE WORK

- A. The work required to be done under this contract includes all labor, materials, equipment and services necessary for or incidental to the furnishings and installing of all the **Stage Curtains and Curtain Tracks**, complete and ready for use in strict accordance with the Contract Documents.

1.3 MEASUREMENTS

- A. This Contractor is required to take all measurements he may require at the building prior to bid. He shall consult with the various other contractors whose work adjoins his work and he shall be responsible for the proper working out of all details.

1.4 WORKMANSHIP

- A. All workmanship and finish must be first class in every particular and strictly in accordance with the best practice. All work shall be made in accordance with approved drawings. All work made in sections shall be carefully fitted together. All units shall be properly laid out and spaced between terminals.

1.5 SECURING TO OTHER WORK

- A. This Contractor shall do all drilling and fitting, and work of similar character required in the fitting and setting of his materials in place.
 - 1. He shall do all cutting and fitting required in connection of his materials to the adjoining work of other contractors.
 - 2. He shall provide all connecting members needed for properly securing this work to the masonry, joists, walls, structural members, or other parts of the building as may be best suited for each case.

1.6 RUBBISH

- A. At the completion of the work, this Contractor shall remove all rubbish and accumulated materials not caused by other trades from the building and shall leave the work and site in a clean, orderly and acceptable condition.

1.7 GUARANTEE

- A. This Contractor shall guarantee the entire installation for a period of one (1) year after the completion and acceptance of the building, against any faulty workmanship, manufacture, or installation. Any defects that may appear within said time shall be repaired or replaced at this contractor's expense and at no additional expense to the Owner. All replacement items shall be of approved new materials.

1.8 INTENT

- A. It is the prime intent of these specifications, schedules and applicable drawings, to show and define the essential minimum requirements as to the quality of materials, construction, finish, and overall workmanship. The Owner reserves the right to review any proposal offering equipment which in his opinion does not meet the standard of quality established by these specifications. Any such decision will be considered final and not subject to further recourse.

1.9 DRAWINGS

- A. This Contractor shall prepare and furnish to the Owner complete detailed working drawings and erection drawings consistent with these specifications. Sufficient erection drawings shall be

provided in order to supply other contractors doing work in conjunction with this work with proper instructions to coordinate their work in conjunction with this work.

1.10 RELOCATION

- A. The Owner reserves the right to notify the Contractor of any desired change in the spacing of sets without causing change in bid price.
 - 1. Such notification must be made before the installation of pieces of equipment for that set listed on the schedule has begun.
 - 2. The Contractor, while carefully following the detailed schedule of sets, may make such minor changes as he deems necessary to clear possible obstacles. Notification must be made to the Owner's representative on the job. Any relocation of a major nature must be proposed in writing to the Owner.

1.11 TRIMMING OF SETS

- A. After final installation, all curtains shall trim to within 1" of the floor. Tracked curtains shall maintain this trim during operation from full open to full close.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. The following manufacturers products have been used to establish minimum requirements for materials, workmanship, and function:
 - 1. Kendall Stage Curtains, Lascassas, TN
 - 2. LuXout, Richmond VA
 - 3. Stage Decoration and Supplies, Inc., Greensboro, NC
 - 4. NorthEast Stage, Richmond, VA
- B. Equal products of other manufacturers may be used in the work, provided such products have been approved, by the Architect, not less than Ten (10) days prior to scheduled bid opening.

2.2 MATERIALS - GENERAL

- A. The following General Specifications shall apply throughout this section of the specifications and the accompanying drawings, whenever the individual parts involving them may occur, or whenever reference is made to them. Manufacturers' names and catalog numbers are used to indicate quality and/or special designs or inclusions which shall be required in that type item on this job.

2.3 MATERIALS – FRONT CURTAIN & VALANCE & TRACK

- A. The front curtain shall be made of 54" memorable velour as manufactured by K/M Fabrics, Inc., Greenville, S.C., in 50% fullness and flameproofed. Color of curtain and valance to be selected. All pleats will be sewn in at top of curtain on heavy 3-1/2" jute webbing. The curtain will have pleats and grommets twelve (12) inches o.c. with #9 galvanized "S" hooks in grommets for attaching to track carriers. The bottom hems in the curtain will be four (4) inches with rust-proof, galvanized chain weight encased in separate duck chain pocket inside hems. The leading edges of the curtain will have a minimum of 12" of material turned back. The front curtain shall be made in two (2) sections. All hems and leading edges to be put in with special blindstitch machine.
 - 1. Front Curtain: The front curtain will be made of sufficient widths of material to overlap proscenium opening on each side and in center. Each section will finish to **refer to drawings and field verify**
 - 2. Valance: The valance will finish to **refer to drawings and field verify**. Valance to be straight.

3. Curtain Track: Track to be United Stage Equipment, Inc. #2100 Steel Noiseless Track or approved equal. Carriers to be ball-bearing type with hard rubber wheels operating in steel channels. **Refer to drawings and field verify** with necessary ball-bearing end block pulleys, with floor block pulleys and rope for operating manually.
4. Hanging of Equipment:
 - a. Front curtain tracks mount directly to 1"x6" continuous wood blocking attached flush with ceiling.
 - b. All wood blocking required shall be furnished by other trades as directed by curtain manufacturer.

2.4 MATERIALS – CYCLORAMA & CEILING BORDER & TRACK

- A. The cyclorama and ceiling borders will be made of Atlas Oxford Repp material as manufactured by Valley Forge Fabrics, Inc. to be flameproofed, as specified, in 50% fullness. All pleats will be sewn in at top on heavy 2" jute webbing with brass grommets twelve (12) inches o.c. The cyclorama will have #11 galvanized "S" hooks in grommets for attaching to track carriers. The borders will have tie-lines in grommets for attaching to battens. Cyclorama bottom hems will be four (4) inches with rust-proof, galvanized chain encased in separate heavy canvas pockets inside hems. All bottom hems of borders will be one (1) inch. All hems and leading edges to be put in on special blindstitch machine. Equipment as manufactured by United Stage Equipment, Inc., Hartselle, Alabama or approved equal.
 1. Cyclorama: The Cyclorama to finish in six (6) rear sections total of **refer to drawings and field verify**.
 2. Ceiling Border: There will be ceiling border. The finish shall be **refer to drawings and field verify**.
 3. Cyclorama Track: Track to be United Stage Equipment, Inc. #2100 Steel Noiseless Track, or approved equal. Carriers to be 12" o.c. with hard rubber wheels operating in steel channels. Feet of track to be furnished for cyclorama with two (2) curves as shown on the drawings, rigged for walk-along operation.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine areas and conditions, with installer present for compliance with requirements for supporting members, blocking, installation, tolerances, clearances, and other conditions affecting performance of stage-curtain work. Proceed with installation only after unsatisfactory conditions have been corrected.
- B. Examine inserts, clips, blocking, or other supports required to be installed by others to support tracks and battens. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Install stage curtain system according to track manufacturer's and curtain fabricator's current written instructions and recommendations and reviewed and approved submittals and shop drawings. No work in this section shall begin without an approved shop drawing layout of the entire Stage Curtain System as detailed and designed in the Contract Documents.

3.3 TRACK INSTALLATION

- A. Install track for center-parting curtains with not less than 24-inch (600 MM) overlap of track sections at center, supported by special lap clamps.

3.4 CURTAIN INSTALLATION

- A. Track Hung: Secure curtains to track carriers with track manufacturer's special heavy-duty S-hooks or snap hooks.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to test system and to train Owner's personnel to rig, adjust, operate, and maintain stage curtains, tracks and draw-curtain machines.

END OF SECTION

SECTION 12304 - LAMINATE CLAD CASEWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the contract including General and Supplementary Conditions and Division 1 Specification Sections apply to work of this section.

1.2 WORK INCLUDED

- A. The extent of laminate clad casework as shown on the drawings.
- B. The work includes the fabrication and installation of laminate clad casework components of base cabinets, wall cabinets, tall cabinets, shelf units, cubbies and other units as indicated.

1.3 RELATED WORK SPECIFIED ELSEWHERE

- A. Sinks and Service Fixtures: Furnished and installed under Mechanical and Electrical Divisions 15 and 16.
- B. Base Molding: Furnished and installed under Finishes Division 9.

1.4 QUALITY ASSURANCE

- A. Provide laminate clad casework and countertops furnished by the same supplier for single responsibility and integration with other building trades.
- B. Manufacturers shall show evidence of at least five (5) years experience and installations for similar types of projects.
- C. Millwork must conform to design quality of materials, workmanship and function of casework specified and shown on drawings.

1.5 SUBMITTALS

- A. Product Data: In addition to the general conditions as relates to prior approvals, submittals of manufacturer's data, installation instructions and samples are required upon architect's request.
- B. Samples:
 - 1. Submit 2, 2" x 3" samples of casework manufacturer's standard decorative laminate colors, patterns and textures for exposed and semi-exposed materials for architect's selection.
 - 2. Samples will be reviewed by architect for color, texture, and pattern only. Compliance with other specified requirements is the exclusive responsibility of the contractor.
 - 3. Submit one full-size sample base cabinet unit with hardware, doors and drawers, without countertop.
 - 4. Submit one full-size sample wall cabinet unit complete with hardware, doors, and adjustable shelves.
 - 5. Acceptable sample units will be used for comparison inspections at the project. Unless otherwise directed, acceptable sample units may be incorporated in the work. Notify architect of their exact locations. If not incorporated in the work, retain acceptable sample units in the building until completion and acceptance of the work.
 - 6. Remove sample units from the premises when directed by the architect.
- C. Shop Drawings:
 - 1. Submit shop drawings for laminate clad casework and counter- tops showing layout, elevations, ends, cross-sections, service run spaces, and location of services. Show details and location of anchorages.
 - 2. Include layout of units with relation to surrounding walls, doors, windows, and other building components.
 - 3. Coordinate shop drawings with other work involved.

1.6 PRODUCT HANDLING

- A. Deliver laminate clad casework and countertops only after wet operations in building are completed.
- B. Store completed laminate clad casework and countertops in a ventilated place, protected from the weather, with relative humidity range of 20% to 50%.
- C. Protect finished surfaces from soiling and damage during handling and installation. Keep covered with a protective covering.

1.7 JOB CONDITIONS

- A. Humidity and Temperature Controls:
 - 1. Advise contractor of requirements for maintaining heating, cooling and ventilation in installation areas as required to reach relative humidity necessary to maintain optimum moisture content.

1.8 WARRANTY

- A. All materials and workmanship covered by the section will carry a one (1) year warranty from date of acceptance.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function:
 - 1. Case Systems Midland, MI. (Basis of Design)
 - 2. TMI Systems - Dickson, N.D.
 - 3. L.S.I.
 - 4. Stevens Industries - Teutopolis, IL.
 - 5. Cabinets by Design, LLC; 770.418.1200
 - 6. PR Bean Company, LLC; 812.254.3761
 - 7. Advanced Cabinet Systems (ACS); 765.677.8000
 - 8. Varner Woodworks, Montgomery, AL.

2.2 MATERIALS

- A. Definitions: Identification of casework parts by surface visibility.
 - 1. Unit Body Open Interiors: Any storage unit surface without solid door or drawer fronts and units with glass sliding or glass framed doors.
 - 2. Unit Body Closed Interiors: Any storage unit surface behind solid door or drawer fronts.
 - 3. Unit Body Exposed Side: Any storage unit exterior side surface is visible.
 - 4. Concealed Surfaces: Any surface not normally visible after installation.

2.3 CORE MATERIALS

- A. Particleboard: Minimum density 45 lb. western particleboard of fir or pine meeting or exceeding ANSI A 208 1-1979, 1-M-3 requirements. Thickness used are 1/4", 1/2", 3/4" and 1". (Thickness of particleboard excluding skins).
- B. Hardboard: Prefinished hardboard in 1/4" thickness meeting or exceeding commercial standards CS-251.
- C. Plywood: Shall be 9-ply hardwood plywood.

2.4 DECORATIVE LAMINATES

- A. High pressure decorative laminate GP50 (.050), NEMA Test LD-3 - 1985.
- B. High pressure decorative laminate GP38 (.038), NEMA Test LD-3 - 1985.
- C. High pressure decorative laminate GP28 (.028), NEMA Test LD-3 - 1985. Laminate shall be counter balanced.
- D. High pressure decorative laminate PF42 (.042), NEMA Test LD-3 - 1985.
- E. High pressure decorative laminate PF30 (.030), NEMA Test LD-3 - 1985
- F. High Pressure cabinet liner CL20 (.020), NEMA Test LD-3 - 1985.
- G. Laminate shall be counter balanced.
- H. Melamine laminate tested to meet NEMA Test LD-3 - 1985. Laminate shall be counter balanced.
- I. High pressure backer BK20 (.020). Laminate shall be counter balanced.
- J. Laminate Color Selection(s):
 - 1. Colors for countertop grades GP50, GP38, PF42 and PF30 shall be selected from Wilsonart's standard solid and pattern offering. A maximum of five (5) colors per project.
 - 2. Colors for cabinet surfaces grade GP28 shall be selected from Wilsonart's standard solid and pattern offering. A maximum of one (1) color to be selected per unit face and five (5) colors per project.
 - 3. Melamine colors shall be light beige or dove grey. One color only per project.
 - 4. Colors: To be selected by architect after bid date / during submittal phase of project.

2.5 PLASTIC EDGING

- A. 1mm PVC hot melt glue applied.
- B. 3mm PVC hot melt glue applied.

2.6 METAL PARTS

- A. Countertop support brackets, legs and miscellaneous metal parts shall be furniture steel, welded, degreased, cleaned, treated and powder painted in light beige, sienna brown, dove grey or black colors.

2.7 CABINETS HARDWARE

- A. Hinges: Shall be five knuckle, 2-3/4 inch, overlay type, hospital tip, .095 inch thick steel. Hinges shall have a minimum of eight (8) edge and leaf fastenings. Doors 48 inches and over in height shall have three (3) hinges per door. Available in light beige, sienna brown, dove grey, black colors, or brushed chrome finish. Magnetic door catches are required with this hinge and shall be magnetic type with a minimum ten (10) pound pull, attached with screws and slotted for adjustment.
- B. Pulls: Door and drawer fronts shall be a semi-flush ABS plastic recessed and fastened with glue and screws. Available in light beige, sienna brown, dove grey or black colors.
- C. Drawer Slides: Shall be Blum bottom mount style No. BS 230E with epoxy finish. Slides will have a 100 pound load rating at full extension and a built-in, positive stop both directions. Slides shall have a life time warranty as offered by the slide manufacturer.
- D. Adjustable Shelf Supports: Shall be heavy-duty to support two hundred (200) pounds, self-locking nylon, to fit 32mm pre-drilled holes in cabinet ends and vertical partitions. The self supports shall have two (2) pins 5mm in diameter, to prevent the shelf support from rotating and tipping. Available for 3/4 inch or 1 inch thick shelves.
- E. Locks:
 - 1. Door and Drawer Locks: Shall be National Lock #M4-7054C, removable core, disc tumbler, cam style lock with strike. Each lock shall be furnished with two (2) keys.

2. Locks for sliding 3/4" doors shall be disc type plunger lock, sliding door type with strike locks for sliding glass doors shall be a ratchet type sliding showcase lock. Install locks on all teacher's cabinets.
 3. Chain bolts shall be 3 inches long, shall have a 18 inch pull and an angle strike to secure inactive door on cabinets over 72 inches in height. Elbow catches shall be used on inactive doors up to and including 72 inches in height.
- F. Coat Rods: Shall be 1-1/4 inch, 14 gauge chrome plated steel.
- G. Mirrors: Shall be 1/4 inch thick polished mirror plate.
- H. Computer Grommets: Shall be 2 1/2 inch dia. plastic insert and cover to be located at each computer station.

2.8 FABRICATION

- A. Fabricate laminate clad casework to dimensions, profiles and details shown.
- B. Cabinet Joinery: Tops and bottoms shall be joined to cabinet ends using a minimum of six (6) dowels at each joint for twenty- four (24) inch deep cabinets and a minimum of four (4) dowels at each joint for twelve (12) inch deep cabinets. All dowels are to be industrial grade hardwood laterally fluted, with chamfered ends and a minimum diameter of ten (10) millimeters. Internal cabinet components such as fixed horizontals, rails and verticals are to be doweled in place. Dowels are to be securely glued and cabinets clamped under pressure during assembly to assure secure joints and cabinets and squareness.
- C. Unit Door and Drawer Fronts:
1. Shall be 3/4 inch thick particleboard and laminate with high pressure decorative laminate GP28 color as selected on the exposed surface and high pressure laminate cabinet liner CL20 on the interior surface light beige or dove grey color.
 2. All edges shall be finished with 3mm PVC in light beige, sienna brown, dove grey or black color.
 3. Framed glass insert doors shall be 1/4 inch thick plate glass trimmed with extruded PVC plastic in light beige, sienna brown, dove grey or black color only.
 4. Double doors shall be used on all cabinets in excess of 24 inches in width.
- D. Unit Body Open Interiors:
1. Exposed cabinet sides shall be 3/4 inch thick particleboard laminated on the exterior with high pressure decorative laminate GP28 in color as selected and balanced with high pressure cabinet liner CL20 in light beige or dove grey color. The front edge shall be edgebanded with 1mm PVC to match the door and drawer front edge color.
 2. Unexposed cabinet sides shall be 3/4 inch thick particleboard laminated both sides with melamine in light beige or dove grey color. The front edge shall be edgebanded with 1mm PVC to match the door and drawer front edge color.
 3. Unit top or subtop shall be 3/4 inch thick particleboard laminated both sides with melamine and front edge with 1mm PVC to match the door and drawer front edge color. All subtops shall be full depth.
 4. Bottom of base and wardrobe units shall be 3/4 inch thick particleboard laminated both sides with melamine and front edged with 1mm PVC to match the door and drawer front edge color.
 5. Fixed intermediates shall be 3/4 inch thick particleboard laminated both sides with melamine and front edged with 1mm PVC to match the door and drawer front edge color. An intermediate will be provided on all units over 36 inches wide.
 6. Standard unit backs shall be 1/2 inch thick prefinished particleboard. Color to match interior. Exposed back on fixed or movable cabinet to be 3/4 inch thick particleboard laminated with CL20 on the interior to match melamine color and GP28 on the exterior as selected.

7. Adjustable shelves shall be 3/4 inch thick particleboard up to 30 inches wide and 1 inch thick particleboard over 30 inches wide, laminated both sides with melamine in light beige or dove grey color.
8. Shelves shall be edged front edge only with 1mm PVC to match the self color.

E. Unit Body Closed Interiors:

1. Exposed cabinet sides shall be 3/4 inch thick particleboard laminated on the exterior with high pressure decorative laminate GP28 in color as selected and balanced with high pressure cabinet liner CL20 in light beige or dove grey color. The front edge shall be edgebanded with 1mm PVC to match the door and drawer front edge color.
2. Unexposed cabinet sides shall be 3/4 inch thick particleboard laminated both sides with melamine in light beige or dove grey color. The front edge shall be edgebanded with 1mm PVC to match the door and drawer front edge color.
3. Unit top or subtop shall be 3/4 inch thick particleboard laminated both sides with melamine and front edged with 1mm PVC to match the door and drawer front edge color. All sub- tops shall be full depth. Sink base units shall have a 1 inch x 1 inch x 1/8 inch angle iron rail in lieu of full sub- top.
4. Bottom of base and wardrobe units shall be 3/4 inch thick particleboard laminated both sides with melamine and front edges with 1mm PVC to match the door and drawer front edge color. Sink cabinet bottoms shall be laminated both sides with CL20.
5. Fixed intermediates shall be 3/4 inch thick particleboard laminated both sides with melamine and front edged with 1mm PVC to match the door and drawer front edge color. An intermediate will be provided on all units over 36 inches wide.
6. Standard unit backs shall be 1/2 inch thick prefinished particleboard. Color to match interior. Exposed back on fixed or movable cabinet to be 3/4 inch thick particleboard laminated with CL20 on the interior to match melamine color and GP28 on the exterior as selected.
7. Adjustable shelves shall be 3/4 inch thick particleboard up to 30 inches wide and 1 inch thick particleboard over 30 inches wide, laminated both sides with melamine in light beige or dove grey color.
8. Shelves shall be edged front edge only with 1mm PVC to match the shelf color.

F. Wall Unit Bottom:

1. For units with open interiors shall be 3/4 inch thick particleboard laminated both sides with melamine laminate in light beige or dove grey color.
2. For units with closed interiors shall be 3/4 inch thick particleboard laminated both sides with melamine laminate in light beige or dove grey color.
3. The front edge shall be edgebanded with 1mm PVC to match the door and drawer front edge color. The exposed bottom edge of each wall cabinet side shall be edgebanded with 1mm PVC.

G. Drawers:

1. Sides, back and sub-front shall be particleboard, 1/2 inch thick, laminated with melamine in light beige or dove grey color. The back and sub-front are dowelled and glued into sides. Dowels shall be fluted, with chamfered ends and a minimum diameter of eight (8) millimeters. To edge is banded with 1mm PVC edging in a matching color.
2. Drawer bottom shall be 1/2 inch thick prefinished particle- board with color to be light beige or dove grey, screwed directly to the bottom edges of the drawer box.
3. Paper storage drawers are of heavy-duty 3/4 inch particle- board laminated both sides with melamine color to be light beige or dove grey, and constructed with retaining hood at the rear of each drawer.

H. Continuous or Unit Tops:

1. All cabinets over 42" and up to 72" in height shall be supplied with a $\frac{3}{4}$ " plywood continuous top.
2. All cabinets over 42" and up to 72" in height shall be supplied, where indicated on drawings, with a finished 1" continuous top laminated with high pressure decorative laminate GP28 and balanced with high pressure backer BK20.

I. Bases:

1. Provide and install all base and tall units with finished integral base. Provide $\frac{3}{4}$ " thick marine grade plywood bases. All bases shall have finished facings unless rubber vinyl base covering is being furnished and applied by others.

PART 3 - EXECUTION

3.1 INSPECTION

- A. The installer must examine the jobsite and the conditions under which the work under this section is to be performed and notify the contractor in writing of unsatisfactory conditions. Do not proceed with work under this section until unsatisfactory conditions have been corrected in a manner acceptable to the installer.

3.2 PREPARATION

- A. Conditions laminate clad casework to average prevailing humidity conditions in installation areas prior to installing.

3.3 INSTALLATION

- A. Install casework with factory-trained supervision authorized by manufacturer. Erect casework, plumb, level, true and straight with no distortions. Shim as required. Where laminate clad casework abuts other finished work, scribe and cut to accurate fit.
- B. Adjust casework and hardware so that doors and drawers operate smoothly without warp or bind.
- C. Lubricate operating hardware as recommended by Manufacturer.

3.4 CLEANING AND PROTECTION

- A. Repair or remove and replace defective work as directed upon completion of installation.
- B. Clean plastic surfaces, repair minor damage per plastic laminate manufacturer's recommendations. Replace other damaged parts or units.
- C. Advise contractors of procedures and precautions for protection of casework and tops from damage by other trades until acceptance of the work by the Owner.

END OF SECTION

SECTION 12355 – MUSIC EDUCATION STORAGE CASEWORK

PART 1 - GENERAL

1.1 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.

1.2 DESCRIPTION OF WORK

- A. Music Instrument Storage Casework.
- B. Robe and Uniform Storage Casework.

1.3 RELATED SECTIONS

- A. Division 06 Section "Rough Carpentry" for blocking in frame walls required to anchor casework.
- B. Division 09 Section "Resilient Base and Accessories" for finish base materials applied to casework.

1.4 REFERENCES

- A. American National Standards Institute (ANSI):
 - 1. ANSI A208.1 – Particleboard.
- B. ASTM International (ASTM):
 - 1. ASTM E 488 – Standard Test Methods for Strength of Anchors in Concrete and Masonry Elements.
- C. Audio Engineering Society (AES):
 - 1. AES-4id – AES information document for room acoustics and sound reinforcement systems – Characterization and measurement of surface scattering uniformity.
- D. Builders Hardware Manufacturers Association (BHMA):
 - 1. ANSI/BHMA A156.9 – Cabinet Hardware.
- E. National Electrical Manufacturers Association (NEMA):
 - 1. NEMA LD 3 – High Pressure Decorative Laminates.
- F. U.S. Department of Commerce, National Institute of Standards and Technology (NIST):
 - 1. DOC PS 1 – U.S. Product Standard for Construction and Industrial Plywood.

1.5 SYSTEM DESCRIPTION

- A. Modular instrument storage casework with integral bases, adjustable levelers, and through-bolted fastening, enabling owner reconfiguration of unit layout.
- B. Robe and uniform storage casework with integral bases, adjustable levelers, and through-bolted fastening, enabling owner reconfiguration of unit layout.

1.6 PERFORMANCE REQUIREMENTS

- A. Storage Casework Component Load Capacities:
 - 1. Storage Casework Wire-Grille Door Hinge: Each weld capable of resisting 400 lbf (1779 N) pull test without visible damage or permanent deformation.
 - 2. Storage Casework Full Grille Door Hinge: Full length door capable of supporting 315 lbs. Through open and close cycle without permanent damage.
 - 3. Robe and Uniform Storage Casework Garment Hanger Rods: Capable of supporting vertical load applied uniformly along width of unit of 200 lbf (890 N).

4. Sheet Music Storage Casework: Units shall support 35 lb/lin. ft. (52 kg/m) uniform shelf loading with maximum 1/16 inch (1.6 mm) deflection.

1.7 SUBMITTALS

- A. Product Data: Manufacturer's data sheets, installation instructions, and maintenance recommendations.
- B. Shop Drawings: Prepared by manufacturer. Include elevations showing casework components, details of each condition of installation, and types and locations of hardware and fasteners. Show fabrication and installation details. Include plans, elevations, sections, details, and attachments to other Work.
- C. Samples: For each color and finish for each exposed casework component.
- D. Operation and Maintenance Data.
- E. Warranty: Submit sample meeting warranty requirements of this Section.

1.8 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Approved manufacturer listed in this section, with minimum 5 years experience in manufacture of similar products in use in similar environments. Obtain music education storage casework through one source from a single approved manufacturer.
- B. Approval of Comparable Products: Submit the following in accordance with project substitution requirements, within time period allowed for substitution review:
 1. Product data, including certified independent test data indicating compliance with requirements for acoustical performance.
 2. Project references: minimum of 5 installations not less than 5 years old, with owner contact information.
 3. List of successful installations of similar products available for evaluation by Architect.
 4. Sample warranty.
 5. Submit substitution request not less than 5 days prior to bid date. Substitutions following award of contract are not allowed except as stipulated in Division 01 General Requirements.
 6. Approved manufacturers must meet separate requirements of Submittals Article.
- C. Deliver, store, and handle music education storage casework in accordance with manufacturer's recommendations. Ship to jobsite only after roughing-in, painting work, and other related finish work has been completed and installation areas are ready to accept casework and recommended temperature and humidity levels will be maintained during the remainder of construction.

1.9 COORDINATION

- A. Coordinate installation of blocking and supports in frame wall assemblies under work of other sections where required for anchoring of music education storage casework.

1.10 WARRANTY

- A. Warranty: Manufacturer's written warranty indicating manufacturer's intent to repair or replace components of music education storage casework that fail in materials or workmanship within 10 years from date of Substantial Completion. Failures are defined to include, but are not limited to, the following:
 1. Fracturing or breaking of casework components including doors, panels, shelves, or hardware resulting from normal wear and tear and normal use other than vandalism.
 2. Delamination or other failures of glue bond of components.
 3. Warping of casework components not resulting from leaks, flooding, or other uncontrolled moisture or humidity.

4. Failure of operating hardware.

PART 2 – PRODUCTS

2.1 MANUFACTURER

- A. The following manufacturers' products have been used to establish minimum standards for materials, workmanship and function:
 1. Wenger Corporation (Basis of Design), 555 Park Drive, Owatonna, MN | Ph: 507.455.4258 | www.wengercorp.com.
 2. Case Systems | 2700 James Savage Road, Midland, WI 48642 | Ph.: 989.496.9510 | www.casesystems.com.
 3. Equal products of other manufacturers may be used in the work, provided such products have been approved, by the Architect, not less than Ten (10) days prior to scheduled bid opening.

2.2 MATERIALS

- A. Particleboard: ANSI A208.1, minimum 45 lb/cu. ft. (721 kg/cu. m) density.
 1. Particleboard Thermoset Panels: Particleboard finished with thermally-fused polyester surfacing on both sides meeting performance properties of NEMA LD 3 for VGS grade, edge-banded, including the following:
- B. Surface Abrasion Resistance: Taber Wheel, 400 cycles, for solid colors.
- C. Polyethylene Shelves: High-density, one-piece, blow-molded or polyethylene, with radiused front edge, for abuse-resistant shelves.
- D. PVC Edge Banding: Radiused PVC extrusions, 3 mm thick.

2.3 INSTRUMENT STORAGE AND ROBE AND UNIFORM STORAGE CASEWORK

- A. General: Provide through-ventilating instrument storage and robe and uniform storage casework meeting requirements in System Description and Performance Requirements Articles.
- B. Side Panels and Divider Panels: Particleboard thermoset panel with no urea formaldehyde added, 3/4 inch (19 mm) thick. Side panels machined to accept unit-to-unit through-bolting.
- C. Panel Edge Banding: 3 mm thick, heat-bonded, with radiused and profiled edges and corners.
- D. Shelving: Sized with adequate gap between shelving and casework side panels to allow air movement inside casework.
- E. Up to 27 inches (686 mm) wide: Removable molded polyethylene shelf, with impact-resistant, radiused front edge, mounted to cabinet wall with self-locking clip.
- F. Over 27 inches (686 mm) wide: For large instrument casework: Removable formed polyethylene shelf, ribbed, with high-impact-resistant, radiused front edge, supported by steel tube frame.
- G. Corner cabinet revolving shelving: 0.053 inch (1.3 mm) min. thickness steel sheet bolted to revolving steel center post, with radiused hardboard deflector panel.
- H. Casework Panel Color: As selected by Architect from manufacturer's standard colors.

2.4 HARDWARE

- A. Butt Hinges: 2-3/4 inch (70 mm), 5-knuckle steel hinges made from 0.090 inch (2.29 mm) thick metal, ANSI/BHMA A156.9, Grade 1, with powder-coated finish, through-bolted to door and side panels and welded to grille door frames. Provide 2 hinges on compartment doors, and 4 hinges on full-height doors.
- B. Slide Latch: 0.105 inch (2.67 mm) min. thickness steel, with padlock eye, powder-coat finish, through-bolted to panel door and side panel and welded to grille door frames. Latches securely without padlock. Provide with clear plastic label holder for use with standard size labels; number

system available for user to print. Padlocks furnished by Owner.

- C. Panel Connectors: 1/4–20 by 1.77 inch (45 mm) panel connectors, with steel thread inserts, powder coated to match panels.
- D. Cabinet Levelers: Leveling glides with 3/8 inch (9.5 mm) diameter threaded steel rod in steel corner brackets, minimum two each per cabinet side, accessible from within unit, and concealed in completed installation.
- E. Fasteners: Manufacturer-recommended fasteners as required for casework substrate and project performance requirements, consisting of one or more of the following:
- F. Sheet Metal Screws: SAE J78, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.
- G. Wood Screws: ASME B18.6.1.
- H. Expansion Anchors in Concrete and Concrete Masonry Units: Carbon-steel, zinc plated.

2.5 FINISHES

- A. Steel Sheet, Steel Wire, and Exposed Fasteners: Urethane-based electrostatic powder coating, color as indicated.

PART 3 – EXECUTION

3.1 EXAMINATION

- A. Examine casework installation areas for compliance with requirements for installation tolerances, location of blocking and other anchoring reinforcements, and other existing conditions affecting installation and performance of casework. Proceed with casework installation upon correction of unsatisfactory conditions.

3.2 CASEWORK INSTALLATION

- A. Install plumb, level, and true; using integral levelers. Install in accordance with manufacturer's recommendations and approved submittals.
- B. Install hardware uniformly and precisely. Set hinges snug and flat. Adjust and align hardware so moving parts operate freely and contact points meet accurately. Allow for final adjustment after installation.
- C. Adjust casework and hardware so doors and drawers operate smoothly without warp or bind and close with uniform reveals.

3.3 CLEANING AND PROTECTING

- A. Repair or replace defective work as directed by Architect upon inspection.
- B. Clean casework surfaces. Touch up, refinish, or replace damaged components in a manner acceptable to Architect.
- C. Turn over operation and maintenance instructions to Owner.

END OF SECTION

SECTION 14425 - VERTICAL WHEELCHAIR LIFTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Vertical platform wheelchair lift installed within shaftway.

1.2 RELATED SECTIONS

- A. Section 03300 - Concrete: Anchor placement in concrete.
- B. Section 04200 - Unit Masonry: Anchor placement in masonry.
- C. Section 06100 - Rough Carpentry: Blocking in framed construction for lift attachment.
- D. Section 09250 - Gypsum Board Assemblies: Stair walls.
- E. Division 26 - Electrical.

1.3 REFERENCES

- A. ASME A17.1 - Safety Code for Elevators and Escalators.
- B. ASME A17.5 - Elevator and Escalator Electrical Equipment.
- C. ASME A18.1a 2001 - Safety Standard for Platform Lifts and Stairway Chairlifts.
- D. CSA B44 – Safety Code for Elevator and Escalators.
- E. CSA B355 - Lifts for Persons with Physical Disabilities.
- F. ICC/ANSI A117.1 - Accessible and Usable Buildings and Facilities.
- G. NFPA 70 - National Electric Code.
- H. CSA - National Electric Code.

1.4 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: Manufacturer's data sheets on each product to be used, including:
 - 1. Submit manufacturer's installation instructions, including preparation, storage and handling requirements.
 - 2. Include complete description of performance and operating characteristics.
 - 3. Show maximum and average power demands.
- C. Shop Drawings:
 - 1. Show typical details of assembly, erection and anchorage.
 - 2. Show complete layout and location of equipment, including required clearances.
- D. Selection Samples: For each finished product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns.
- E. Verification Samples: For each finished product specified, two samples, representing actual product, color, and patterns.

1.5 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Firm with minimum 10 years documented experience in manufacturing of inclined wheelchair platform lifts of installations of type specified.
- B. Installer Qualifications: Firm licensed to install equipment of this scope, with evidence of experience with specified equipment. Installer shall maintain an adequate stock of replacement parts and have qualified people available to ensure timely maintenance and callback service at the project site.

1.6 REGULATORY REQUIREMENTS

- A. Provide platform lifts in compliance with:
 - 1. ASME A18.1 - Safety Standard for Platform Lifts and Stairway Chairlifts.
 - 2. ASME A17.1 - Safety Code for Elevators and Escalators.
 - 3. ASME A17.5 - Elevator and Escalator Electrical Equipment.
 - 4. NFPA 70 - National Electric Code.
- B. Provide platform lifts in compliance with:
 - 1. CSA B355 - Lifts for Persons with Physical Disabilities.
 - 2. CSA B44.1/ASME A17.5 - Elevator and Escalator Electrical Equipment.
 - 3. CSA - National Electric Code.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Store products in manufacturer's unopened packaging until ready for installation.
- B. Store components off the ground in a dry covered area, protected from adverse weather conditions.

1.8 PROJECT CONDITIONS

- A. Do not use wheelchair lift for hoisting materials or personnel during construction period.

1.9 WARRANTY

- A. Warranty: Manufacturer shall warrant the wheelchair lift materials and workmanship for one year following completion of installation.
- B. Extended Warranty: Provide an extended manufacturer's warranty for the entire warranty period covering the wheelchair lift materials and workmanship for the following additional extended period beyond the initial one year warranty. Preventive Maintenance agreement required.
 - 1. Five additional years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Garaventa Lift; United States - P.O. Box 1769, Blaine, WA 98231-1769. Canada 18920 36th Ave., Surrey, BC V3Z 0P6. ASD. Toll Free: 800-663-6556. Tel: (604) 594-0422. Fax: (604) 594-9915. Email: productinfo@garaventlift.com; Webwww.garaventlift.com.
- B. Equal products of other manufacturers may be used in the work, provided such products have been approved by the Architect, not less than Ten (10) days prior to scheduled bid opening.

2.2 UNENCLOSED VERTICAL WHEELCHAIR LIFT

- A. Capacity: 750 lbs (340 kg) rated capacity.
- B. Mast Height:
 - 1. Model GVL-OP-42; 45 inches (1143 mm) maximum lifting height.
- C. Platform Size and Nominal Clear Platform Dimensions:
 - 2. Large 90 degrees: 43-1/2 inches (1104 mm) by 58-1/2 inches (1485 mm) with 90 degree entry/exit configuration.
- D. Platform Configuration:
 - 3. 90 Degree: Front and side openings.
- E. Landing Openings: Gates shall be self closing type.

4. Gate Height: 42-1/8 inches (1070 mm).
5. Gate Width: 41-3/4 inches (1060 mm).
6. Platform Gate: Travels with platform and opens at lower landing.
7. Upper Landing Gate: Detached, freestanding type.

F. Power Gate Operators:

8. Location:
 - a. Platform Gate: Travels with platform and opens lower landing.
 - b. Upper Landing Gate.
9. Automatically opens the gate when platform arrives at a landing. Will also open at landing by pressing call button or gently pulling the gate.
10. ADA Compliant and obstruction sensitive.
11. Low voltage, 24 VDC with all wiring concealed.

G. Lift Components:

12. Machine Tower: Custom aluminum extrusion.
13. Base Frame: Structural steel.
14. Platform Side Wall Panels: 16 gauge (1.5 mm) galvanized steel sheet.
15. Platform Access Ramp: 12 gauge (2.5 mm) galvanized steel plates; slip resistant surfaces.
 - a. Ramp: Automatic folding type.
16. Side Guard Panels: 42-1/8 inches (1070 mm) high mounted on platform.

H. Base Mounting at Lower Landing:

17. Floor Mount: Base of lift shall be mounted on the floor surface of the lower landing. For access onto the platform provide a ramp of 16 gauge (1.5 mm) galvanized steel sheet with a slip resistant surface.

I. Infill Panel Kit: Provide 16 gauge (1.5 mm) galvanized panels and mounting hardware to cover void between side of enclosure, drive mast and adjacent wall at all landings including but not limited to the following locations:

1. Lower landing.
2. Intermediate landing.
3. Upper landing.

J. Leadscrew Drive:

1. Drive Type: Self-lubricating acme screw drive.
2. Emergency Operation: Manual handwheel device to raise or lower platform.
3. Battery Powered Emergency Lowering: Battery powered platform lowering device that automatically activates in the event of power failure. Allows passenger to drive platform downward to lower landing. Does not operate lift in up direction.
4. Safety Devices:
 - a. Integral safety nut assembly with safety switch.
5. Travel Speed: 10 fpm (3.0 m/minute).
6. Motor: 2.0 hp (560 W).
7. Power Supply:

- a. 120 VAC single phase; 60 Hz on a dedicated 20 amp circuit.
- K. Hydraulic Drive:
 - 1. Drive Type: Chain hydraulic.
 - 2. Emergency Operation: Manual device to lower platform and battery auxiliary power to raise or lower platform.
 - 3. Safety Devices:
 - a. Slack chain safety device.
 - b. Shoring device.
 - 4. Travel Speed: 17 fpm (5.2 m/minute).
 - 5. Motor: 3.0 hp (2.2 kW); 24 volts DC.
 - 6. Power Supply:
 - a. 120 VAC single phase; 60 Hz on a dedicated 15 amp circuit.
 - b. 208/240 VAC, single phase; 50 Hz on a dedicated 16 amp circuit.
 - c. Powered by continuous building mains converted to 24 VDC, equipped with auxiliary power system capable of running lift up and down for a minimum of 5 trips with rated load.
 - d. Powered by continuously charged battery system.
- L. Platform Controls: 24 VDC control circuit with the following features.
 - 1. Direction Control: Constant pressure rocker switch.
 - 2. Illuminated and audible emergency stop switch shuts off power to lift and activates audio alarm with battery backup.
 - 3. Keyless operation.
- M. Call Station Controls: 24 VDC control circuit with the following features.
 - 1. Direction Control:
 - a. Constant pressure rocker switch.
 - 2. Keyless operation.
 - 3. Call Station Mounting:
 - a. Lower:
 - 1) Wall mounted surface.
 - b. Upper:
 - 1) Wall mounted surface.
- N. Safety Devices and Features:
 - 1. Grounded electrical system with upper, lower, and final limit switches.
 - 2. Tamper resistant interlock to electrically monitor that the gate is in the closed position and the lock is engaged before lift can move from landing.
 - 3. Electrical disconnect shall shut off power to the lift.
 - 4. Under platform safety pan with five waterproof safety switches to detect obstruction under platform.
- O. Finishes
 - 1. Aluminum Extrusions: Champagne anodized finish.
 - 2. Ferrous Components: Electrostatically applied baked powder finish, fine textured.

- a. Color: Satin Grey, RAL 7030.
- 3. Lift Finish: Baked powder coat finish as selected by the Architect from manufacturer's optional RAL color chart.
- P. Complete Installation Requirements:
 - 1. **The Contractor shall be responsible for providing all filler panels as required, whether shown on drawings or not shown on drawings, for a complete professional installation.**

PART 3 EXECUTION

3.1 EXAMINATION

- A. Do not begin installation until substrates have been properly prepared.
- B. Verify required supports are correct.
- C. Verify required landings and openings are of correct size and within tolerances.
- D. Verify electrical rough-in is at correct locations.
- E. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 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.

3.3 INSTALLATION

- A. Install platform lifts in accordance with applicable regulatory requirements including ASME A 17.1, ASME A 18.1 and the manufacturer's instructions.
- B. Install platform lifts in accordance with applicable regulatory requirements including CSA B355, and manufacturer's instructions.
- C. Install system components and connect to building utilities.
- D. Accommodate equipment in space indicated.
- E. Startup equipment in accordance with manufacturer's instructions.
- F. Adjust for smooth operation.

3.4 FIELD QUALITY CONTROL

- A. Perform tests in compliance with ASME A 17.1 or A18.1 and as required by authorities having jurisdiction.
- B. Perform tests in compliance with CSA B355 and required by authorities having jurisdiction.
- C. Schedule tests with agencies and Architect, Owner, and Contractor present.

3.5 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

Goshen High School
Arts Center Renovation
To Goshen High School

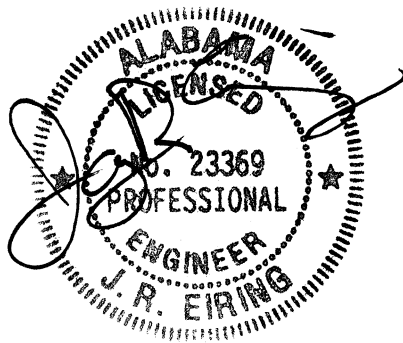
These specifications sections were prepared by and under the direct supervision of the Engineer of Record for this project.

Division 15 – MECHANICAL

15010 Mechanical General Provisions

15400 Plumbing

15700 Heating, Ventilating & Air Conditioning



September 5, 2025

SECTION 15010

GENERAL MECHANICAL PROVISIONS

PART 1. GENERAL

- 1.1. **General Requirements:** Carefully and completely read all the specifications, review all plans and all related construction documents. Pay particular attention to strict submittal requirements and note the ramifications of providing incomplete or incorrectly formatted and incorrectly submitted submittals.

The respective Contractor is responsible for paying all fees, utility connections, permits, etc., required. No consideration will be given after bid opening for alleged misunderstanding regarding the specifications, plans, utility connections, permits, fees, etc.

Division One is applicable in full hereto. Where the words, "provide", "furnish", "include" or "install" are used in the specifications, Codes or on the Drawings, it must mean to furnish, install, and test, complete and ready for operation as specified and required.

No materials or products that contain asbestos, formaldehyde, polychlorinated biphenyl (PCB), lead or mercury, in excess of limits mandated and defined by OSHA, LEED and the EPA, must be utilized.

Manufacturers not mentioned in the specifications require prior approval, seven (7) days prior to bid date. Follow procedures set forth in Division 1 of the specifications. All prior approvals must be submitted through the Architect. Where substitutions are proposed, unless the Contractor states in writing, on a separate recap/summary sheet in front of the respective submittal, the differences of the substituted equipment or material, he must be responsible to replace such items any time discrepancies are found.

Where conflicts occur between a Code, Standard or Listing and the contract drawings or contract specifications, the most stringent requirements must govern and be applied.

The Architect and Engineer must interpret the meaning of the drawings and specifications and will reject all work and materials, which in their judgment, is not in full accordance therewith.

- 1.2. **Spare Parts:** Manufacturer of any equipment specified must have a wholesale outlet for readily available replacement parts in the nearest major USA city.
- 1.3. **Codes and Standards and Listings:** Unless specified otherwise, comply with all current editions of all referenced publications within these specifications and all current editions of applicable NFPA, NFPA 58, ASME, OSHA, IBC, ASHRAE, ASTM, ASME, ANSI, SMACNA, Americans with Disabilities Act (ADA), ADA Standards for Accessible Design, with Local Building Codes, Mechanical Codes, Gas Codes, Plumbing Codes, ANSI/ASHRAE/IESNA Standard 90.1, ANSI/ASHRAE Standard 135, International Energy Conservation Code (IECC), International Fuel Gas Code (IFGC), International Fire Code (IFC), Americans with Disability Act Accessibility Guidelines (ADA), ICC A117.1 Standard for Accessible and Usable Buildings and

Facilities, U.S. Department of Energy Regulatory requirements and with all applicable local ordinances and codes. Equipment must bear Underwriters Laboratories Inc. (UL) listing label, Canadian Standards Association (CSA) listing label or ETL approved rating. All electrical components and products must also comply with the respective Code of Federal Regulations (CFR).

Where conflicts occur between a Code, Standard or Listing and the contract drawings or contract specifications, the most stringent requirements must govern and be applied. Advisory provisions listed in all Codes referenced in the Contract Documents are mandatory and the word "should" or "shall" must be interpreted as "must".

- 1.4. Permits and Inspections:** Provide all permits, pay all fees and arrange for inspections as required by all applicable Governing Authorities. Furnish certificates of all inspections and approvals from all Governing Authorities to the Architect. Include certificates of all inspections and approvals from all Governing Authorities in the Plumbing and HVAC closeout documents. Provide additional materials, parts, methods, etc. and modify the work as required by Governing Authorities' Inspections and Regulations. Correct all deficiencies required by Code officials at no additional cost to the Owner or the Owner's Project Design Professionals.

The Plumbing Contractor must arrange and pay for the State of Alabama Boiler and Pressure Vessel Safety Division/Inspection Divisions, Elevators/Boilers Inspector to visit job site to inspect water heater and/or boiler installation and air compressor installation. The Plumbing Contractor must obtain written approval, certification, tags and Certificate for Potable Water Heater (PWH) as required. **This inspection must be accomplished prior to the final site visit; to include the tagging of the equipment with the inspection tag, else DCM will cancel the site visit and impose a reinspection fee.**

Correct all deficiencies required by any Governmental Inspector without additional cost to the Owner or the Owner's Project Design Professionals, using materials and methods, as directed by, State of Alabama Boiler and Pressure Vessel Safety Division/Inspection Divisions and Elevators/Boilers inspector as required.

- 1.5. Site Visits:** It is the contractor's responsibility to have the job ready for site visits when they are scheduled. If the project is not ready for the requested site visit and the Architect, any governmental agency or any other entity requires a re-inspection with the Engineer present, the contractor must pay Zgouvas, Eiring & Associates a re-inspection fee of \$2,000. The payment must be made directly to Zgouvas, Eiring & Associates 5 days prior to the scheduled re-inspection.

The Contractor is urged to carefully review the extensive requirements of Paragraph "Identification" in this Section 15010 of the specifications and note that certain identification is required to be completed before certain site visits. There are specific identification requirements prior to the above ceiling and final site visits, respectively, that are mandatory. The State of Alabama Department of Construction Management (DCM) will cancel on-site, the site visit if not completed as specified. Failure to comply with this provision will be cause for cancellation of the site visit, and a fee imposed for the additional site visit, with all costs of the additional site visit to be borne by the Contractor.

- 1.6. Drawings and Specifications:** The Architect and Engineer must interpret the meaning of the drawings and specifications and will reject all work and materials, which in their judgment, is not in full accordance therewith. Where doubt arises as to

the meaning of the plans and specifications, obtain the Architect's decision, in writing, before proceeding with parts affected; otherwise assume liability for damage to other work and for making necessary corrections to work in question.

All drawings are diagrammatic and are intended to quantify the materials specified and indicate their intended relationship with each other. The drawings and specifications are complementary, and work shown, but not specified, or specified, but not shown, must be the same as though required by both.

Bidders must carefully examine the contract documents during the bidding phase. Any missing information, clarifications, conflicts, etc. in the contract documents that is required to provide accurate pricing must be brought to the attention of the Architect, **prior to bid date**, so all may be clarified and/or corrected. Failure to identify and resolve any issue prior to bid must require the Contractor to provide said items, complete, without additional cost to the Owner or the Owner's Project Design Professionals, using materials and methods specified by, and as directed by, the Owner's Design Professionals.

Bidders must visit the site and become acquainted with all job conditions that may affect the work shown on the plans. Report to the Architect, prior to bid, any new or existing conditions that require modifications to accomplish the installation of all items. Provide for required adjustments to complete the intent of the work. No consideration will be given after bid opening for alleged misunderstanding regarding new or existing job conditions, utility connections, permits, fees, construction documents, etc.

DO NOT SCALE the Plumbing and HVAC drawings. In the interest of clearness, the work is not always shown to scale or exact location. Refer to Architectural drawings for dimensions and verify scale shown on the drawings. The various scales used on the drawings do not allow for all fittings, offsets and accessories that may be required to complete the work. Check all measurements, location of pipe, all required and specified appurtenances for duct and piping, ducts, and equipment with the architectural and electrical drawings, and lay out work to fit in with ceiling grids, lighting, and other parts. All wiring, piping, ductwork, etc., must be concealed unless specified or noted otherwise. Adjust in the field as required to provide the optimum result to facilitate ease of service, efficient operation, and best appearance.

- 1.7. **Conflicts, Coordination and Changes:** If interferences or conflicts occur, the Architect must decide which equipment must be relocated regardless of which was first installed. In the interest of avoiding such conflicts, each Sub-Contractor who is using common space, etc., must coordinate his work with all other trades and other parts of his own work. If during this coordination, it is discovered that necessary or desirable changes are required to be made, advise the Architect and secure his decision in writing prior to proceeding. Do not fabricate or install any items, equipment, etc. until all coordination has been accomplished.

Coordinate the location of all Division 15 work with Division 16. Do not run piping, ductwork and similar Division 15 work in NEC dedicated service areas for electrical equipment, including above panel boards, starters, communication panels, control panels, telephone backboards, data panels and similar electrical elements.

- 1.8. **Coordination Drawings:** Follow procedures set forth in Division 1. Before starting work, submit for review, coordination shop drawings showing proposed arrangement of all equipment, all piping, ducts, floor drains, power requirements, all equipment

maintenance/service requirements and controls. As a minimum, submit detailed layouts of potential conflicts at plumbing risers, HVAC ductwork, piping, equipment rooms, limited ceiling space, etc. Refer to subsequent Sections for additional specific requirements.

Coordinate the submission of shop drawings and refer questionable locations to Architect/Engineer for resolution prior to installation. Failure to coordinate all items, and correct non-conforming installed work, must be provided at no additional cost to the Owner or the Owner's Project Design Professionals.

Failure to submit shop drawings must make the Contractor responsible for changes required to facilitate installation of, and the proper operation of all systems at no additional cost to the Owner or the Owner's Project Design Professionals.

- 1.9. Maintenance, Replacement and Service Access:** Locate equipment as shown on the plans. The Contractor must install valves, controllers, actuators, manual dampers, motorized dampers, air vents, cleanouts, smoke detectors, fire dampers, smoke dampers, fans and any other items requiring maintenance access with the maintenance, service and replacement access required by the Manufacturer of the respective installed item. All items must be installed to provide maximum safety, service, replacement, and maintenance access.

To ensure proper maintenance access, all piping with valves, any equipment, and any other items that may require maintenance, service or replacement, must be located no more than 12" above the finished ceiling and no more than 14'-0" above finish floor in areas without ceilings.

Coordinate all questionable access or location of items that may present a problem, if installed as specified above, with the Engineer or the Architect's field representative prior to installing any item; else, relocation will be at the Contractor's expense once discovered.

- 1.10. Warranty:** Refer to Division 1. Additionally, guarantee in writing to make good without cost any defects in materials and workmanship for one year following the date of substantial completion of the project as determined by the Architect. Provide free maintenance and service during the guarantee period.

Refer to other Division 15 Sections for additional detailed warranty requirements.

- 1.11. Submittal Data:** Within 25 days of contract award, all contractors must submit a complete submittal for review of all specified items proposed including a detailed schedule of materials, means and methods, equipment, etc.. Failure to submit any specified items will result in rejection of non-compliant materials, equipment, means and methods, etc. when discovered, with replacement costs borne solely by the contractor. The Architect and/or Engineer's review of submittals does not absolve the contractor of full responsibility for strict compliance with all contract documents.

A recap/summary sheet must be inserted at the beginning of each tabbed section to summarize the contents of each respective tabbed section. The recap/summary sheet must include all items that have been changed or removed due to Project cost constraints, addendums, or Value Engineering (VE).

Variations from the specifications, plans and all value engineered (VE) items for the items submitted for review must be explicitly indicated immediately after the submittal

cover page otherwise, it will be assumed the product will conform to the plans and specifications in all respects.

Failure to include items changed or removed due to Project cost constraints, addendums or VE items that require an additional review by the Engineer will require the Contractor to reimburse the Engineer a minimum of \$700 for the effort involved to review the corrected, proper submittal.

Where substitutions are proposed, unless the Contractor states in writing, on a separate recap/summary sheet in front of the respective submittal, the differences of the substituted equipment or material, he must be responsible to replace such items any time discrepancies are found.

Submittals must include catalog data, scheduled capacities, fan curves, sound data, materials and methods of installation, various components of various assemblies, etc.

The General Contractor must review and stamp all submittals prior to submitting them to the Architect. Submittals provided without the General Contractor's review will be automatically rejected and a possible re-review fee of \$700 imposed.

Only ONE complete submittal will be accepted for each specification section. Do not submit plumbing fixtures separately without the remaining Section 15400 items submittal. If a partial or incomplete submittal is provided, it will be automatically rejected and a possible re-review fee of \$700 imposed. If the Contractor provides a submittal for review and then provides additional items for review after the initial submittal was submitted, a \$700 review fee **will** be imposed. The objective is to provide one complete submittal as specified hereinbefore. **Providing submittals piecemeal is not allowed.**

All submittals must be separately bound by specification Section (Plumbing, Fire Protection and HVAC) in pdf format. Submittals must be electronically indexed and tabbed. Refer to the Architectural General Conditions and Division 1 for the format required by the Architect.

A cover sheet must be provided in front of the submittal package which states, as a minimum, the Project name and location, the name of the Owner, the Architectural firm, the Engineering firm, **the Engineer's Project number**, located within the Engineer's logo in the bottom right corner of the HVAC and Plumbing plans, the General Contractor, the Mechanical Contractor for mechanical submittals and Plumbing Contractor for plumbing submittals and each Contractors' point of contact, with phone number, as applicable for the respective trade's submittal. The respective Contractor's contact phone number is requested in an effort to obtain submittal clarifications which otherwise may be cause for rejection by the Engineer.

Submittals must include specifications section numbers and related sub-paragraph numbers, materials used, methods of installation, product manufacturer, equipment capacities, etc. HVAC equipment items must follow the identical tabular format, category by category, nomenclature, etc., as shown on the HVAC equipment schedules. As a minimum, the recap/summary sheet must indicate the submitted values compared to each of the specified values. **Failure to provide the submittals in the format specified will be cause for immediate rejection without review.** If there is any doubt as to the format required for the HVAC equipment summary sheet, contact ZEA and an example will be provided. Plumbing and Fire Protection

submittals must follow the identical procedure specified for the Mechanical Contractor.

- 1.12. Submittal Rejection and Resubmittal:** The Contractor must carefully review the submittal data requirements specified above. Pay particular attention to specific items within the specifications that are cause for immediate rejection when submittals are not provided to the Engineer as requested or specified. If the Engineer requests submittals for items not provided and the items are not included in the resubmittal, the resubmittal will be automatically rejected without review and a possible rereview fee imposed.

Any submittal that requires a review before the Engineer receives a complete submittal, a request for additional submittals, or portions thereof that are rejected TWICE and resubmitted a third, fourth, etc. time for review will require the Contractor to reimburse the Engineer each time for his effort. The minimum fee for each re-review is \$700.

When submittals are rejected, **DO NOT** return a copy of the rejected submittal with the Engineer's review stamp or notations. Provide a clean submittal addressing all requested, outstanding and rejected items. Provide a recap sheet that also addresses each comment made by the Engineer.

- 1.13. Site and Existing Conditions:** Bidders must visit the site and become acquainted with all job conditions that may affect the work shown on the plans. Report to the Architect, prior to bid, any new or existing conditions that require modifications to accomplish the installation of all items. Provide for required adjustments to complete the intent of the work. No consideration will be given after bid opening for the alleged misunderstanding regarding new or existing job conditions, utility connections, permits, fees, etc.
- 1.14. Line Locators:** Before proceeding with excavating or trenching, arrange with the Owner, all utility companies, and line locating firm(s) to describe, mark and locate utilities, piping, conduits, etc. which might be damaged by construction operations. Failure to provide the above must make the offending Contractor responsible for all costs involved to correct the damage incurred.
- 1.15. Phasing:** Interrupt existing services only at times approved by the Architect and the Owner. The General Contractor must make a written request to the Architect and the Owner for permission to interrupt services at the facility. The request must be provided with a minimum of seven (7) days prior to the desired date of the interruption. Hold interruptions to a minimum in duration and frequency.
- 1.16. Contractor Requested Electronic Drawing Files:** Not available.
- 1.17. Record Documents:** Provide in such detail, as is set forth under General and Supplemental Conditions.

Keep an accurate record of changes made during construction. The respective Contractor must take as-built measurements, including all depths, prior to commencement of backfilling operations. It will not be sufficient to check off line locations. Definite measurements must be taken for each service line. The location of buried piping must be shown on the drawings and dimensioned from fixed points.

The Plumbing Contractor must take as-built measurements, including all

depths, inverts, etc., prior to commencement of backfilling operations. It must not be sufficient to check offline locations. Definite measurements must be taken for each line entering and leaving the facility. The location of buried piping must be shown on the record drawings and dimensioned from fixed points. Additionally, the Plumbing Contractor must indicate the location of all cleanouts, dielectric unions and valve numbers from the specified valve chart on record/as-built drawings.

The respective Contractor must complete the Record Documents, using the As-Built Drawings from the General Contractor's construction site office. Transfer these changes to a set of reproducible copies of original drawings that the Architect will sell to Contractor at printing cost. The drawings will be provided to the Contractor "As Is".

The final drawing set within the Record Documents must be labeled "**Record Documents**" in the Title Block and must not include "clouds" or other indications of the changes during the project process. The Contractor must provide hard copies and an electronic set of all documented modifications to the contract documents in PDF format.

The Contractor is responsible for providing and showing all changes to the drawings that are different from the original contract drawings, including but not limited to addendums, change-orders, VE items, RFI's, test reports, field observations/site visit reports, etc. Hard copy plans may be a set of reproducible copies of the final corrected contract drawings. When work is completed, submit corrected reproducible drawings to the Architect for record and include copies in the Owner's Operating and Maintenance Manual.

Record documents must also be provided in PDF digital format on CD-R type CD(s). Include a CD of the documents in the Owner's Operating and Maintenance Manual.

PART 2. MISCELLANEOUS REQUIREMENTS TO BE COORDINATED WITH OTHER TRADES

- 2.1. Foundations and Supports:** "Sammy" bolts are prohibited. The Plumbing, Fire Protection and Mechanical Contractor, as applicable, must provide foundations, support, etc. not specified under other Divisions, and as required to mount all items in a safe, professional and structurally sound manner. The respective Contractor must provide all supplemental steel between various types of structural members, including between bar joists, purlins, wood trusses, miscellaneous structural items, etc. as required for the item(s) proper support. All supports and related components and assemblies must be sized for a minimum of 300% (3 times) the anticipated load carried by the respective item.

Where the Contractor has doubt as to proper supporting requirements, he must consult with, and seek the guidance of, the Architect and the project Structural Engineer for resolution. Consult all contract documents pertaining to other trades to determine extent of their work.

Concrete pads for outside equipment are specified under other Sections. Concrete work must meet the requirements of Division 3. Respective Contractor must provide all concrete pads not indicated or specified on the Architectural, Civil or Structural plans. Refer to the various equipment specifications for requirements in the absence of requirements by the various disciplines and provide as specified.

- 2.2. Sleeves:** Sleeves are required for all interior partitions, floors, perimeter exterior walls, etc. regardless of whether the above ceiling penetration occurs at locations where partitions go to the structure above or stop short of the structure above. All pipe sleeves must be installed as work progresses. Note the space required between the insulated/uninsulated piping, conduits, etc. and the pipe sleeve so that it can be properly firestopped per the firestopping assembly manufacturer and Code requirements. See plan details and firestopping requirements in this Section 15010 and provide as required. Split sleeves are not allowed.

All penetrations of floors and partitions are required to be built-in as work progresses. All penetrations of new construction that were not built-in as required by these specifications, and all existing floors, walls and existing partitions must be core drilled or sawcut large enough to allow all conduits, piping, firestopping assemblies, etc., to continue uninterrupted, and to provide proper firestopping of the penetration as required to install new items as shown and/or specified.

ALL penetrations of partitions that go to the deck/structure above require a firestopping/sleeve assembly, regardless of whether partition is rated or not.

All wiring penetrating any exterior wall, interior partition, floor, and similar construction must be in conduit, not sleeves, with protective grommets on the conduit ends. HVAC outdoor control wiring must be routed within a conduit that terminates above the ceiling in an accessible location.

Where non-rated walls or partitions do not extend to the structure above, a firestopping assembly or device is not required at the penetration. Instead, provide a 10 ga. galvanized sleeve of size required and specified. Pack the opening on both sides of the partition/sleeve with mineral wool insulation and seal on both sides with materials the same as the material penetrated. i.e., If it is a penetration of gypsum board, seal with gypsum board joint compound. If it is a penetration of concrete block or any other type of cementitious assembly, seal with cementitious type product matching the item being penetrated. Do not allow bare copper, steel, iron, conduit or other metallic item to be in contact with any cementitious assembly. Provide escutcheon on both sides of the partition in spaces exposed to view. See plan details for additional requirements.

Do not route any wiring through sleeves/firestop assembly in partitions containing piping. Do not route multiple wires, pipe or any other items through a single sleeve/firestop assembly. Do not route HVAC equipment control wiring through any sleeve containing refrigerant or other piping. Each conduit, pipe, wire, etc., must be provided with its own sleeve. Outdoor control wiring for HVAC equipment must be in conduit to a point above the ceiling in an accessible location. Provide a grommet at the conduit termination point to avoid control wiring abrasion at the conduit termination point.

All floor sleeves, except slab on grade, must be cast-in-place Schedule 40 steel pipe. Floor sleeves in foundations above the finish floor must terminate 2" above finish floor or housekeeping pad as applicable, and flush on the bottom side of the concrete foundation.

Sleeves for piping passing through exterior walls or exterior partitions must be Schedule 40 PVC pipe, 1" larger in diameter than piping and piping covering, neatly sawed off flush with the exterior wall, sealed water tight and vermin proof, and

exposed edge painted to match building, unless specified otherwise. **Spray foam is not an approved sealant.** Refrigerant piping suction and liquid lines routed through a singular pipe sleeve in an exterior wall is acceptable only in this circumstance.

Any pipe that passes through a below grade foundation wall must be provided with a relieving arch, or a pipe sleeve pipe cast in place into the foundation wall. The sleeve must be two pipe sizes greater than the pipe passing through the wall. Example: A 6" uninsulated pipe must require an 8" sleeve.

Piping installed through a foundation wall must be structurally protected from any transferred loading from the foundation wall. The annular space between pipe and sleeve must be filled with backing material and sealants in the joint between the pipe and concrete or masonry wall. Sealant selected for the earth side of the wall must be compatible with damp proofing/waterproofing materials that are specified in Architectural section of the specifications to be applied over the joint sealant.

Demolish and modify existing roof, walls, floors, partitions and ceilings as required to accomplish the required work. Remove existing carriers, valves, hangers, supports, existing water and waste piping, saw cut floors, walls, partitions, ceilings, etc., as shown and as required to install new piping or reconnecting to existing waste and water rough-in. do not reuse any existing hangers, supports, valves, etc. All items must be new.

Reconstruction and repair of the demolished/modified items must be as directed by the Architect. Coordinate demolition and repairing/rebuilding of items with General Contractor prior to bid to allow for installation of carriers, piping, etc., as applicable.

- 2.3. Firestopping:** Provide assemblies to form a specific U.L. or ASTM tested and listed system with minimum 10 ga. sleeve and appropriate UL/ASTM listing that maintains the required or specified integrity of the fire barrier and non-fire barrier to stop the passage of fire, gases, smoke and water. The through-penetration firestop systems and firestop devices must be tested and listed in accordance with ASTM E814 or UL 1479 using the "F" or "T" rating to maintain the same rating and integrity as the fire barrier being sealed or a minimum of 1-hour protection for non-rated assemblies. The assembly or device must prevent passage of fire, smoke, gases and water through openings, and prevent transmission of sound and vibration from the penetrating element to the structure. Penetrations involving insulated piping must be a tested and listed firestop system not requiring removal of insulation and in accordance with ASTM E 814 or UL 1479.

Wherever pipes, conduit, ducts, etc. penetrate any type of interior construction that extends to the underside of the structure/deck above it, **regardless of whether the wall, partition or floor is a rated assembly or not**, the space between the penetrating member and the building construction must be sealed with an ASTM E814 or UL 1479 listed, approved and labeled factory fabricated firestop assembly or device as specified above.

Where partitions are not indicated as fire rated, the firestopping assembly used must provide a minimum of one-hour resistance.

Where walls or partitions do not extend to the structure above, a factory fabricated firestopping assembly is not required. Instead, provide a 16 ga. galvanized sleeve or conduit (for wiring) and pack the respective sleeve or conduit as specified above in Para. Sleeves.

At each through penetration, attach identification labels on both sides, in location where label will be visible to anyone seeking to remove penetrating items or firestopping. Attach labels permanently to surfaces adjacent to and within 6 inches of edge of the firestop systems so that labels will be visible to anyone seeking to remove penetrating items or firestop systems. Provide metal labels in areas used as return air plenums. Use mechanical fasteners for metal labels. For plastic labels, use self-adhering type with adhesives capable of permanently bonding labels to surfaces on which labels are placed and, in combination with label material, will result in partial destruction of label if removal is attempted. Additionally, secure to the wall with metal thumbtack at each corner of the label. Labels must be Hilti Firestop Identification Labels 00339611, 3M Sticker 98040056289 or approved equivalent. Firestop identification labels must include the following information on labels:

1. The words: "*Warning--Through-Penetration Firestop System--Do Not Disturb. Notify Building Management of Any Damage.*"
2. Contractor's name, address, and phone number.
3. Through-penetration firestop system designation of applicable testing and inspecting agency.
4. Date of installation.
5. Through-penetration firestop system manufacturer's name.
6. Installer's name.

All fire stop material employed on the project must be the same brand throughout. The firestopping assemblies must be manufactured by Hilti, 3M, USG or other pre-approved Manufacturer.

- 2.4. Access Panels and Doors:** Do not locate serviceable items above inaccessible, hard ceilings without written approval from the Architect. Coordinate all items' locations with the Architectural ceiling plans before installing any items. Furnish access panels and doors required to the General Contractor for installation for access to valves, controllers, actuators, manual dampers, motorized dampers, air vents, cleanouts, smoke detectors, fire dampers, smoke dampers, fans and any other items requiring maintenance access. Refer to Section 15700, Paragraph Access Doors and Panels for access' required in ductwork.

Doors/panels must be suitable for location and finish involved, 16" x 16" unless otherwise indicated, required or specified to permit removal of equipment and provide acceptable maintenance access.

Access panels and doors must be fire rated where rated assemblies are penetrated. Access panels and doors for items located outdoors or in damp environments must be weatherproof.

Access panels and doors must be manufactured by Milcor, Philip Carey, Zurn, Mifab or approved equivalent. The Architect must approve the use of, and type of, panels and doors to be installed in areas that are exposed to view or in finished areas. Exposed access panels and doors must be factory cleaned and primed for painting in the field. Colors, materials and methods must be selected by the Architect. Refer to Architectural Section, Painting, for additional information.

For detention and similar institutional type facilities, refer to Section 1122 for type of access panels/doors required.

Where device occurs above a lift-out acoustical ceiling panel, provide engraved plastic labels of type specified in Part "Identification Requirements" below.

In addition to identification of items above the ceiling, provide engraved plastic labels below the item, on the ceiling grid. Engraved plastic labels must match ceiling grid size (width), color and be neatly glued to the ceiling grid adjacent to the ceiling tile that should be removed for access to the item. The label must have engraved on it the item being identified and its designation as shown on the plans, valve chart, equipment or item designation, etc. Refer to Part "Identification Requirements" below for additional requirements.

- 2.5. Cutting and Patching:** All openings must be laid out. Furnish detailed layout shop drawings to other trades in advance of their work. Failure to furnish layout shop drawings to the General Contractor must make the applicable Mechanical/Plumbing/Fire Protection Contractor responsible to rebuild openings as directed by the Architect. Where openings have not been laid out or built in, or they occur in existing partitions, floors, etc., they must be core drilled or saw cut large enough to allow all penetrating items with or without insulation to continue uninterrupted, with clearances specified.

Piping and duct within walls or behind walls must be installed before wall is erected otherwise, walls, floors, ceilings, etc., affected must be reworked by the trade which erected it at expense of the respective Contractor. Chasing and cutting new work is not allowed without written permission from the Architect.

- 2.6. Duct and Miscellaneous Items Painting and Finishes:** Painting of ducts, piping, piping insulation, grilles, diffusers, and other surfaces in finished areas is specified in Architectural Section "Painting" or similar section. Refer to those sections for requirements. If not specified in other sections, paint items with two coats of paint as directed by the Architect. Where the Architectural specifications require items to be painted, the Contractor must furnish it with a Manufacturer provided, factory applied prime coat.

Where factory finished items are marred, scratched, or damaged, replace the item, or upon approval from the Architect or Owner, refinish or touch-up as required or specified to bring to a like new condition.

All paint and coatings must have a fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed as determined by ASTM E84. Also, see Part "Identification Requirements" below for additional requirements.

PART 3. TRENCHING, EXCAVATION & BACKFILLING

- 3.1. Excavation:** Keep excavation free from water by pumping if necessary. Ensure that walls and footings and adjacent loadbearing soils are not disturbed in any way, except where lines must cross under a footing. Where a line must pass under a footing, make crossing with the smallest possible trench to accommodate the pipe. Where a line must pass adjacent to and below the bottom of a column footing, or the corner of a continuous footing, backfill the trench with concrete up to the level of the footing bottom, for a distance away from the footing equal to the depth of the fill.
- 3.2. Trenching and Bedding of Piping:** Buried piping must be supported throughout its entire length. Where trenches are excavated, such that the bottom of the trench

forms the bed for the pipe, solid and continuous load-bearing support must be provided between joints. Bell holes, hub holes and coupling holes must be provided at points where the pipe is joined. Such pipe must not be supported on blocks to grade. In instances where the material manufacturer's installation instructions are more restrictive than those prescribed by Codes, the material must be installed in accordance with the more restrictive requirement.

- 3.3. **Over-Excavation:** Where trenches are excavated below the installation level of the pipe such that the bottom of the trench does not form the bed for the pipe, the trench must be backfilled to the installation level of the bottom of the pipe with sand or fine gravel placed in layers not greater than 6 inches in depth. Such backfill must be compacted after each placement.
- 3.4. **Rock Removal:** Where rock is encountered in trenching, the rock must be removed to not less than 3 inches below the installation level of the bottom of the pipe, and the trench must be backfilled to the installation level of the bottom of the pipe with sand tamped in place so as to provide uniform load-bearing support for the pipe between joints. The pipe, including the joints, must not rest on rock at any point.
- 3.5. **Soft Load-Bearing Materials:** If soft materials of poor load-bearing quality are found at the bottom of the trench, stabilization must be achieved by over excavating not less than two pipe diameters and backfilling to the installation level of the bottom of the pipe with fine gravel, crushed stone or a concrete foundation. The concrete foundation must be bedded with sand tamped into place so as to provide uniform load-bearing support for the pipe between joints.
- 3.6. **Backfilling:** Backfill within the building and under paved areas must meet compaction requirements established under Division 2. Backfill must be free from discarded construction material and debris. Loose earth free from rocks, broken concrete and frozen chunks must be placed in the trench in 6-inch layers and tamped in place until the crown of the pipe is covered by 12 inches of tamped earth. The backfill under and beside the pipe must be compacted for pipe support. Backfill must be brought up evenly on both sides of the pipe so that the pipe remains aligned. In instances where the manufacturer's instructions for materials are more restrictive than those prescribed by the Codes, the material must be installed in accordance with the more restrictive requirement.
- 3.7. **Protection of Footings:** Trenching installed parallel to footings and walls must not extend into the bearing plane of a footing or wall. The upper boundary of the bearing plane is a line that extends downward, at an angle of 45 degrees from the horizontal, from the outside bottom edge of the footing or wall.
- 3.8. **Shoring, Sub-Soil Assumptions and Data, Work Around Trees and Surplus Earth:** Refer to Section "Earthwork".
- 3.9. **Broken Pavement:** In public streets, sidewalks, right of ways, etc., backfill and repair to satisfaction of authorities having jurisdiction.

PART 4. PIPE SUPPORTS, PIPE HANGERS AND MISCELLANEOUS SUPPORTS

- 4.1. **General:** Below requirements do not apply to refrigerant piping. Refer to Section 15700, Refrigerant Piping and Accessories for refrigerant piping support requirements. Refer to the plan details and these specifications for various piping

support requirements.

“Sammy” bolts are prohibited. Provide factory fabricated galvanized pipe hangers and supports for all piping, complete with properly sized bolts, washers, clamps, etc. and with coatings and finishes specified below, and all as required for a complete and safely functioning installation. Material items, methods and general requirements not covered in this specification must be provided in strict accordance with current edition of Manufacturer’s Standardization Society Specification MSS SP-58 and Manufacturer’s Published Product Information.

All hangers, supports, related components and assemblies must be sized for a minimum of 300% (3 times) the anticipated load carried by the respective item. Where the Contractor has doubt as to proper supporting requirements, he must consult with, and seek the guidance of, the Architect and the project Structural Engineer for resolution.

Where in contact with bare copper pipe provide same assembly except it must be copper, continuous-thread rod, nuts, and washers made of copper-coated steel.

Hangers must be manufactured by Elcen Metal Products Co., Fee & Mason Mfg. Co., ITT Grinnell Corp, B-Line Systems or preapproved equivalent.

- 4.2. Coatings and Finishes:** Pipe hangers, Unistrut pipe supports and duct Unistrut support assemblies of galvanized, zinc and similarly coated items are considered to **NOT** be coated. All must be painted, powder coated, epoxy coated or plastic coated. Hanger rods and associated bolts, and clamps on Unistrut assemblies are not required to be painted or coated.

All damaged or rusted steel pipe, all uncoated cast iron pipe, and all hangers, Unistrut and other support assemblies, must be cleaned, primed and painted with two coats of compatible black enamel paint as specified below. Any rusted items must have the rust removed, then etched and primed for painting as recommended by the respective manufacturer. After prepping the surfaces, then paint with two coats of compatible black, rustproof enamel paint. Do not use spray paint.

All paint and coatings must have a fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed as determined by ASTM E84. See Part "Identification Requirements" below for additional requirements.

In lieu of painted surfaces as specified hereinbefore, the Contractor may provide factory fabricated hangers and Unistrut assemblies with rust resistant powder coating, epoxy coating or plastic coating. All paints/coatings/finishes must meet or exceed a fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed as determined by ASTM E84.

- 4.3. Hangers at Typical Single Suspended Horizontal Pipe:** Where multiple pipes are shown adjacent to each other on the plans, provide a Unistrut assembly as shown on the plan details. Do not use multiple, single pipe assemblies.

Single pipe assemblies must be galvanized adjustable clevis or split-ring type equal to MSS 58 and 59, Type 1. Refer to Coatings and Finishes above for additional requirements. See other specifications and plan details for additional requirements. See part “Hanger Rods” below for limitations on use of clevis hangers.

Do not use clevis hangers for refrigerant piping. See refrigerant piping support requirements in Section 15700, Refrigerant Piping and Accessories.

Where in contact with bare copper pipe provide same assembly except it must be copper, continuous-thread rod, nuts, and washers made of copper-coated steel.

- 4.4. Manifolds and Parallel Runs:** Where multiple pipes are shown adjacent to each other on the plans, provide a Unistrut assembly as shown on the plan details. Do not use multiple, single pipe assemblies.

As specified above, the Contractor must provide a Unistrut system complete with fittings, clamps and accessories required and specified. Horizontal and vertical mounted piping must all be secured to each Unistrut hanger assembly. Refer to the plan details and specifications for requirements.

Refer to Coatings and Finishes above for additional requirements. Refer to "Hanger Rods" below for locations that require a Unistrut assembly. Furnish for review proposed system components.

Where in contact with bare copper pipe provide same assembly except it must be copper, continuous-thread rod, nuts, and washers made of copper-coated steel.

Unistrut assemblies must also be provided for refrigerant piping. Refer to Section 15700, Refrigerant Piping and Accessories for requirements.

- 4.5. Spacing:** Install supports as required or specified to prevent sags, bends or vibration. Provide additional building supports and attachments where support is required or specified for additional concentrated loads, including valves, in-line pumps, flange guides, strainers, expansion joints and at all changes in direction of piping.

At no-hub pipe, support as specified below for cast iron piping.

In all cases, provide on all sides of, and within 12 inches of, all elbows, take-off fittings, joints, valves, any change in direction of item supported, at ends of branches over 5 feet long and on centers not exceeding the following:

<u>Piping Material</u>	<u>Pipe Size</u>	<u>Maximum Spacing</u>
Copper Piping/Tubing (Water And Condensate Drainage)	1 1/4" or less	6 ft. Horizontal 8 ft. Vertical
	1 1/2" or larger	8 ft. Horizontal 8 ft. Vertical
Refrigerant Piping	All	8 ft. Horizontal 6 ft. Vertical
Cast Iron	All	4 ft. Horizontal 12 ft. Vertical
Steel LP Gas Piping	1/2" to 1"	6 ft. Horizontal 6 ft. Vertical
	1-1/4" or larger	8 ft. Horizontal 8 ft. Vertical

Where horizontal cast iron pipe is installed in 10ft. lengths, spacing must be increased to 9 ft. In addition to specified cast iron support requirements, provide additional support for cast iron pipe within 6" of each fitting on all sides of the fitting.

PVC

All

4 ft. Horizontal

8 ft. Vertical

Where vertically installed piping is provided, a guide must be installed midway between the specified/required vertical supports, at the base of each riser and at each floor. Such guides must prevent pipe movement in a direction perpendicular to the axis of the pipe.

- 4.6. Protection of Physical Damage for Piping:** In concealed locations where piping is installed through holes or notches in studs, joists, rafters or similar type members, the pipe must be protected by shield plates. Protective steel shield plates having a minimum thickness of 0.0575 inch (16 gage) must cover the area of the pipe where the member is notched, drilled or bored, and must extend not less than 2 inches above sole plates and below top plates.

- 4.7. Hanger Rods:** Must be mild steel, hot dipped galvanized, threaded as required. Rods must be selected as specified hereinbefore. Use not smaller than 3/8" rods for pipe 2" and under, 1/2" rods for pipes 2 1/2" through 4", 3/4" rods for 5" through 12" and 1" rods for piping over 12". Support rods with threaded Underwriters listed inserts, expansion shields or beam clamps must be all galvanized. Beam clamps must be equal to Elcen Fig. 34 or 36 with rod and eye end.

Where in contact with bare copper pipe provide same assembly except it must be copper, continuous-thread rod, nuts, and washers made of copper-coated steel.

At bar joists, support from bottom chord at panel points. For piping over 6" provide supplemental steel angle supports and welding to span 3 joists when running parallel to joists and welded angle between two panel points for piping running perpendicular to joists. Concrete inserts must be equal to Grinnell Figure 282.

Wherever piping hanger support rods heights exceed 36" length from top of the supported item to the structure above, Contractor must provide a Unistrut support assembly and bracing of the assembly with minimum 1"x1"x1/4" angle iron or as required for the weight of the supported item, whichever is greater, and anchor to structure above to prevent swaying. Assembly must be welded at the connection to Unistrut and building structural assembly. Follow welding procedures set forth in the structural division of the specifications.

- 4.8. Bracing:** Where hanger rods heights exceed 36", provide sway bracing as specified above in "Hanger Rods". Bracing must be provided at each Unistrut assembly and attached to the building structural system.
- 4.9. Approved Equivalents:** By Grinnell, Elcen, Stockham or Crane will be accepted.

PART 5. IDENTIFICATION REQUIREMENTS

- 5.1. Identification:** All of the above ceiling identification specified must be completed prior to the above ceiling site visit. All remaining identification must

be completed prior to the final site visit.

The State of Alabama Department of Construction Management (DCM) will cancel on-site, the site visit if not completed as specified. Failure to comply with this provision will be cause for cancellation of the site visit, and a fee imposed for the additional site visit, with all costs of the additional site visit to be borne by the Contractor.

All identification must follow the nomenclature used on the plans.

All equipment, equipment access points, smoke detectors, smoke dampers, fire dampers, equipment filter access locations, access panels, motor starters, disconnects, thermostats, humidistats, sensors, valves, trap primers, control systems components, switches, all air handling equipment access doors and any other items or devices which cannot be readily identified by the Architect, Engineer or Owner and his personnel, must be provided with engraved laminated plastic nameplates, as described below.

All filter access locations' identification must include the size and number of filters required for each specific piece of equipment.

Identify all access openings/panels/doors to indicate item for which access is provided. Ex. Motorized damper, fire damper, smoke detector, filters, valves, coils, etc. Additionally, add the following to each access identifier: **"ACCESS - DO NOT BLOCK."**

All above ceiling identification must have a corresponding engraved plastic label identifier neatly attached to the ceiling grid below the aforementioned equipment, item, valve, access door, etc. Attach to the ceiling grid with permanent adhesive. The engraved plastic labels background must match ceiling grid color with contrasting black or red letters as desired by the Architect. The label must have engraved on it the item being identified and its designation as shown on the plans, valve chart, etc.

Engraved equipment designation and numbers must be as shown on the Mechanical and Plumbing drawings on the upper half of tag, leaving lower half of tag for future engraving by Owner. Where equipment is typed (HP-A, HP-B, EF-A, etc.) rather than numbered (HP-1, HP-2, EF-1, etc.) the tag must include the room number(s) of the area served. Room numbers must be designated by the Owner. In absence of Owner's room numbers, numbers must be as indicated on the architectural plans.

Identify all piping, including refrigerant suction lines, refrigerant liquid lines, refrigerant hot gas reheat coil lines, condensate drainage piping located in concealed areas above ceilings and exposed to view in finished spaces, all water piping, fire sprinkler piping, gas piping, air piping, jacket of all insulated pipe and all pipe exposed to view and/or accessible through removable ceilings, attics, access panels, etc... Sanitary vent piping above the ceiling, in chases and similar areas, and condensate drainage piping on the floor in mechanical rooms or located on the roof, are not required to be identified **except that all sanitary vent piping associated with an acid resistant waste and vent piping system must be identified.** See subsequent part below for special requirements for refrigerant piping identification.

Identification must be visible from all sides of the piping, bear name of pipe contents and show direction of flow. Install identification within 12" of all flanges, valves, fittings, elbows, change in piping direction, at each branch take-off, both sides of floor

and wall penetrations, and along all straight runs of pipe not further apart than 15 feet. In the case of gas/air systems, the identification must also indicate pressure of the pipe contents.

Gas piping identification must be provided as specified in Part "Gas Pipe Painting and Identification" above except intervals must be a maximum of 10 feet for straight runs of piping. Identification must indicate direction of flow and pressure of piping contents and placed at intervals and locations specified. See special requirements for gas piping identification in the subsequent part below.

Piping identification must be provided over every space, including small areas (closets, storage rooms, etc.) above accessible ceilings. All piping identification must be installed such that the Owner or maintenance personnel can remove any ceiling tile and visually identify any overhead piping with the specified identification markers.

Pipe labels must be factory fabricated, flat wrap-around markers that completely surround the pipe. The markers' colors, designations, etc., must comply with IBC/IPC/IMC requirements, ANSI/ASME Standard A13.1 and ANSI Z535.1, current editions. Markers must be Seton "Snap-Around" or Seton "Strap-Around" pipe line markers, Marking Services Inc (MSI) Series MS-970, Kolbi Pipe Marker Co., Brimar or approved equivalent. **Stick-on, painted, stenciled, hand written or any non-factory fabricated type identification is not allowed.**

Fit all Plumbing dielectric unions, all gas valves and plumbing valves (except equipment service valves and sprinkler valves) with a custom laser engraved brass valve tag at each valve and dielectric union and include on the specified valve chart. Tag must be 1-1/2 inches in diameter, 18-gauge polished brass tags with 3/16-inch chain hole and 1/4-inch-high stamped, black-filled service designation. All gas valve identification must indicate gas pressure, including the entering and leaving side of all gas pressure regulators, as applicable. Number tags in sequence, starting with number 1; prefix the number with "P" for plumbing items. After numbering plumbing valves, also indicate valve numbers on the record/as-built drawings.

Provide a valve chart laminated and framed which shows the valve number and location of each valve and dielectric union, and type of service of each valve (Cold water, hot water, hot water circulating, propane gas, etc.). Locate a valve chart in each water heater room and each janitor closet. Permanently attach each chart to the wall as directed by the Architect. All valves' numbers must also be shown on the Record drawings. Include a copy of the valve chart and the record drawings with the valves and dielectric union identification in the Owner's Operation and Maintenance Manuals.

In addition to valves identification specified above, provide an engraved laminated label, of the type specified above, and glue to the ceiling tile grid below the valve for each valve concealed from view.

Access openings/panels/doors to all items requiring access must be permanently identified on the exterior of the access panel and on the ceiling grid below by a label having letters not less than 3/4" in height and reading: **"XXX – DO NOT OBSTRUCT ACCESS"** where "XXX" is the item requiring access.

Permanently affixed warning labels must be attached to all equipment, inside the facility and outside of the facility, on a highly visible location on the equipment, which can be automatically started. The warning label must read as follows: **"CAUTION!!**

This equipment is operating under automatic control and may start or stop at any time without warning. Place disconnect switch in the "OFF" position before servicing or attempting to work on equipment."

Permanently affixed warning labels must be attached to all motor starters and all control panels which are connected to multiple power sources utilizing separate disconnect switches. The warning labels must read as follows: ***"THIS EQUIPMENT IS FED FROM MORE THAN ONE POWER SOURCE WITH SEPARATE DISCONNECTS. DISCONNECT ALL POWER SOURCES BEFORE SERVICING OR WORKING ON THIS ITEM"***

Provide signage on each access point to the UV-C lights and on each side of the unit. Signage materials and methods must be as specified below, white letters with red background. Do not use the UV-C Manufacturer provided signage.

Warning signage must read as follows: ***"DANGER!! UV-C LIGHT SOURCE! UV-C RADIATION CAN CAUSE SEVERE BURNS OF THE SKIN AND EYE INJURIES. DISCONNECT POWER BEFORE SERVICING UNIT OR UV-C LIGHTING!"***

Identify the UV-C lighting redundant shut-off switch specified in Section 15700. Signage materials and methods must be as specified below, white letters with red background.

UV-C lighting redundant shut-off switch signage must read as follows: ***"UNIT XX-YY UV-C LIGHTING REDUNDANT SHUT-OFF SWITCH."*** XX denotes the unit, and YY is the unit number or type, all as scheduled on the plans.

Labels must be Norplex-Micarta stock meeting ASTM D709, a minimum of 3" x 3" x 1/8" thick, laminated plastic labels (larger if needed) with engraved, all caps, 3/8" high, 1/8" stroke letters for thermostats, CO2 sensors and similar control devices in the finished space and 6" x 4" x 1/8" thick, laminated plastic labels (larger if needed) 3/4" high x 1/4" stroke numerals and all capital letters to identify all items furnished under Division 15 specifications, to include all warning signage, access panels, equipment and all other items above the finished ceiling requiring identification. Labels may be smaller but must be legible. The intent is to provide proper identification without it being aesthetically undesirable. If there is any doubt about appearance, coordinate with the Architect's field representative before proceeding.

Labels attached to the ceiling grid must be the same width as the ceiling grid to which it is attached. Properly adjust lettering height to fit within the smaller width label. Labels color on the ceiling grid must match the ceiling grid and be provided with contrasting black or red letters as desired by the Architect.

All items above the ceiling or in mechanical rooms, attics, mezzanines and similar type spaces must be red with white lettering.

Where the tag, label or marker occurs in a plenum (return air) space, the material employed must carry a Class A Flame Spread Rating per ASTM E84. If the material does not meet the Class A Flame Spread Rating per ASTM E84, provide custom laser engraved, 0.029" thickness, red, 316 Stainless Steel with white letters. Sizes, letter heights, etc., and colors must be as specified for the laminated plastic labels specified hereinbefore.

Gas piping identification must be provided as specified in this Section 15010, "Gas Pipe Painting and Identification," except intervals must be a maximum of 12 feet for straight runs of piping.

All exterior and interior gas piping, fittings, etc., must be clean and rust free when installed. All exterior and interior gas piping exposed to view piping in finished and unfinished areas must be painted. Gas piping concealed above the ceiling or in partitions is not required to be painted unless it is rusted. Where gas piping, fittings, etc., are rusted, all rust must be removed and then pre-treated with acidic etching primer specifically manufactured for the piping installed. Apply two coats of a compatible base and rustproof enamel paint. Rusted portions of gas piping, fittings, etc., in attic and other concealed areas must be painted black after prepping for paint. Do not use spray paint. Gas piping that is exposed to view must be painted with colors in accordance with IBC/IPC/IMC requirements and ANSI Standard A13.1, current edition. After gas piping is painted, identify with pipe markers and tags as specified hereinbefore.

All piping exposed to view in unoccupied finished spaces, mechanical rooms, plumbing chases, housekeeping and similar spaces, and jacket of insulated piping exposed to view in mechanical rooms, janitor/housekeeping and similar type spaces must be painted with two coats of compatible enamel paint in accordance with IBC/IPC/IMC color requirements and ANSI Standard A13.1, current edition. Do not use spray paint. After piping is painted, identify with pipe markers, valves tags, etc. as specified hereinbefore.

Exposed piping and the jacket of insulated piping in occupied finished spaces must be painted with two coats of compatible enamel paint, with color selected by the Architect.

Painting of the jacket of the insulated piping is not required where a protective aluminum jacket is specified and provided. Provide identification markers as specified hereinbefore on piping with aluminum jacket. Refer to Sections 15400 and Section 15700 for piping requiring aluminum jacket.

- 5.2. Refrigerant Piping Identification:** All refrigerant piping must be identified. The pipe identification must be located at intervals not exceeding 15 feet on the refrigerant piping or pipe insulation. Provide piping identification over every space, including small areas (closets, storage rooms, etc.) above accessible ceilings. All piping identification must be provided such that the Owner or maintenance personnel can remove any ceiling tile and visually identify any overhead refrigerant piping with the specified identification markers. Minimum height of the lettering of the identification label must be 3/4".

IMC 1109.2.7 requires that the identification must indicate the refrigerant designation and safety group classification of refrigerant used in the piping system. For Group A2, A3, B2 and B3 refrigerants, the identification must also include the following statement: "***DANGER - Risk of Fire or Explosion. Flammable Refrigerant.***" For any Group B refrigerant, the identification must also include the following statement: "***DANGER - Toxic Refrigerant.***"

Basic identification for all refrigerant lines to and from all of the various split systems must be identified as specified above. Refrigerant piping identification must use the nomenclature on the plans for the specific unit it identifies. Where equipment is typed (HP-A, HP-B, F-A, F-B, etc.) the piping identification must include the room number

of the space the respective unit serves or the room number of the mechanical room the unit is located in. Ex. An HP-A that serves Classroom 102A must be identified as "Refrigerant Suction Line HP-A Rm. 102A" and "Refrigerant Liquid Line HP-A Room 102A".

Due to the complexity of the required identification, the piping may require multiple, side by side identification wrap arounds.

Custom factory fabricated refrigerant piping labels are required. Stick-on, painted, stenciled, hand written or any non-factory fabricated type identification is not allowed.

- 5.3. Gas Pipe Painting and Identification:** Gas piping identification must be provided as specified in this Section 15010, Identification Requirements, except intervals must be a maximum of 12 feet for straight runs of piping.

All exterior and interior gas piping, fittings, etc., must be clean and rust free when installed. All exterior and interior exposed to view piping in finished and unfinished areas must be painted. Gas piping, related fittings, etc., which are concealed above the ceiling or in partitions are not required to be painted unless it is rusted. Where any part of the gas piping is rusted, regardless of location, the rust must be removed and then pre-treated with acidic etching primer specifically manufactured for the piping installed. Apply two coats of a compatible base and two coats of compatible rustproof enamel paint. Rusted portions of gas piping, fittings, etc., in attic and other concealed areas must be painted black after prepping for paint. Do not use spray paint.

Color for the exterior piping and all piping in all mechanical rooms and similar locations where the piping is exposed to view in finished or unfinished areas (except concealed areas) must comply with IBC/IPC/IMC requirements and ANSI Standard A13.1, current edition. After gas piping is painted, identify with pipe markers and tags as specified.

PART 6. MISCELLANEOUS REQUIREMENTS

- 6.1. Materials and Equipment:** New and of best quality in every respect. Pipe and fittings must conform to the ASTM Standard designated for pipe of each material. Equipment must bear Underwriters Laboratories Inc. (UL) listing label, Canadian Standards Association (CSA) listing label or ETL approved rating.

All electrical components and products must also comply with the respective Code of Federal Regulations (CFR). All pressure vessels must be constructed and tested in accordance with applicable ASME Codes and must bear ASME stamps unless specified otherwise. Minimum pressure rating must satisfy job conditions.

Manufacturers not mentioned in the specifications require prior approval, seven (7) days prior to bid date. Follow procedures set forth in Division 1 of the specifications. All prior approvals must be submitted through the Architect. Where substitutions are proposed, unless the Contractor states in writing, on a separate recap/summary sheet in front of the respective submittal, the differences of the substituted equipment or material, he must be responsible to replace such items any time discrepancies are found.

Where units of the same class of equipment are required or specified, these units must be products of a single manufacturer, however, the component parts of each unit need not be. All major equipment must be provided by the same manufacturer throughout the project. No mix matching of equipment Manufacturers is allowed unless specified otherwise.

Architect must select all colors where a choice exists.

No materials or products that contain asbestos, formaldehyde, lead or mercury, in excess of limits mandated and defined by OSHA, LEED and the EPA, must be utilized.

Where conflicts occur between a Code, Standard, Listing and the contract drawings or contract specifications, the most stringent requirements must govern and be applied.

- 6.2. Workmanship:** Workmanship must be first class, premium and in accordance with superior practice. Work must be executed by experienced mechanics and must present a neat and professional appearance. Exact location of pipe, duct, equipment, etc., must be determined in field, considering work of other trades. Do not attach any items to other trades' assemblies. Items must be separately attached to the building structural system. Except in unfinished areas and where specifically indicated on the plans or approved in writing, ductwork, piping, conduit, wiring, and similar items must be concealed in the construction.

Aboveground piping must run parallel with the lines of the building, unless otherwise indicated. Branch pipes from water service lines may be taken from top, bottom, or side of main, using crossover fittings required by structural or installation conditions. Refer to the plan details and other specification sections for gas piping and compressed air piping take-off requirements. Supply pipes, valves, and fittings must be kept a sufficient distance from other work and other services to permit not less than 1 inch between finished covering on the different services. Bare and insulated lines must not bear directly against building structural elements so as to transmit sound to the structure or to prevent flexible movement of the lines.

Lines required to be sloped have the right of way over those not required to be sloped. Lines whose elevations cannot be changed have the right of way over lines whose elevations can be changed. Lines and equipment whose locations are dimensioned have precedence over lines and equipment not dimensioned.

Pipe must be clean, cut clean, properly reamed, threaded or soldered, erected plumb and secure. Make changes in pipe size by reducing fittings without the use of bushings. Install all items in accordance with manufacturer's recommendations. Absolute coordination is required with the other Contractors on the project before proceeding with installation of any system or item.

At all stages of installation, protect pipe openings, floor drains, hub drains, fixtures, ductwork, condenser coils and equipment against the entrance of foreign materials and from damage by the elements, mortar, concrete, paint, etc. Plugs of rags, wool, cotton, waste or similar materials are not acceptable.

If air moving equipment must be used during construction, temporary filtration media with a Minimum Efficiency Reporting Value (MERV) of 11 must be installed at each return air grille, return air register, exhaust grille, exhaust register, and unit return air

inlet. ALL open portions of ductwork and equipment must be covered with a self-adhesive film (not Visqueen) or airtight sheet metal caps to prevent the intrusion of contaminants.

All equipment openings, duct openings, duct take-offs, etc., must be protected immediately after the tap, take-off, opening, etc. has been fabricated in the field. In effect, there must be no ductwork opening or equipment opening that is exposed to the ambient air. The material must be a minimum of 3 mils thick and have a minimum tensile strength of 10 psi. It must be waterproof and recyclable. Material must be DuroDyne Dyn-O-Wrap or approved equivalent.

Where bare sheet metal is delivered unassembled to the job site, all ductwork must be covered and protected with Visqueen. After fabricating the duct in the field, the interior bare metal must be wiped clean with a clean damp cloth before installing in the field. After installation, the duct must be protected as specified above. Any ductwork discovered to be unprotected as specified is subject to immediate rejection for use on this project.

- 6.3. **Testing Documentation:** Throughout the Division 15 specifications, there are various tests required and specified. Provide the Architect written certification and results of all tests specified, including those indicating failure. The absence of written testing certification and results will be considered the same as if testing was never done. Include all testing documentation in the Operating and Maintenance Manuals.
- 6.4. **Factory Finishes:** Furnish to the Architect, color cards for standard and premium colors available. The Architect must select color where choices exist. Provide Manufacturer's standard color where color choices are not available. Coordinate all color selections with appropriate Architectural specification sections.
- 6.5. **Expansion:** Provide for expansion and contraction of all piping, ductwork, etc. and make proper provisions so that excessive strain will not occur on piping, ductwork or other parts. Provide flexible connections for all piping and ductwork at all building expansion joints.
- 6.6. **Safety Provisions:** Provide covers or guards on all hot, moving, projecting items and at any other location that could be construed by the Engineer, Owner or Architect as a hazard. Provide full size expanded metal grilles over all exhaust/relief air assemblies on all packaged equipment to protect against any intrusion to motorized dampers, gravity backdraft dampers, etc.
- 6.7. **Cleaning and Adjusting:** Upon completion of work, clear all drains, traps, fixtures, ducts and pipe. Adjust all valves, remove rubbish and leave work in clean and excellent operating condition. Clean and polish all floor drains, floor and wall cleanouts, wall hydrants and any other exposed metal objects.

Install final permanent type filters only after cleaning of building is completed.

- 6.8. **Escutcheons:** Where pipes pass through cabinets, walls and ceilings of finished rooms provide one-piece, cast-brass type with polished, chrome-plated finish and setscrew fastener or stainless steel type securely fastened in place. Do not use split ring type escutcheons.

Pack penetrations with mineral wool insulation, seal with firestopping compound and install escutcheons to prevent passage of fire, smoke and vermin.

- 6.9. Delivery and Storage:** All equipment and materials delivered and placed in storage must be protected from the weather, humidity and temperature variations, dirt and dust, and other contaminants. See Section 15700 and this Section 15010 for additional requirements for ductwork and equipment.
- 6.10. Dielectric Isolation:** Provide dielectric isolation where dissimilar metals are joined, at supports, etc. For pipe sizes 2" through 6", copper piping flanges must be drilled to ANSI B 16.5 150/125 Standard and powder coated, with an EPDM insulator adhered to the plate steel flange protruding inside of the steel flange to prevent contact with the copper flange adapter. The copper component of the flange adapter must be Third Party Classified by Underwriters Laboratories, Inc. Minimum working pressure must be 300 psi at 272°F.
- 6.11. Miscellaneous Bonding/Grounding of Metallic Items:** Wherever any bare metallic piping, conduit, structural elements or any other metallic assembly is in contact with externally insulated duct or bare sheet metal duct, bonding/grounding must be provided. The Contractor must provide 1/2" thickness, unslit AP Armaflex insulation of sufficient inside tubular diameter to snugly and completely cover the respective metallic item. The insulation must extend the full length of the affected area. Where channel shapes are used, orient the open side of the Unistrut assembly down. Materials that are not supported by Unistrut, sheet Armaflex may be used provided it is properly attached to the duct or affected items. Refer to Section 15700, Part "Pipe and Miscellaneous Insulation Work" for AP Armaflex material specification.

END OF SECTION

SECTION 15400

PLUMBING

PART 1. GENERAL & MISCELLANEOUS

- 1.1. **General Provisions:** Section 15010 is applicable in full hereto. No building materials or products that contain asbestos, formaldehyde, polychlorinated biphenyl (PCB), lead or mercury, in excess of limits mandated and defined by OSHA, LEED and the EPA, must be utilized.

Do not fabricate, or install, any pipe or equipment until all coordination has been accomplished. Refer to Section 15010 for coordination requirements.

- 1.2. **Qualifications:** The Plumbing Contractor and the required third party Insulation Contractor must be properly licensed and established at the location of the work and must maintain locally adequate service facilities. They must have had previous experience in the satisfactory installation of at least six (6) systems of this type, size, complexity and scope.

- 1.3. **General Scope:** Include all equipment, material and labor required for a complete operating plumbing system even though every item involved is not indicated. Refer to architectural drawings and verify all plumbing fixture's locations and mounting heights. Notify the architect prior to bidding of any discrepancies. Do not attach any items to other trades' assemblies. Items must be separately attached to the building structural system.

The Plumbing Contractor must not install the piping insulation. All piping insulation work must be provided by an independent third party licensed and experienced Insulation Subcontractor whose primary business is the sale and installation of insulation materials in accordance with insulation manufacturers' requirements and these specifications. Refer to Part Pipe Insulation for detailed requirements.

Advisory provisions listed in all Codes referenced in the Contract Documents are mandatory. Codes are minimum requirements. Where conflicts occur between a Code, Standard, the contract drawings or these specifications, the more stringent requirements must govern and be applicable.

Manufacturers not mentioned in the specifications require prior approval, seven (7) days prior to bid date. Follow procedures set forth in Division 1 and Section 15010 of the specifications. All prior approvals must be submitted through the Architect.

Arrange and install piping systems sizes as shown, as close as practical, straight, properly supported and run as directly as possible forming right angles or running parallel with building lines, true to line and grade, free of sags and bends. Locate piping as high as practical and in parallel groups as close together as practical.

Demolish and modify existing roof, walls, floors, partitions and ceilings as required to accomplish the required work. Remove existing carriers, valves, hangers, supports, existing water and waste piping, saw cut floors, walls, partitions, ceilings, etc., as shown and as required to install new piping or reconnecting to existing waste and water

rough-in as shown. Do not reuse any existing hangers, supports, valves, piping, etc. All items must be new.

All penetrations of floors and partitions are required to be built-in as work progresses. All penetrations of new construction that were not built-in as required by these specifications, and all existing floors, walls and existing partitions must be core drilled or sawcut large enough to allow all conduits, piping, firestopping assemblies, etc., to continue uninterrupted, and to provide proper firestopping of the penetration as required to install new items as shown and/or specified.

Reconstruction and repair of the demolished/modified items must be as directed by the Architect. Coordinate demolition and repairing/rebuilding of items with General Contractor prior to bid to allow for installation of carriers, piping, etc., as applicable.

All piping must be clean and rust free when it is installed. Before installation, it must be checked, upended and swabbed. All rust or dirt from materials in storage or from lying on the ground must be removed. Any dirty piping installed must be cleaned. Any rusted piping must have the rust removed, etched and primed for painting as recommended by the respective piping manufacturer, and then painted with two coats of black, compatible, rustproof enamel paint. Do not use spray paint. Refer to gas piping specification for requirements of gas piping painting. The paint must comply with the requirements of ASTM E84 for flame spread and smoke development.

The Plumbing Contractor must take as-built measurements, including all depths, inverts, etc., prior to commencement of backfilling operations. It must not be sufficient to check offline locations. Definite measurements must be taken for each line entering and leaving the facility. **The location of buried piping must be shown on the record drawings and dimensioned from fixed points.**

- 1.4. **Record Documents:** Provide in such detail, as is set forth under General and Supplemental Conditions and in Section 15010. **Note that the Plumbing Contractor must take as-built measurements, including all depths, inverts, etc., prior to commencement of backfilling operations. It must not be sufficient to check offline locations. Definite measurements must be taken for each line entering and leaving the facility. The location of buried piping must be shown on the record drawings and dimensioned from fixed points. Also, show locations of all dielectric unions, cleanouts and all valve numbers on the record documents.**

- 1.5. **Access Panels and Doors in Finished Areas:** Do not locate serviceable items above inaccessible, hard ceilings or in partitions without written approval from the Architect. Coordinate all items locations with the Architectural plans before installing any items. Furnish access panels and doors to the General Contractor for installation wherever required for access or maintenance to any items including but not limited to valves, controllers, actuators, trap primer assemblies, water hammer arrestors, air vents, cleanouts, etc.

Access panels/doors in finished areas or areas exposed to view must be suitable for wall or ceiling finish involved, 24" x 24" unless otherwise indicated or as required to permit removal of equipment and provide acceptable maintenance access. Access panels and doors must be fire rated where rated assemblies are penetrated.

Access panels and doors must be manufactured by Milcor, Elmdor, Zurn, Mifab or approved equivalent. The Architect must approve the use of, and type of, all panels and doors to be installed in areas that are exposed to view or in finished areas.

Access panels/doors exposed to view and in finished spaces must be factory cleaned and primed for painting in the field. Colors must be selected by the Architect. Refer to Architectural Section, Painting, for additional information.

For detention and similar institutional type facilities, refer to Section 1122 for type of access panels/doors required.

Refer to Section 15010, Part Access Panels and Doors for additional requirements.

- 1.6. Warranty:** Guarantee work as set forth in Section 15010 and Division 1. Guarantee in writing to make good without cost any defects in materials and workmanship for one year following the date of substantial completion of the project as determined by the Architect, unless specified otherwise. Flush valves and faucets must be provided with a complete replacement, including labor, and a five year guarantee in the event of failure. Provide free maintenance and service during the guarantee period. Refer to other parts for additional requirements and extended warranty requirements.
- 1.7. Site Visits:** It is the contractor's responsibility to have the job ready for site visits when they are scheduled. If the project is not ready for the requested site visit and the Architect, any governmental agency or any other entity requires an additional site visit with the Engineer present, the contractor must pay Zgouvas, Eiring & Associates a re-visit fee of \$2,000. The payment must be made directly to Zgouvas, Eiring & Associates 5 days prior to the scheduled site visit.

The Contractor is urged to carefully review the extensive requirements of Part "Identification" in Section 15010 of the specifications and note that certain identification **is required to be completed before certain site visits. There are specific identification requirements prior to the above ceiling and final site visits, respectively, that are mandatory. The State of Alabama Department of Construction Management (DCM) will cancel on-site, the site visit if not completed as specified. Failure to comply with this provision will be cause for cancellation of the site visit, and a fee imposed for the additional site visit, with all costs of the additional site visit to be borne by the Contractor.**

- 1.8. Governmental Inspections:** The Plumbing Contractor must arrange and pay for the State of Alabama Boiler and Pressure Vessel Safety Division/Inspection Divisions, Elevators/Boilers Inspector to visit job site to inspect water heater installation. The Plumbing Contractor must obtain written approval, certification, tags and Certificate for Potable Water Heater (PWH) as required. **This inspection must be accomplished prior to the final site visit; to include the tagging of the equipment with the inspection tag, else DCM will cancel the site visit and impose a reinspection fee.**

Correct all deficiencies required by the Inspector without additional cost to the Owner or the Owner's Project Design Professionals, using materials and methods, as directed by, State of Alabama Boiler and Pressure Vessel Safety Division/Inspection Divisions and Elevators/Boilers inspector as required.

- 1.9. Miscellaneous:** Bidders must visit the site and become acquainted with all job conditions that may affect the work shown on the plans. Report to the Architect, prior to bid, any new or existing conditions that require modifications to accomplish the installation of all items. Provide for required adjustments to complete the intent of the work. No consideration will be given after bid opening for alleged misunderstanding

regarding new or existing job conditions, utility connections, permits, fees, construction documents, etc.

The Contractor must carefully examine the contract documents during the bidding phase. Any missing information, clarifications, etc. in the contract documents that is required to provide accurate pricing must be brought to the attention of the Architect, **prior to bid date**, so all may be clarified and/or corrected. Failure to identify and resolve any issue prior to bid must require the Contractor to provide said items, complete, without additional cost to the Owner or the Owner's Project Design Professionals, using materials and methods specified by, and as directed by, the Owner's Design Professionals.

Refer to Section 15010 for additional requirements.

- 1.10. Spare Parts:** Manufacturer of any equipment specified must have a wholesale outlet for readily available replacement parts in the nearest major USA city.

- 1.11. Electrical Work:** All electric power wiring required for installation of equipment under this Section is specified under the Electrical Division. The Plumbing Contractor must furnish and install all controls and control wiring as specified or required to properly complete the installation. Control conduit is specified under the Electrical Division or shown on electrical drawings; all other control conduit must be provided under this Section of the work.

All control conduit, power wiring, relays, transformers, contactors, etc. which are required and are not shown on the electrical drawings or specified in the Electrical Division of the specifications, must be provided under this Plumbing Section.

Coordinate all requirements with the Electrical Sub-Contractor prior to bid. Electrical work performed under this Section must meet the requirements set forth in the Electrical Division and the National Electric Code (NEC), current edition.

- 1.12. Submittals:** Refer to Section 15010 for **strict requirements** and, especially as it applies to format, project cost constraints, addendums and Value Engineering (VE) items.

Only ONE complete submittal will be accepted for review. Do not submit plumbing fixtures separately without the remaining required plumbing items. Providing submittals piecemeal is not allowed. If a partial or incomplete submittal is provided, it must be cause for immediate rejection.

- 1.13. Identification:** The Contractor is urged to carefully review the extensive requirements of Part "Identification" in Section 15010 of the specifications and note that certain identification is required to be completed before certain site visits. **There are specific identification requirements prior to the above ceiling and final site visits, respectively, that are mandatory. The State of Alabama Department of Construction Management (DCM) will cancel on-site, the site visit if not completed as specified. Failure to comply with this provision will be cause for cancellation of the site visit, and a fee imposed for the additional site visit, with all costs of the additional site visit to be borne by the Contractor.**

- 1.14. Firestopping:** Refer to Section 15010, Part "Partial Work to be Coordinated With Other Trades", Paragraph "Firestopping". **Note that Division 15 firestopping specifications require firestopping of all penetrations regardless of**

wall/ceiling/floor construction. Refer to Division 1 regarding additional requirements. Where there is a conflict between Division 1 specifications and Division 15 specifications, the most stringent requirements must govern, be applicable and must be provided.

- 1.15. Motors:** All furnished motors must be designed, manufactured, and tested in accordance with the current applicable standards of NEMA, ANSI, IEEE, and ASTM. As a minimum requirement, all motors must conform to the current applicable sections of NEMA Standard No. MG-1. Motors must meet or exceed The Consortium for Energy Efficiency (CEE) Premium Efficiency full load efficiencies. All motors must be listed under the UL recognized component file as applicable. All motors must be suitable for installation according to the requirements of NEC. Motors must be wound for the specified voltage and a 1.5 service factor, 1750 RPM open drip proof construction unless otherwise shown or specified. Premium efficient motors must be **warranted for 36 months** from the date of substantial completion of the project, as determined by the Architect.

All motors must be provided with overload protection and phase protection on all legs. Do not run motors until correct overload elements are installed in starters, as applicable.

All motors serving outdoor equipment exposed to weather must have TEFC motors meeting the requirements set forth previously.

Motors must be manufactured by Regal Rexnord Corporation, Emerson Electric, Franklin Electric, AMETEK, Inc, Baldor Electric Company/ABB, Nidec Corporation, Siemens AG or ABB Group.

- 1.16. Fusing:** Provide factory installed fuses in all equipment requiring fusing for branch circuit protection.
- 1.17. Operating and Maintenance Manuals:** Two weeks before the final site visit, furnish three complete sets of operating and maintenance instructions, bound in hard cover, indexed and tabbed.

The Contractor must also provide this information in digital Adobe Acrobat PDF format, on a CD-R CD. The PDF file must be provided with an embedded index for each specified item. The index must appear in the left hand window of the opened document so that the Owner or his maintenance personnel can "click" on the indexed item and move immediately to that specific item.

Minimum requirements for the Operating and Maintenance Manuals must be as follows:

- a. The first page of the bound instructions must be a listing of:
 1. The Owner/Project Title.
 2. The Architect and Architect's Job Number.
 3. The Engineer and Engineer's Job Number (Found in the Engineer's Logo in the Bottom Right Corner of the Plumbing Plans).
 4. The General Contractor and Contact Information.
 5. The Plumbing Subcontractor and Contact Information.

- b. Second page must be a Table of Contents listing all products in the order which appear in the specifications and label the tab accordingly. Include all "P" numbers for fixtures, water heater numbers, valves, floor drains, etc.
- c. The third page must be a summary page that lists each item with its respective warranty listed, including all extended warranties.
- d. All warranty card information must be filled in by the Plumbing Contractor; Serial numbers, Model Numbers, etc. all as required for proper warranty registration. The warranty registration date must be the date of substantial completion as determined by the Architect.
- e. Provide copies of all filled in warranty cards.
- f. Provide a local source of supply for parts and replacement, including names and telephone numbers of parts suppliers.
- g. Provide a general maintenance summary section. Section must be a list of each piece of equipment or device using the designations as shown on the plans, and the routine maintenance procedures based on the respective manufacturer's recommended intervals. As a minimum, maintenance must be grouped and individually tabbed to indicate maintenance operations required:
 - 1. Once a month
 - 2. Quarterly
 - 3. Once every six months
 - 4. Once a year
- h. Provide drawings of system controls and wiring diagrams and condensed operating instructions. Include hard copy in binder and digital copy on CD in PDF format. All components must be numbered and identified on the diagram. Laminate, frame under plastic and mount in each mechanical/water heater room(s) in an optimally viewed location for the respective equipment.
- i. Provide written results of all specified tests.
- j. Copies of all Site Visit Reports including Contractor's written response that items listed were corrected.
- k. Copies of all certificates of all site visits, comments and approvals from all Governing Authorities, to include all water heater and pressure vessel inspections by the Authority having jurisdiction.
- l. Provide domestic water samples testing and results specified.
- m. Provide a copy of the valve chart required in Section 15010, Part Identification. Include all dielectric unions and LP gas valves on chart.
- n. Provide copy of Section 15010 and 15400 Specifications.
- o. Provide a copy of all shop drawings/submittals.
- p. Provide record drawings of the Plumbing drawings, in hard copy and PDF format on CD. Refer to Section 15010, Part 1, General, Paragraph, Record Drawings for detailed requirements. Record drawings must indicate the valve numbers from the required valve chart, all clean outs and all dielectric unions.

PART 2. TESTS

- 2.1. General: Do not test when freezing conditions exist or are anticipated. Test when freezing conditions have subsided.** Perform all tests in the presence of the Architect. Refer to Division One for Fuel, water and power required, therefore. In absence of specific testing procedure comply with code requirements and/or nationally acceptable industry standards. Furnish written reports of all tests results specified to Architect.

Once the tests are conducted as specified below, seal any leaks discovered, and then

repeat the testing process until all tests are successfully completed and the systems are fully verified.

- 2.2. Drainage and Vent System Pretest: Do not test PVC or any non-metallic piping with compressed air.** A water test must be applied to the drainage system in its entirety. All openings in the pipe must be tightly closed and sealed air tight with cast iron or PVC caps as applicable for the pipe installed, except the highest opening. Then, the system must be filled with water to the point of overflow.

If the system is tested in sections, each opening must be tightly closed and sealed air tight with PVC or cast iron caps as applicable for the pipe installed, except the highest openings of the section under test. Each section must then be filled with water. Sections must not be tested with less than a 10-foot head of water. In testing successive sections, not less than the upper 10 feet of the next preceding section must be tested so that no joint or pipe in the building, except the uppermost 10 feet of the system, must have been submitted to a test of less than a 10-foot head of water.

Test pressure must be held for not less than 8 hours. Check all portions for leaks. Correct all leaks and retest. The system must then be tight at all points.

Do not test when freezing conditions exist or are anticipated. Test when freezing conditions have subsided.

- 2.3. Drainage and Vent System Final Test: Do not test PVC or any non-metallic piping with compressed air.** A smoke test must be utilized as a final test. It must be made by filling all traps with water and then introducing into the entire system a pungent, thick smoke produced by one or more smoke machines as required to achieve the specified pressure. **Do not test when freezing conditions exist or are anticipated. Test when freezing conditions have subsided.**

When the smoke appears at stack openings on the roof, the stack openings must be sealed air tight with PVC or cast iron caps and a pressure equivalent to a 1-inch water column must be held for a test period of not less than 8-hours. Check all piping visually for smoke leakage and odors and correct all leaks.

The final test of the completed drainage and vent systems must be visual and in sufficient detail to determine compliance with the provisions of the International Plumbing Code.

- 2.4. Water Supply System Test:** Test and secure acceptance of entire system before the piping is insulated or otherwise concealed. **Do not test when freezing conditions exist or are anticipated. Test when freezing conditions have subsided.**

Disconnect and cap all outlets to all plumbing fixtures and all other equipment not designed for the full test pressure. Fill the system with water and prove tight under a water pressure not less than the working pressure of the system; or, for piping systems other than plastic, by an air test of not less than 50 psi. This pressure must be held for not less than 10 hours without a loss of pressure.

The water utilized for the test must be obtained from a clean potable source of supply. All piping throughout must be air tight under test. Water piping must remain under normal water pressure during construction except when freezing weather is expected.

Refer to PEX piping specification for testing pressure requirements.

2.5. LP Gas Piping System: Test before equipment, appliances, etc. are connected. Provide complete system testing per NFPA 54 or 58 as applicable. Provide combination stop valve and insulating union at each point piping drops to underground or rises above grade from underground. Refer to LP Gas Distribution System, Part 8 below for additional requirements.

2.6. Fixtures: Test for soundness, stability of support and satisfactory operation.

PART 3. SANITARY PIPING

3.1. General Scope: Provide a system of soil, waste and vent piping connecting all plumbing fixtures, equipment, etc. to the house sewer, with consolidated vent connections extending through the building roof, all as shown on the drawings and as required for complete installation. All piping must be concealed below grade, within walls, chases, above ceilings, etc., unless specifically noted otherwise. Waste and vent piping must be sloped in accordance with the applicable codes.

The Plumbing Contractor is responsible for and must consider pipe-grading requirements when coordinating pipe routing for the project. The contractor must determine inverts/connection points in the field based on the shop drawings of the sanitary system submitted. Coordination is required with the Civil Contractor before proceeding.

Do not begin work until the elevation of the final connection point is verified and grading of entire system can be determined (even if final connection is specified under another Section.)

Do not route the sewer line in the same trench as the domestic water line. Maintain a minimum of six (6) feet of separation between the two utilities.

Each pipe length and each pipe fitting, trap, fixture, material and device utilized in the plumbing system must bear the identification of the manufacturer and any markings required by the applicable referenced standards.

Rework existing waste roughing as required to facilitate renovation work as applicable.

3.2. Utility Connection: Connect to existing as indicated on the plumbing plans.

3.3. Soil, Waste and Vent Piping Underground, Inside the Building Walls and to Points Outside the Building as Indicated: Provide service weight hub-and spigot cast iron soil pipe and fittings for underground service and hubless for above ground service, meeting ASTM A-74 for hub and spigot and ASTM A-888 for hubless, coated inside and out. The pipe exposed within the building must be uncoated outside, primed and left clean for painting. Fittings to receive screwed pipe arms must be recessed drainage type. Soil and waste pipe must have long sweeping connections. All cast iron soil pipe and fittings must be marked with the collective trademark of the Cast Iron Soil Pipe Institute (CISPI) and be listed by NSF International.

Joints for hubless pipe and fittings must be equivalent to MG couplings meeting ASTM A-48 and ASTM C-564, or Anaco Husky SD 4000, super-duty, shielded couplings of Type 304 AISI stainless steel, meeting ASTM C1540 and Factory Mutual 1680, Class 1 and vulcanized virgin compound in which the primary elastomer is neoprene

conforming to ASTM C-564. Equivalent by Ideal Tridon Heavy Duty HD (Green) or Charlotte Pipe Heavy Duty HD (Green) are acceptable.

Option: Contractor may use solid wall PVC Schedule 40 DWV pipe and fittings meeting ASTM Standard D2665 and ASTM Standard D1785 for above ground service and underground service with the following exceptions. Use cast iron as specified hereinbefore or PVDF (Polyvinylidene Fluoride) piping and fittings in areas used as return air plenums, return air platforms and when passing through or within a fire rated assembly.

Piping and fittings above the floor must be solid wall PVC Schedule 40 DWV pipe and fittings, cast iron pipe and fittings as specified above or PVDF pipe and fittings as specified below, and with exceptions as noted.

THE USE OF "CELLCORE" OR "FOAMCORE" TYPE PIPING IS EXPRESSLY FORBIDDEN.

PVDF piping and fittings, where specified and required, must be Orion Super Blue PVDF (Polyvinylidene Fluoride) or equivalent products manufactured by Enfield, Zurn, GEO or Fisher. The PVDF material must conform to ASTM D3222 ASTM F1673, ASTM E-84 and UL 723. Pipe must be marked with its UL Classification to indicate compliance with UL723 (ASTM E84). All fittings must meet or exceed Schedule 40 dimensions.

All vents thru roof, regardless of type provided, must be cast iron pipe (minimum 10" both sides of the roof). Secure the cast iron VTR to structure with heavy gauge 1-hole strap.

All floor drains must have cast iron deep seal p-traps with trap primer and required connections.

- 3.4. Laying Out Work:** Vents from any fixture, when connected to a vent line serving other fixtures, must be extended at least 6 inches above flood level rim of highest of such fixtures to prevent use of vent lines as a waste. Make changes in direction by appropriate use of 45-degree Y's, 1/2 Y's, or long sweeping 1/4, 1/6, 1/8 or 1/16 bends. Sanitary T's or short 1/4 bends may be used on vertical stacks or drainage lines where change in direction of flow is from horizontal to vertical; except that long-radiused, double TY's must be used when two fixtures are installed back-to-back with common drain. Do not use double sanitary Tees. Straight Tees, Ells and Crosses may be used on vent lines. Make no change in direction of flow greater than 90 degrees. Where different sizes of drainage pipe or fittings are connected, use standard increasers and reducers of proper size. Do not reduce the size of drainage piping in direction of flow. Drilling and tapping of house drains, soil, waste or vent pipes, and use of saddle hubs and bands are prohibited. Route all vent lines high as possible while maintaining proper slope. All plumbing vents **through the roof, regardless of type provided must be cast iron and located a minimum of 10'-0" away from all outside air intakes.** Coordinate all plumbing vent locations with the HVAC plans prior to routing vent piping through the roof.

- 3.5. Grading:** Uniform and not less than 1/8" PLF for pipe 3" and over, and not less than 1/4" PLF for piping less than 3".

- 3.6. Hangers and Supports:** Refer to Section 15010 and plans for requirements.

- 3.7. **Roof Flashing:** Roof penetrations are to be flashed by the roofing contractor, using materials as recommended by the roofing manufacturer and approved by the Architect. Coordinate work with Roofing Contractor. Offset vents as required to clear gravel guards and flashing courses. Extend vents to 10" above roof level.
- 3.8. **Waste Arms:** Type K copper or IPS brass pipe typical. Alloy steel or IPS brass pipe at urinals.
- 3.9. **Escutcheons:** Where pipes pass through cabinets, walls and ceilings of finished rooms provide one-piece, cast-brass type with polished, chrome-plated finish and setscrew fastener or stainless steel type securely fastened in place. Pack penetrations with mineral wool insulation, seal with firestopping compound and install escutcheons to prevent passage of fire, smoke and vermin. Do not use split ring type escutcheons.
- 3.10. **Test Fittings:** Not shown on the drawings. Provide where required for partial tests.

PART 4. DRAINAGE SPECIALTIES

- 4.1. **Manufacturers:** Except as noted, catalog numbers are from J.R. Smith and/or Zurn. Equivalents by Josam, Sioux Chief or MIFAB will be considered.
- 4.2. **Cleanouts:** Provide in sanitary piping at all changes in direction, at ends of branches, at intervals not exceeding 40 feet on straight runs, and elsewhere as shown. Cleanouts must be fully opening type and completely accessible without obstruction. Size same as lines in which they occur, but not larger than 4 inch. Tees and extensions must be of same weight as soil pipe. Plugs must be countersunk or raised head type with lead-free seals. Coordinate with plan details and specifications and provide as required. Provide flashing clamps and flashing flanges in all areas where cleanouts are accessible from floor below or above, as applicable.

Extreme care must be taken when roughing in cleanouts in each wall mounted lavatory and hand sink. Cleanouts must be located within the specified Lav Shield piping cover when possible. All cleanouts must be roughed in high enough to clear the Architectural base molding without cutting the base molding.

All cleanouts must be indicated on the record/as-built drawings.

In Tile Floors: J.R. Smith 4052L, Zurn Model ZN1400-T-BP, adjustable, cast iron body with bronze plug and satin finished square scoriated nickel bronze top. Where soft tile occurs, provide 4172L, Zurn ZN1400-TX-BP, recessed square nickel bronze cover.

In Concrete Floors: J.R. Smith 4238L, Zurn Model Z1400-BP, adjustable head, cast iron head and ferrule with bronze plug, round loose-set scoriated tractor cover.

In Outside Lines: J.R. Smith 4262L-NB, Zurn Model Z1474-N-BP, cast iron head and ferrule with bronze plug. Terminate cleanout within 8" of finish grade at grade in 18"x18"x18" deep concrete pad with tooled edges or flush in pavement as applicable. Provide with loose set scoriated bronze tractor cover as shown on the plan details.

In Accessible Unfinished Spaces: J.R. Smith 4400 or 4511-S, Zurn Model ZS1468, cast iron with bronze plug, as appropriate.

In Finished Walls: J.R. Smith 4530S, Zurn Model Z1446-BP cast iron cleanout tee with bronze plug and 16 ga., 304 stainless steel, flat, wall plate cover. Where distance from plug to finish wall exceeds 4 inches provide extension from sanitary tee to bring plug within 2 inches of the stainless steel cleanout cover. rough in all wall cleanouts such that stainless steel cover occurs above the Architectural base. Do not cut Architectural base.

In Terrazzo Floors: J.R. Smith 4192L, Zurn Model ZN1400-Z-BP, adjustable cast iron head and ferrule, bronze plug and round nickel bronze cover and rim.

In Carpeted Floors: J.R. Smith 4032L-X, Zurn Model ZN1400-CM-BP, adjustable head, cast iron, round polished bronze top with carpet clamping device.

- 4.3. **Typical Drains:** Size outlets same as pipe to which they connect. Install temporary closures during construction. **Each drain connected to sanitary sewer must have cast iron deep seal p-trap with trap primer and required connections.** Provide trap primer connections on floor drains and trap primers as specified below.

Where drains occur above finished spaces, furnish with clamping collar to secure waterproof membrane.

Floor Drain (FD): J.R. Smith Series 2005B-05, Zurn Models ZN415-5S-P, J.R. Smith 2005B-06, ZN415-6S-P, J.R. Smith 2005B-08, ZN415-8S-P (as required) two-piece cast iron drains with gasketed outlet and adjustable nickel bronze strainer and rim. Strainer tops for 2" drains 5" x 5" (ZN415-5S-P), for 3" drains 6" x 6" (ZN415-6S-P), for 4" drains 8" x 8" (ZN415-8S-P). Provide PO5 trap primer connection as indicated on the plans.

PART 5. WATER PIPING

- 5.1. **General Scope:** Connect to existing as indicated and extend to all plumbing fixtures, wall hydrants, trap primers, water heaters, ice machines, etc.; and to other plumbing items as indicated or required.

Piping systems must be sloped to drain points. Drain points are not shown on the plans. They must be determined in the field based on the actual system installed. The Contractor must grade pipe upward from source to facilitate drainage and air relief. Where low points are required because of long runs or where sections may be valved off, provide with 3/4" globe valve and hose nipple for drainage at low point.

All piping must be concealed below grade, within walls, chases, above ceilings, etc., unless specifically noted otherwise.

Refer to Section 15010 for hanger rods, hangers, spacing, firestopping, sleeves, uni-strut support assembly, etc., requirements.

- 5.2. **General Workmanship:** Cut water piping accurately to measurements established at site and work into place without springing or forcing, clearing all openings, finished ceilings, etc.

All piping not in an accessible attic or similar spaces that contain valves and other items which may require maintenance or service access must be located no more

than 12" above the finished ceiling. Piping located in attics must be supported such that maintenance access can be accomplished without the use of a ladder.

In finished spaces where water piping is exposed to view, route piping high as possible. Where valves or other items requiring service or maintenance are shown in piping of finished areas and exposed to view, the piping must be installed high as possible, except where a valve or other item requiring maintenance and service is shown in the line, the item must be no more than 14'-0" above the finish floor. Provide a drop, offset, etc., as required to maintain maximum service height of 14'-0" above the finished floor.

Route all piping through previously built-in sleeves/firestopping assembly as specified in Section 15010. Avoid excessive cutting or other weakening of the building structure. Make changes in direction and size with fittings. Cap or plug open pipe ends during installation to keep out foreign material. Make connections carefully to ensure unrestricted flow, eliminate air pockets, and to permit complete drainage of the systems.

Supply piping to fixtures, faucets, hydrants, showerheads and flush valves must be anchored to prevent movement.

Install all buried piping with at least 36" of earth cover. Do not route the water line in the same trench with the sewer/sanitary piping. Maintain a minimum of six (6) feet of separation between the two utilities.

Uninsulated pipes passing through concrete or cinder block walls and floors, or other corrosive material must be protected against external corrosion by a protective sheathing or wrapping that will withstand any reaction from the lime and acid of concrete, cinder block or other corrosive material. Sheathing or wrapping must allow for movement including expansion and contraction of piping. The wall thickness of the sheathing material must be not less than 0.125 inch thickness. The protective wrapping/sheathing is not an alternative where sleeves are specified and required. Coordinate requirement with Section 15010 sleeves/firestopping specifications and provide as specified.

All piping below slab-on-grade construction must be installed in plastic jacket equivalent to Plasti-Sleeve, as manufactured by Plastic Products Co. of Stanton, California.

- 5.3. Freeze Protection: Do not install piping or any device in spaces subject to freezing.** All water piping must be routed within the building insulation envelope unless specifically noted otherwise. Route all overhead water piping and water piping within masonry and non-masonry walls within the building insulation envelope.

All overhead piping must be located between the architectural air barrier at the bottom of the structure and the finished ceiling. Do not route overhead piping in the attic where it can be located between the architectural air barrier and the finished ceiling.

All water piping shown to be located in exterior perimeter masonry walls must be insulated before being routed within the cells of the masonry block. If block is to be cut to allow for the installation of the insulated piping it must be in strict accordance with the procedures required by the Structural Engineer and the Architect. **Do not allow masonry block cells that contain water piping to be filled with concrete.**

Piping located in exterior stud walls must be located on the warm side of the insulation.

- 5.4. Water Piping Insulation:** Refer to Part Pipe Insulation for requirements.
- 5.5. Grading:** The Contractor must consider pipe-grading requirements when coordinating pipe routing for the project. All piping must be carefully installed to eliminate traps and pockets in pressurized lines. Where air pockets and traps cannot be avoided, provide valved hose connections for water traps and valved automatic air vents for air traps. The pipe slope must be maintained throughout the project.
- Pressurized plumbing piping systems must be sloped to drain points. Drain points are not shown on the plans. They must be determined in the field based on the actual system installed. The Contractor must grade pipe upward from source to facilitate drainage and air relief. Where low points are required because of long runs or where sections may be valved off, provide with 3/4" globe valve and hose nipple for drainage at low point. **Make all connections to risers and fixtures from top or sides of mains. Do not make take-offs from bottom of mains.**
- 5.6. Nipples:** Of same material as pipe in which they are installed. Provide extra strength when unthreaded portion is less than 1 inch long. Steel nipples are not allowed.
- 5.7. Escutcheons:** Where pipes pass through cabinets, walls and ceilings of finished rooms provide one-piece, cast-brass type with polished, chrome-plated finish and setscrew fastener or stainless steel type securely fastened in place. Pack penetrations with mineral wool insulation, seal with firestopping compound and install escutcheons to prevent passage of fire, smoke and vermin. Do not use split ring type escutcheons.
- 5.8. Piping and Fittings: ProPress or similar type joints and fittings are not allowed.** Typical lines to be of copper tubing meeting ASTM B-88, Type L hard above ground and Type K soft below ground. Cut copper pipe square and ream to remove burrs. Clean fitting socket and pipe ends with sand cloth, No. 00 cleaning pads or wire brush. No acids must be used to clean either pipe or fittings or as a flux in sweating joints. Make up joints with sweat fittings of wrought copper, and 0.25% of the total wetted surface area, lead free compliant solder complying with ASTM B-32 and the Safe Drinking Water Act. Surfaces must be prepared for soldering as required by ASTM B828. Do not make joints or branch connections below a slab on grade.
- 5.9. Hangers:** Refer to Section 15010 and plan details for requirements.
- 5.10. House Supply Connection:** Connect to existing piping as shown on the plans.
- 5.11. Disinfection:** New potable water systems must be purged of deleterious matter and disinfected prior to utilization. The method to be followed must be as prescribed by the health authority or water purveyor having jurisdiction or, in the absence of a prescribed method, the procedure described in AWWA C651 or as described in this section below.

The potable water piping system must be flushed with clean, potable water until dirty water does not appear at the points of the outlet. The system or part thereof must be filled with a water/chlorine solution containing not less than 50 parts per million of chlorine, and the system or part thereof must be valved off and allowed to stand for

24 hours; or the system or part thereof must be filled with a water/chlorine solution containing not less than 200 parts per million of chlorine and allowed to stand for 3 hours. Following the required standing time, the system must be flushed with clean potable water until the chlorine is purged from the system.

Upon completion of the disinfection procedure, the Plumbing Contractor must engage the services of the Alabama Department of Public Health Clinical Laboratories or a certified, licensed, testing laboratory to provide a lead and bacteriological water analysis to include a standard heterotrophic plate count (HPC), microbial, bacterial, pathogens and coliform count.

Test a minimum of two (2) samples of domestic water from two (2) separate locations within the facility.

Test locations must be selected by the Architect and must be noted on the Testing Laboratory's report. Test each sample for Coliform Present, Fecal Present, E. Coli and lead present.

If the test results for any building or portion thereof indicates positive results for Total, Fecal, or E. Coli coliform per 100 ml respectively, or an HPC greater than 500 CFU/mL, or lead maximum contaminant level goal (MCLG) greater than zero, the Contractor must disinfect the system in its entirety, as specified above, and obtain new test results as outlined hereinbefore until levels are reached as required by AWWA C651. If maximum contaminant level goal (MCLG) of lead is greater than zero, immediately notify the Architect in writing and furnish copy of test results.

Prior to the final site visit, the Contractor must provide to the Architect the certified test results on the testing facility letterhead. The report must indicate the name of the project, the locations from where the samples were taken, the testing laboratory findings and written indication whether the water is safe for consumption. **No Certificate of Occupancy will be provided to the Owner without the required lab results indicating the potable water system is safe for consumption.**

- 5.12. System Drainage:** Provide valves and hose nipple to allow for drainage of all risers and other system low points.

PART 6. WATER PIPING SPECIALTIES

- 6.1. General:** All specialties in potable water distribution must be certified for lead free compliant design as required by Code, Regulations and Standards.

All specialties/valves must be bronze or heat-treated DZR, CW511L brass, lead free compliant, AB 1953 compliant, NSF/ANSI 61 compliant and must be the product of one American Manufacturer and must meet the Buy American Act 41, USC 10a-10d as specified hereinbefore. Valves must have MSS SP-25, MSS SP-80 listings as applicable. Provide extended operators for all valves installed in insulated piping. Seal the opening where the stem, nipple, etc., penetrates the insulation as required to maintain the continuity of the insulation and vapor barrier.

All valves must be identified. Provide a custom laser engraved brass valve tag at each valve. Tag must be 1-1/2 inches diameter, 18-gauge polished brass tags with 3/16-inch chain hole and 1/4 inch high stamped, black-filled service designation.

Refer to Section 15010, Part Identification for detailed requirements and provide all as specified.

Valves must be Nibco, Jomar, Watts, Apollo, Kitz, Hammond/Milwaukee, Matco-Norca or Mueller. Nibco and Jomar units are the basis of design unless specified otherwise.

- 6.2. Unions:** 150 psi rated; WOG pattern, cast brass ground-joint type in copper pipe. Unions in steel pipe must be malleable iron, WOG female pattern brass seat, ground joint, 150 psi type. Provide in all sizes of threaded pipe, and in sweat-jointed pipe over 1 inch, to facilitate easy repairs. In such lines, install at all inlets and outlets of all devices and equipment, adjacent to water heaters, pumps, tanks, etc. into which piping is terminated; and on each side of valves, cocks, strainers, etc. and other devices that occur in piping runs.
- 6.3. Dielectric Unions:** Provide dielectric unions between ferrous and non-ferrous piping as required, including piping and water heater stubs where different, and stainless-steel water hammer arrestors. Dielectric unions must be constructed using lead free compliant materials as required by all Governmental Agencies, Codes and Standards and must comply with ASTM 1545. Dielectric unions must be Watts Series LF or equivalent by Mueller or Matco Norca. Where dielectric unions are installed, they must be provided with factory fabricated brass tag. 1-1/2 inches diameter, 18-gauge polished brass tags with 3/16-inch chain hole and 1/4 inch high stamped, black-filled service designation. Indicate valve tags on the record drawings. **Contractor must provide a ball valve on the respective piping containing the union as required to allow for proper maintenance of the union.**
- 6.4. Valves and Valve Extensions:** Provide as specified, including all fixtures or equipment not furnished with stops. Arrange and install valves to be readily accessible for servicing. All valves must be bronze or heat-treated CW511L brass, lead free compliant, AB 1953 compliant and must be the product of one American Manufacturer and must meet the Buy American Act 41, USC 10a-10d as specified hereinbefore. Nibco and Jomar units are basis of design.
- Coordinate valve handle height requirement with specified insulation thickness. Provide height extension as required to clear insulation and properly operate without causing damage to piping insulation. All handles must comply with UL 2043 and must be UL listed for installation in return air plenums. Valve extensions must be provided by the valve manufacturer and must have blowout-proof stems. Valve extensions must be Matco-Norca (for Matco-Norca valves) P759EXT, Nibco Series RG (for Nibco valves) or similar type extensions for the other specified valve manufacturers and constructed of all brass or stainless steel.
- 6.5. Globe Valves:** Nibco T-235-LF, threaded, bronze type with replaceable disc, 150 WSP.
- 6.6. Check Valves:** Jomar T-511G, Nibco T-413-Y-LF or equivalent, MSS SP-80, ANSI B1.20.1, NSF/ANSI 61 and NSF/ANSI-372 compliant, all lead free bronze, threaded, Y-Pattern swing check, 300 WOG, Class 150 WSP.
- 6.7. Ball Valves:** Valves must be Jomar T-200CSSG EH, Nibco T-585-66-LF, or equivalent, 600 CWP, 150 WSP, two-piece body, full port, blowout proof ASTM A276, Type 316 stainless steel stem and ball, reinforced PTFE seats and 2" minimum valve extension to bring valve handle beyond insulation. Valves must comply with

NSF/ANSI 61/372-8, ANSI Z1157 and MSS SP-110/145 standards. Note that ball valves are also required on one side of each dielectric union.

- 6.8. Thermometers:** Trerice Series BX, Model AX9, universally adjustable type with 7-inch scale and suitable temperature range, mercury free, 0°F to 160°F range as manufactured by Trerice. Thermometers must be “blue liquid” actuated with Phenol Condensate and lead-free cast aluminum case and brass stem and thermowell, with extension neck and other accessories required for a complete installation. Locate for convenient reading. Equivalent product by Blue Ribbon, Weksler, March or Maxwell Moore will be accepted.
- 6.9. Exterior Wall Hydrants (WH):** Encased, Ecolotrol, lead-free compliant, non-freeze automatic draining wall hydrant for flush installation. Hydrant must have integral backflow preventer with anti-siphon type, copper casing, all-bronze interior components with 1/2 turn long-life ceramic disc cartridge, combination 3/4” female solder and 3/4” male pipe thread inlet connection, 3/4” male hose connection, with type 304 stainless steel housing with locking hinged cover stamped “WATER” and operating key. Hydrant housing must fit within one standard modular masonry course. Provide one extra stock spare hydrant repair kit and one extra stock spare cartridge removal tool for EACH wall hydrant.

Seal all interior joints, seams, gasket seams/closures including around the hydrant box flange with an appropriate sealant recommended by a sealant manufacturer. Wall hydrant must be JR Smith 5519 QT, Zurn Z1320XL-EZ or approved equivalent by Woodford. Install approximately 24 inches above finished grade.

- 6.10. Water Hammer Arrestors (Shock Absorbers):** Certified by the American Society of Sanitary Engineers and in compliance with current edition of ASSE 1010, ANSI A112.26.1M, Plumbing and Drainage Institute Standard PDI-WH201, heavy-duty construction and designed for a minimum 150-PSI working pressure. Arrestors must consist of a Type 304 stainless steel casing and piston. The device must be pre-charged and sealed at the factory. Install on both hot and cold water branch lines in an upright position as close as possible to the valve or valves being served.

Arrestors must be installed at all solenoids, remote operated or quick closing valves and at each electric water cooler, each plumbing fixture or battery of plumbing fixtures. Type, location and size must be as recommended by the arrestor Manufacturer. Plumbing Contractor must provide a dielectric union at connection of this device to the copper water piping.

Arrestors must be Zurn Z1700, J.R. Smith Hydrotrol Series 5005-5050, Watts Series SS, Sioux Chief Series 660-G2B or MIFAB Series WHB.

- 6.11. Automatic Trap Primer Units Where Water Closets Occur:** Trap primers must comply with the International Plumbing Code and local codes and must be served from the water closet flush valve tube assembly as shown on the plans. Provide trap primer line from flush tube to each floor drain, hub drain, etc. as shown, specified or required by Code. Water saver type trap primers that attach to lavatory p-traps or any other type of assemblies that use grey water are not allowed.

Trap primers must be Sloan VBF-72-A1, Zurn P6000-TPO or equivalent.

PART 7. PIPE HANGERS AND SUPPORTS

- 7.1. **General:** “Sammy” bolts are prohibited. Refer to Section 15010, this Section 15400, plan details and Pipe Insulation requirements below.
- 7.2. **Coatings and Finishes:** Pipe hangers, Unistrut pipe supports and Unistrut support assemblies of galvanized, zinc and similarly coated items are considered to **NOT** be coated. All must be painted, powder coated, epoxy coated or plastic coated. Hanger rods and associated bolts, and clamps on Unistrut assemblies are not required to be painted or coated.

All damaged or rusted steel pipe, all uncoated cast iron pipe, and all hangers, Unistrut and other support assemblies, must be cleaned, primed and painted with two coats of compatible black enamel paint as specified below. Any rusted items must have the rust removed, then etched and primed for painting as recommended by the respective manufacturer. After prepping the surfaces, then paint with two coats of compatible black, rustproof enamel paint. Do not use spray paint.

All paint and coatings must have a fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed as determined by ASTM E84. See specification section, Part "Identification" for detailed requirements.

In lieu of painted surfaces as specified hereinbefore, the Contractor may provide factory fabricated hangers and Unistrut assemblies with rust resistant powder coating, epoxy coating or plastic coating. All paints/coatings/finishes must meet or exceed a fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed as determined by ASTM E84.

PART 8. LP GAS DISTRIBUTION SYSTEM

- 8.1. **General Scope:** Make house supply connection as indicated and extend to all gas fired equipment as well as other locations shown.
- 8.2. **House Supply Connections:** The Plumbing Contractor must extend piping to within 48" of the tank(s). Cap at point shown. Liquefied petroleum piping connection to the LP tank will be by the Owner's LP gas provider. Coordinate requirement with Architect and Owner's personnel.
- 8.3. **General Installation:** Comply with the local gas code, requirements of local utility company, and NFPA Standards 54 and 58 as applicable. The entire installation must also comply with the State of Alabama Liquefied Petroleum Board rules and regulations. Cut the pipe accurately to measurements established at site and work into place without springing or forcing. Avoid running through solid walls or floors. Route through previously built in sleeves/firestopping assembly and avoid excessive cutting or other weakening of the structure. Ream all piping to remove burrs. Make changes in direction and size with fittings. Make take-offs from top or sides of mains, not from bottoms. Cap or plug open pipe ends during installation to keep out foreign material. Lay out and grade work (1/4" in 15 feet min.) to avoid trapped lines, where unavoidable provide 4-inch drip leg with removable cap at low point. Use joint compound sparingly, applying to male threads only. Provide complete system testing per NFPA 54 or 58. Provide combination stop valve and insulating union at each point piping drops to underground or rises above grade from underground.

Provide hangers and supports same as specified under Water Piping Specialties. Refer to Section 15010 and plan details for piping supports, bracing, hanger rods and uni-strut assembly requirements.

Provide a custom laser engraved brass valve tag on both sides of each regulator identifying entering and leaving gas pressure and pipe contents. Tag must be 1-1/2 inches diameter, 18-gauge polished brass tags with 3/16-inch chain hole and 1/4 inch high stamped, black-filled service designation.

- 8.4. Interior and Above Grade Piping and Related Fittings:** Pipe shall be wrought iron or steel (black or galvanized) and shall comply with ASTM A53/A53M, Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless and ASTM A106/A106M, Standard Specification for Seamless Carbon Steel Pipe for High-Temperature Service. All pipe fittings shall have a minimum pressure rating as specified in Table 5.11.4.2 in NFPA 58.
- 8.5. Exterior Lines Installed Below Grade:** Must be medium density polyethylene (MDPE) pipe with heat fusion joints (butt, socket, or electrofusion). Butt fusion fittings must comply with ASTM D3261, socket fusion with ASTM D2683, and electrofusion with ASTM F1055, all as integrated under ASTM D2513 for the overall PE system. Pipe must be installed per 49 CFR Part 192 by an installer certified by the pipe manufacturer or qualified per 49 CFR 192.285. **Furnish proof of the installer's certification or qualification at the submittal stage. The piping submittal will not be reviewed without this proof.**

Thermoplastic polyethylene (PE) pipe and heat fusion fittings must conform to ASTM D2513, SDR 11, and be manufactured for a minimum 125 psig working pressure. Piping must be provided with minimum AWG 14 tracer wire (electrically continuous and corrosion-resistant). All materials must have physical and mechanical properties classified in accordance with ASTM D3350, with a cell classification of 234373E or equivalent, and comply with APWA/ULCC Color Code Standards (yellow for gas).

Materials must be listed with the Plastics Pipe Institute (PPI) as PE2708 MDPE and manufactured in accordance with all applicable specifications, including ASTM D2513 (Standard Specification for Polyethylene (PE) Gas Pressure Pipe, Tubing, and Fittings) and 49 CFR Part 192 ("Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards"). The installation must be in strict accordance with 49 CFR Part 192, the manufacturer's instructions, NFPA 58 (Liquefied Petroleum Gas Code), and all applicable federal, state, and local codes and regulations. Where the requirements of 49 CFR Part 192, the manufacturer's instructions, NFPA 58 (Liquefied Petroleum Gas Code), and all applicable federal, state, and local codes and regulations are in conflict, the strictest requirement shall be provided.

Piping is for underground vapor LP gas service only, with maximum operating pressure not exceeding 30 psig. Minimum burial depth must be 24 inches. Any piping installed less than 24 inches below finish grade must be installed in a containment conduit or shielded and vented to the outdoors above grade to prevent gas accumulation. Vents must be terminated a minimum of 24" above the facility eave height.

Piping must be marked by the manufacturer as "GAS" or "LP-GAS" and "ASTM D2513". Piping without this marking is not allowed and will be rejected if found on site. Pipe and fittings must have heat fusion joints in accordance with procedures

qualified per ASTM F2620-24 (Standard Practice for Heat Fusion Joining of Polyethylene Pipe and Fittings). PE pipe and fitting materials for heat fusion must be compatible to ensure uniform melting and a proper bond. **When submitting piping for review, compliance with NFPA 58 and ASTM standards must be specifically noted on the cover sheet of the submittal, or it will be rejected without further review.**

After installation, all piping must be pressure-tested in accordance with NFPA 58 Section 6.24 (e.g., pneumatic test at not less than 1.5 times the maximum operating pressure or 15 psig for 10 minutes, whichever is greater), local LP gas company requirements, and any state, local, and federal requirements.

Piping must be JM Eagle UAC 2000 MDPE, Performance Pipe Driscopex 6500, or Dura-Line PolyTough 1, with compatible heat fusion connections (socket, butt, or electrofusion as appropriate for size and specified hereinbefore).

- 8.6. Lines In Any Unventilated Areas or Spaces:** Gas piping concealed in walls, chases, below slab on grade, or any unventilated area or spaces must be installed in a Schedule 40 welded, airtight steel piping and vented to the outside atmosphere through the roof. Suitable internal spacers must be provided. Inaccessible piping must be all-welded connections. Socket type weld fittings may be used for gas piping within the airtight steel enclosure. Termination point of vented steel piping must be a minimum of 10'-0" clear from all outside air intakes.
- 8.7. Gas Piping Mechanical Sleeve Seals Where Rising Through HVAC Equipment Pad and Exterior Wall:** Must be a non-metallic, waterproof modular sealing element unit, designed for field assembly, to protect and fill the annular space between the pipe/anodeless riser and sleeve and where penetrating the exterior walls. Provide type and number required for pipe material and size of pipe and sleeve. Manufacturers must be Advance Product and Systems Series Infinity, Calpico Series C-PWS, Metraflex Company Series WSPVC or Pipeline Seal and Insulator Century-Line Model CS.
- 8.8. LP Gas Ball Valves:** Polyethylene ball valves must conform to ASME B16.40, be listed for LP gas service, and rated for underground use at operating pressures up to 125 psig. Valves must be maintenance free, corrosion-resistant, full-port opening type, and wrench-operated with a 2-inch square adapter securely fastened to the valve stem. Polyethylene valves must be installed by heat fusion. All mechanical fittings must be Category 1 (joints with axial tensile strength at least equal to that of the pipe) per ASTM D2513.

Manufacturers shall be Flowserve/Nordstrom SDR 11, full-port Polyvalve II, Kerotest Polyball, Integrity Fusion IntegriFuse Poly Ball Valves or Georg Fischer ELGEF Plus, all with required transition fittings and adapters as required for connection to the specified piping.

- 8.9. LP Gas Pressure Regulators:** LP gas pressure regulators must be installed at each piece of equipment or appliance where the supply pressure exceeds the manufacturer's recommended inlet pressure as specified by the appliance/equipment rating plate. Regulators must be premium quality, designed for LP gas vapor service and comply with NFPA 58, NFPA 54, the International Fuel Gas Code, ANSI/UL 144, ANSI Z21.80/CSA 6.22 and all applicable federal, state, and local codes. Regulators are for vapor service only (not liquid) and must not be used in systems exceeding 30 psig operating pressure for PE piping systems per NFPA 58.

Manufacturers must be Sensus Series 243, Emerson/Fisher Series R622, Pietro Fiorentini Governor Series Dival 600 or Maxitrol Series RV for outdoor equipment with venting to the atmosphere.

Provide a custom laser engraved brass valve tag on both sides of each regulator identifying entering and leaving gas pressure and pipe contents. Tag must be 1-1/2 inches diameter, 18-gauge polished brass tags with 3/16-inch chain hole and 1/4 inch high stamped, black-filled service designation.

- 8.10. Anodeless Risers:** LP gas risers must be the manufacturer's standard anodeless type, transitioning from plastic to steel pipe with fusion-bonded epoxy coating. Factory assembled anodeless risers must be designed and tested in accordance with ASTM F1973-21. Inlet connections must be socket, butt weld, or swaged gas-tight construction with O-ring seals, metal insert, and protective sleeve. Outlet or above-ground connection ends must be threaded or flanged.

Risers must comply with ASTM A53/A53M, Type F or E, Grade A, Schedule 40 for the steel portion. Factory-assembled anodeless risers must be selected by the manufacturer for LP gas use and leak-tested per appropriate procedures. Service head adapters and field-assembled anodeless risers incorporating service head adapters must be design certified to meet ASTM D2513 and 49 CFR 192.281.

Connections made outdoors and underground between metallic and plastic piping must be made only with transition fittings conforming to ASTM D2513 Category I or ASTM F1973. Provide each valve on buried piping with a minimum 16"x16" cast iron or concrete valve box. The valve box cover must have "LP GAS" cast on it. A custom laser engraved brass valve tag must be installed on top and inside of each valve box lid. Tag must be 1-1/2 inches in diameter, 18-gauge polished brass, and permanently attached. The tag must designate the appropriate valve number, valve size, and gas pressure. Include the valve(s) on the valve chart specified hereinbefore and show on the record drawings. Provide adjustable box extensions of length required for depth of buried valve to finished grade. Provide a valve extension such that the top of valve handle finished elevation is located a maximum 12 inches below the finish grade of the valve box.

- 8.11. Tracer Wire and Identification Tape:** Tracer wire must be installed adjacent to the piping for the entire length of the underground piping system. Tracer wire must be a minimum AWG 14 solid, PRO-TRACE HDD-CCS PE45 or equivalent. The conductor must be hard-drawn, 21% IACS, copper-clad steel, utilizing an AISI 1055 high carbon steel core with minimum break load of 1,330 lbs. or 260,000 psi (required to meet break load). The conductor must be extruded with a minimum 45 mil, high-density, high-molecular-weight polyethylene (HMW-HDPE) pursuant to ASTM D1248. Tracer wire must be rated for direct burial use at 30 volts and RoHS compliant. Tracer wire must be PRO-TRACE HDD-CCS PE45 as manufactured by Pro-Line Safety Products or equivalent by Seton or Stranco.

During the closing of the piping trench, all underground piping must also be identified with detectable direct burial marking tape. The marking tape must bear the printed identification of piping below it and read, "Caution Buried Gas Piping Below." Tape must be minimum 6 inches wide and minimum 5.0 mil overall thickness. The tape must be a 0.80 mil clear virgin polypropylene film, reverse printed and laminated to a 0.35 solid aluminum foil core and then laminated to a 3.75 mil clear virgin polyethylene film. Tape must be printed with APWA color coding, diagonally striped,

and large, bold, black lettering. Tape must be buried 6 to 8 inches below finished grade and continuous over all underground gas piping. For trenches over 8 feet wide, provide an additional continuous length of detectable printed tape must be provided. Tape must be Pro-Line Safety Products or equivalent by Seton or Stranco.

- 8.12. Electrical Bonding:** Anodeless risers must be bonded in accordance with NFPA 70 (National Electrical Code), Section 250.104(B). The bonding connection can be placed on any accessible metallic fitting in the riser system. Where the length of pipe exceeds 75 feet, provide additional bonding connections as required by the local authority having jurisdiction (AHJ) or utility provider. The bonding jumper must not be smaller than 6 AWG copper wire with listed clamps suitable for the application. Clamps must be installed to remain accessible after building construction is complete. Devices used for the bonding connection must be listed for the application in accordance with UL 467 (Grounding and Bonding Equipment). If a lightning protection system is installed, the bonding of the gas piping must be in accordance with NFPA 780 (Standard for the Installation of Lightning Protection Systems).

Bonding of gas piping systems is electrical work and must be provided by a qualified, licensed Electrical Contractor recognized by the Authority Having Jurisdiction (AHJ) as capable of performing such work. Points of connection must comply with the current edition of NFPA 70 (National Electrical Code) and NFPA 58 (Liquefied Petroleum Gas Code), which prohibits using LP gas piping as a grounding electrode and requires electrical isolation where necessary. **It is the responsibility of the Plumbing Contractor to engage a qualified, licensed Electrical Contractor to provide the bonding and grounding as specified. Coordinate prior to bid and provide as specified.**

- 8.13. Gas Pipe Painting and Identification:** Gas piping identification must be provided as specified in Section 15010, Part Identification, except intervals must be a maximum of 12 feet for straight runs of piping.

All exposed exterior and interior gas piping, fittings, etc., must be clean and rust free when installed. All exterior and interior exposed to view piping in finished and unfinished areas must be painted. Gas piping concealed above the ceiling or in partitions is not required to be painted. Where piping is rusted, all rust must be removed from the piping and then pre-treated with acidic etching primer specifically manufactured for the piping installed. **Apply two coats of the base and finish** rustproof enamel paint. Rusted portions of gas piping, fittings, etc., in attic and other concealed areas must be painted black after prepping for paint.

Color for piping in all mechanical rooms, outside of the facility and similar locations where the piping is exposed must comply with IBC/IPC/IMC requirements and ANSI Standard A13.1, current edition. After gas piping is painted, identify with pipe markers as specified hereinbefore.

PART 9. PIPE INSULATION

- 9.1. General:** **The Plumbing Contractor must not install the piping insulation.** All piping insulation work must be provided by an independent third party licensed and experienced Insulation Subcontractor whose primary business is the sale and installation of insulation materials in accordance with insulation manufacturers' requirements and these specifications.

The Insulation Subcontractor must provide a complete insulation submittal on his company letterhead detailing materials and methods as specified. **The Plumbing submittal will be automatically rejected** and not reviewed without a submittal from the required Insulation Subcontractor.

Where a conflict exists between these specifications and the Manufacturer's recommendations, the strictest installation must be provided.

Piping must be clean, dry and pressure tested before covering is applied. Size pipe hangers to fit insulated pipe size. **No installation of pipe hangers for insulated piping will be allowed to be in contact with piping or penetrate the piping insulation. Piping insulation must be continuous through partitions sleeve/firestop assembly and must not be cut away for installation of clamps, valves, fittings, etc.** Refer to details on plans, Section 15010, "Pipe Hangers and Supports", plan details and below for additional requirements.

Insulate all hot and cold water piping except that below grade and excluding plated brass fixture connections. All piping must be routed within the building insulation envelope to prevent freezing. Insulate all p-traps and related piping located in return air plenums, return air platforms, all horizontal overhead drain lines, including p-traps and drain sumps from mechanical room floor drains, ice machine drains, cooler drains, condensate drainage piping, hub drains and other condensate receiving drains, as specified below.

Insulate rainwater drainage system as noted in that Part. Cover fittings, valves and flanges with insulation material as hereinafter specified to same thickness as adjacent pipe covering except screwed unions and other specifically mentioned items. Neatly bevel covering edges adjacent to unions, valves and other points of termination and seal insulation. All insulation materials (including coatings, mastics, jackets and adhesives) must have a composite flame spread rating not to exceed of 25/50 rule as determined by ASTM E-84, NFPA 255 and UL 723.

Fiberglass piping insulation Manufacturers must be Owens-Corning SSL II or equivalent by Johns Manville or Knauf. Owens-Corning is the basis of design.

- 9.2. Installation of Fiberglass Insulation:** No installation of pipe hangers for insulated piping will be allowed to be in contact with piping or penetrate the piping insulation. Refer to details on plans for additional requirements. Size the hanger loops to fit **over** insulation. Insulate with Owens-Corning SSL II with ASJ Max Fiberglass pipe insulation, thickness as shown below, thermal conductivity of $k = 0.23 \text{ Btu-in/hr-ft}^2\text{-}^\circ\text{F}$ at 75°F mean temperature. Insulation must comply with ASTM C547, ASTM C585, ASTM C1136, ASTM C795, NFPA 90A and 90B and be UL Labeled for Flame Spread Index of 25 or less and Smoke Developed Index of 50.

Adhere SSL by removing release paper after the insulation is installed on pipe and sealing the lap starting in the center of each section, working towards ends. Lap must be pressurized by rubbing with a plastic sealing tool. Install 5" butt strips in the same manner at the joint between sections and at 5'-0" on center. Staple jacket flaps and premolded PVC fittings with nominal 3/4" wide stainless steel or Monel outward-clinching insulation staples on 12" centers. PVC covers must be stapled on both sides of the fitting. Insulation staples must have a retarder coating or covered with 4" width 3M Venture Tape Film Faced ASJ Facing Tape, Series 106FXP adhesive tape or vapor barrier mastic that conceals the entire staple. Thereafter, neatly seal the entire jacket flap with vapor retarding sealant. Neatly bevel and seal all insulation at

all unions to allow for the proper operation of the union without damaging the insulation.

Sealant must be water based, LEED, UL 723 (ASTM E84), ASTM C731/C732 Standard Test Method for Extrudability, ASTM E96 Water Vapor Permeance and ASTM D5590 Antifungal. The sealant must be Vimasco 714, Childers Chil-Perm CP-30 or Foster 30-65.

Insulate all fittings and elbows with premolded fiberglass fittings containing 3lb. density **rigid** polyisocyanurate pipe insulation of equal thickness as the adjacent piping with PVC covering and UL Labeled for Flame Spread Index of 25 or less and Smoke Developed Index of 50.

Cold Water/Domestic Water Insulation Thickness

All pipe sizes 1" thickness

Hot Water/Domestic Hot Water Insulation Thickness

For pipe sizes up to 1-1/4" – 1.0" thickness

For pipe sizes 1-1/2" to 6" – 1.5" thickness

- 9.3. **Insulation for Piping Within Concrete Block Walls:** Insulate with 1" or 1.5" thickness insulation for the respective piping as specified above. Insulation must be black, flexible foamed, elastomeric, closed cell pipe insulation with a fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed as determined by ASTM E84. It must be GreenGuard certified tubular insulation with Microban antimicrobial protection. Insulation must have a 'k' factor of not more than 0.26 at 90°F mean temperature and a water vapor transmission rate of 0.05 perm-inches or less. Slip insulation onto pipe prior to installation. **Slit insulation and longitudinal cutting of the insulation is prohibited. Slip insulation onto pipe prior to erecting. Do not stretch or bend insulation at any turn, tee, etc.** Insulate sweat/brazed fittings with miter-cut pieces of insulation as recommended in AP Armaflex installation instructions or, provide factory fabricated, made to order prefabricated fittings for tees, elbows, unions, etc. the same size as on adjacent piping as manufactured by AP Armaflex, Aeroflex Aerofit, K-Flex K-Fit or Aerocell.

- 9.4. **Fiberglass Insulation Fittings:** Insulate with Fiberglass insulation mitered to fit snugly or with PVC covers with integral, 3lb. density **rigid** polyisocyanurate pipe insulation of the same thickness as the adjacent pipe insulation. After installing the insulation and PVC covers, staple, seal, etc. as specified above. Do install sealant over PVC covers. Install cover, staple, seal fitting to the pipe insulation with 3M Venture Tape Film Faced ASJ Facing Tape Series 106FXP and then neatly cover the tape joints with the specified sealant.

Sealant must be water based, LEED, UL 723 (ASTM E84), ASTM C731/C732 Standard Test Method for Extrudability, ASTM E96 Water Vapor Permeance and ASTM D5590 Antifungal. The sealant must be Vimasco 714, Childers Chil-Perm CP-30 or Foster 30-65.

In lieu of premolded PVC covers at elbows and fittings, which contain rigid polyisocyanurate pipe insulation as specified hereinbefore, Contractor may, at his option, miter the specified fiberglass insulation and thickness and then seal as specified hereinbefore.

Loose insulation within premolded covers is not allowed. Insulation must be as specified above or mitered.

Premolded PVC covers must have a flame spread index of 0-25 and a smoke developed index of 0-50 when tested in accordance with ASTM E84.

- 9.5. Exposed Ends:** Finish open ends of sectional covering by rounding off with cement, and sizing with fiberglass cloth jacket around the pipe and finish with Foster 30-36 mastic cement.
- 9.6. Partitions and Floors:** Refer to Section 15010 Pipe Sleeves and Firestopping. In any case, insulation must extend through floors, partitions and walls and firestopped. Note that Section 15010, Firestopping, requires firestopping of all penetrations, regardless of rating. Refer to Section 15010, Firestopping, for specifics and additional requirements.
- 9.7. Electric Water Coolers:** Insulate drain connections and traps with 1/8" thick insulating tape by AP Armaflex, K-Flex or Aerocel AC EPDM or 1/2" thick fiberglass insulation as specified for piping insulation.
- 9.8. Unistrut Support Saddle Requirements:** For all horizontally or vertically installed piping, provide a Unistrut assembly with a factory fabricated pre-formed, pre-insulated saddle assembly consisting of an **integral** hot dipped G-90, ASTM A653 compliant galvanized saddle per table below. **Do not use loose saddles.** The assembly must be a 360-degree section of 3.0 PCF density, 4.0 PCF density or 6.0 PCF density, non-compressive as appropriate for the manufacturer's standard. For IPS 6" and above provide an additional load distribution plate of all point loaded Unistrut or trapeze hangers. The assembly must be ASTM D1621, ASTM C209, ASTM E96, ASTM D2856 compliant. The assembly must have a 6-mil thickness, industrial grade vapor retarder film in compliance with ASTM D-374 and 0.01 perm rating in compliance with ASTM E-96. The assembly must also be provided with an insulation lock joint longitudinal seam. The insulation jacket must have a hazard rating not to exceed 25 flame spread and 50 for fuel contributed and smoke developed as determined by ASTM E-84, NFPA 255 and UL 723. Insulation thickness required must be same as specified above.

Installation must be in strict accordance with the Manufacturer's requirements. After installation, install **3" zero perm** butt strips at the joint between insulation sections where fiberglass insulation and the polyisocyanurate insulation butt together. Staple insulation jacket flaps and seal staples as specified above for fiberglass insulation.

Each assembly must have a genuine "Quick-Inspect" sticker applied at the bottom of each saddle for easy jobsite verification by the Engineer or Inspector. **Failure to provide the sticker on each assembly will be cause for immediate rejection of the installation.**

Refer to the plan details for additional requirements.

The assembly must be Buckaroos Model 3300E-LT or equivalent to Thermal Pipe Shields, Inc, Pipe Shields, Inc. Carpenter & Paterson, Inc., Clement Support Services or VEP/ASC Engineered Solutions. Buckaroos Model 3300E-LT is the basis of design.

Unistrut Saddle Requirements

<u>Nominal Pipe Size</u>	<u>Insulation Length</u>	<u>Saddle Length</u>	<u>Saddle Gauge</u>
1/2" - 3"	6"	4"	22 Ga.

- 9.9. **Clevis Hanger Saddle Requirements:** For a single pipe suspended with a single clevis hanger assembly, provide same insulated saddle assembly as specified above for the Unistrut assembly. Refer to the plan details for additional requirements.
- 9.10. **Painting:** Paint exposed insulation after insulation is completed as specified in Section 15010.
- 9.11. **Identification:** Refer to Section 15010, Part Identification for identification of piping systems.

PART 10. ELECTRIC WATER HEATING EQUIPMENT

- 10.1. **Water Heater:** Rheem Series ELD, A.O. Smith Series DEN, Lochinvar ESX or equivalent by Lochinvar or Bradford-White. Water heater(s) must be light duty, commercial, glass-lined tank with heating elements designed for current shown on the Electrical Drawings, copper dip tube, drain pan, storage capacity not less than indicated on the drawings and must meet new UEF ratings established by the U.S. Department of Energy.
- The water heater must bear the UL or ETL label and be covered by a minimum 3-year manufacturer's tank warranty and 1-year parts and labor warranty from the date of substantial completion as determined by the Architect.
- 10.2. **Power Wiring:** Specified under Electrical Division. **Verify voltage and power requirements with Electrical Contractor and Electrical plans prior to ordering equipment.**
- 10.3. **Circulating Pump:** Furnish and install, as shown on the plans, an all lead-free bronze (0.25% or less lead content of all wetted surfaces) or stainless steel construction, stainless steel flanges, pipe-mounted centrifugal pump with high efficiency ECM motor with algorithm to automatically adjust speed, flow and operation based on the actual requirements of the system, to include maintaining flow rates below recommended practice for the copper piping installed. The pump must be ETL or UL listed and be NSF 372 compliant.

Provide a strap-on aquastat equal to Honeywell L606A for insertion into the well and wire to control the pump through a two channel, 7-day program clock with manual override which must be programmed to the Owner's requested operating schedule. Clock must be equivalent to Tork EWZ-201C, Intermatic ET90215C or equivalent with NEMA 3 enclosure, automatic daylight savings time adjustment, automatic leap year compensation and minimum 4-day battery or super capacitor back-up power. Provide all required control wiring, power wiring and connections as required for proper operation as specified.

In lieu of separate aquastat and time clock, the Contractor may provide a pump with integral timer and aquastat provided the integral assembly meets the requirements of the separate time clock and aquastat.

Pump must be Taco 0026e-SF2, Armstrong Compass H or Grundfos Alpha HWR 15-29 SF/T. Taco 0026e-SF2 is the basis of design. Pump power must be as shown on the electrical plans.

- 10.4. Relief Valve:** The relief valve must comply with ANSI Z21.22 and CSA/ASME rated temperature and pressure relief valve on the water heater with copper relief line piped as indicated on the plans. Temperature and pressure relief valves, or combinations thereof devices must bear the label of an approved agency and must have a temperature setting of not more than 210°F and a pressure setting not exceeding the tank or water heater manufacturer's rated working pressure or 150 psi, whichever is less. The relieving capacity of each pressure relief valve and each temperature relief valve must equal or exceed the heat input to the water heater or storage tank. Do not pipe/connect relief discharge line and auxiliary drain pan lines together. The manufacturers must be Watts, Apollo or McDonnell and Miller.
- 10.5. Thermometers:** Trerice Series BX, Model AX9, universally adjustable type with 7-inch scale and suitable temperature range, mercury free, 0°F to 160°F range as manufactured by Trerice. Thermometers must be "blue liquid" actuated with Phenol Condensate and lead-free cast aluminum case and brass stem and thermowell, with extension neck and other accessories required for a complete installation. Locate for convenient reading. Equivalent product by Blue Ribbon, Weksler, March or Maxwell Moore will be accepted.
- 10.6. Expansion Tank:** Provide diaphragm type with NSF liner, designed for 150 psig working pressure and must bear an ASME stamp. Tank must have minimum acceptance as recommended by the water heater manufacturer. Expansion tank must be supported at the wall by a HoldRite QS-U Quick Strap with 1/2" wide, 0.025" thick, 200/410 stainless steel bands and 16 Ga. galvanized steel bracket of required capacity and load rating for the expansion tank shown on the plans or approved equivalent.
- 10.7. Auxiliary Drain Pan:** Provide 2" deep, 18 ga. (0.05" thickness) galvanized steel or 18 ga. (0.05") thickness stainless steel auxiliary drain pans with seamless, welded or brazed watertight joints. Width of pan must provide minimum of 3" clearance between water heater and inside face of the pan. Provide 3/4" copper drain line in **bottom** of pan to floor drain with dielectric separation where water heater is elevated or placed on a stand. Do not pipe relief discharge line and auxiliary drain pan lines together. Auxiliary pan must be manufactured by Killarney Metals, an approved equivalent or a shop fabricated pan with construction specified above, and with welded or soldered joints. **Factory manufactured pans that do not meet the specified requirements above are not allowed.**
- 10.8. Inspections:** The Plumbing Contractor must arrange and pay for the State of Alabama Boiler and Pressure Vessel Safety Division/Inspection Divisions, Elevators/Boilers Inspector to visit job site to inspect water heater and/or boiler installation and obtain written approval, certification and Certificate for Potable Water Heater (PWH) as required. Correct all deficiencies required by the Inspector without additional cost to the Owner or the Owner's Project Design Professionals, using materials and methods, as directed by, State of Alabama Boiler and Pressure Vessel Safety Division/Inspection Divisions and Elevators/Boilers inspector as required.

PART 11. FIXTURES SUPPORTS AND CONNECTIONS

- 11.1. General:** Verify exact size and location of water, vents, waste and supply connections from approved rough-in drawings and/or catalog data sheets. Allow for modifications required by the shop drawings without additional cost to the Owner or the Owner's Project Design Professionals.

All fixtures including lavatories, urinals, water closets, electric water coolers, etc., must be securely fastened to the walls or floor. **Coordinate all mounting heights and fixture types required with Architectural plans prior to rough-in and ordering fixtures.**

Demolish and modify existing roof, walls, floors, partitions and ceilings as required to accomplish the required work. Remove existing carriers, existing water and waste, saw cut floors, walls, partitions, ceilings, etc., as shown and as required to install new piping or reconnecting to existing waste and water rough-in.

All penetrations of floors and partitions are required to be built-in as work progresses. All penetrations of new construction that were not built-in as required by these specifications, and all existing floors, walls and partitions must be core drilled or sawcut large enough to allow all conduits, piping, firestopping assemblies, etc., to continue uninterrupted, and to provide proper firestopping of the penetration as required to install new items as shown and/or specified.

Reconstruction and repair of the demolished/modified items must be as directed by the Architect. Coordinate demolition and repairing/rebuilding of items with General Contractor prior to bid to allow for installation of carriers, piping, etc., as applicable.

- 11.2. Wall Mounted Fixtures:** Support all wall mounted fixtures that are specified without carriers using 1/4" thick 6" high plates full length and width of fixture, mounted behind wall. Where fixtures are back to back on a solid wall, mount with bolts from fixture hanger to fixture hanger. Do not use toggle bolts or expansion bolts unless noted on the plans or specified.

Where fixtures are mounted on solid (single wythe) walls finished both sides, install fixtures with plated toggle bolts.

Where fixtures are mounted on wood or light gauge steel studs, employ pressure treated blocking of 2" x 12" nominal size well secured into stud line with non-corrosive, dielectric separation fasteners. Fit behind stud flanges, using especially placed studs as required.

Demolish and modify all existing walls, partitions, ceilings and saw cut all floors as required to install new items as shown and/or specified. Reconstruction and repair of the demolished/modified items above must be as directed by the Architect. Coordinate demolition and repairing/rebuilding of items with General Contractor prior to bid to allow for installation of carriers, piping, etc., as applicable.

- 11.3. Floor Connections:** Provide cast iron or galvanized malleable iron floor flanges at least 3/16" thick, screwed or caulked to drainage pipe. Bolt the connection and make tight to fixture with plumbing fixture setting compound, wax setting ring or polyethylene gasket flange. Offset flanges for water closets are not allowed.

- 11.4. **Water Supply Connections:** Provide rigid, lead-free brass nipple from water riser to fixture stop valve threaded connections. Steel pipe is unacceptable. Exposed portion of nipple must be chromium plated. Stops' risers must be lead-free, threaded with chrome over copper pipe. Quick connect fittings and braided supplies are not allowed.
- 11.5. **Waste Arms to Fixtures:** As specified hereinbefore. Where copper or brass pipe is specified, all joints downstream from the trap must be brazed joints.

PART 12. SCHEDULED FIXTURES AND MISCELLANEOUS ITEMS

- 12.1. **Acceptable Manufacturers:** American Standard, Zurn, Elkay, Kohler and Toto catalogs.

Where three (3) Manufacturers are listed for fixtures below, use only those Manufacturers. Manufacturers not mentioned in the specifications require prior approval, seven (7) days prior to bid date. Follow procedures set forth in Division 1 of the specifications. Where substitutions are proposed, unless the Contractor states in writing, on a separate recap/summary sheet in front of the respective submittal, the differences of the substituted equipment or material, he must be responsible to replace such items any time discrepancies are found. All prior approvals must be submitted through the Architect.

Architect must select all colors where choices exists.

- 12.2. **Fixture Trim:** Exposed metal parts to be of heavy weight polished brass, heavily chromium plated, of best quality as regularly furnished by the plumbing fixture manufacturer. Provide stop valve in supply to all fixtures and equipment.
- 12.3. **Compliance with Americans Disabilities Act:** All fixtures, faucets, flush valves, etc., specified or shown to be ADA type must be manufactured and installed in complete compliance with the current requirements of the Americans Disabilities Act and ICC A117.1 Standard for Accessible and Usable Buildings and Facilities
- 12.4. **Guarantee:** Guarantee in writing to make good without cost any defects in materials and workmanship for one (1) year. **ALL** flush valves and faucets must be provided with a five (5) year, full replacement warranty, including labor.

Warranty/guarantee must start on the date of substantial completion of the project as determined by the Architect. Provide free maintenance and service during the first 12 months of the guarantee period.

- 12.5. **Scheduled Items:**

P – 1 Water Closet: American Standard Madera 3451.001 EverClean, Kohler Welcomme Ultra K-96053, Zurn Model Z5655-BWL1-AM or Toto CT725CUFG-#01, floor mounted, 15" high vitreous china, siphon jet, elongated bowl with 1-1/2" top spud, fully glazed trapway, china bolt caps, 1.6 GPF Zurn Z6000AV-WS1, Sloan Royal 111-1.6 or equivalent flush valve by Kohler or Toto with trap primer connection on flush tube where shown on the plans, Bemis 1655SSCT white open-front seat with self-sustaining stainless steel check hinge and hardware with Sta-Tite locking system or equivalent by Zurn, Church or Beneke, Zurn Z5972-COMB closet bolt and wax ring kit, china bolt caps and all other items required for a complete and functional

installation. Provide YJ chrome plated split-ring wall bracket for supply pipe.

P – 2 ADA Water Closet: American Standard Madera 3461.160, EverClean, Zurn Model Z5665-BWL1-AM, Kohler Highcliff Ultra K-96057 or Toto CT725CUFG-#01 17" high vitreous china, siphon jet, fully glazed trapway, elongated bowl with 1-1/2" top spud, 1.6 GPF Zurn Z6000AV-WS1, Sloan Royal 111-1.6 or equivalent flush valve by Kohler or Toto with trap primer connection on flush tube where shown on the plans, Bemis 1655SSCT white open-front seat with self-sustaining stainless steel check hinge and hardware with Sta-Tite locking system or equivalent by Zurn, Church or Beneke, Zurn Z5972-COMB closet bolt and wax ring kit, china bolt caps and all other items required for a complete and functional installation. Provide chrome plated YJ split-ring wall bracket for supply pipe. Coordinate flush valve installation with grab bar. Flush valve control/handle must be mounted for use from the wide side of the toilet stall.

P – 3 Urinal: American Standard Allbrook 6550.001, Zurn Model Z5755, Kohler Bardon K-4991 or Toto CT725CUF#01 vitreous china siphon jet, 3/4" top spud, flushing rim urinal, vandal resistant, stainless steel outlet strainer, china bolt caps, 1.0 GPF Zurn Z6003-AV-WS1, Sloan Royal 186-1 or equivalent flush valve by Kohler or Toto with vacuum breaker and Zurn Series Z-1222 or equivalent carrier by J.R. Smith or Sioux Chief. Strainers for Zurn urinals must be Zurn Z5755-STR. Provide chrome plated YJ split-ring wall bracket for supply pipe. Refer to Architectural plans for mounting heights.

P – 4 ADA Lavatory: American Standard Lucerne 0355.012, Zurn Model Z5364, Kohler Kingston K-2005, 20" x 18" wall hung vitreous china lavatory complete with Zurn Z81000-XL-17M, single control, solid cast brass, polished chrome plated faucet, 1.5 GPM vandal resistant, pressure compensating aerator, McGuire #LF2167, Zurn Z8803-XL-LRLK-PC or equivalent by Brasscraft or Dearborn Brass offset drain, Nibco 1/2" supplies with full turn wheel handles and stops, McGuire #155WC, Zurn Z8746-PC, Brasscraft or Dearborn Brass offset drain, McGuire 8872, Brasscraft, Zurn or Dearborn Brass p-trap and heavy-duty floor supported JR Smith Series 0710, Zurn Z1231EZ or equivalent chair carrier with concealed arms by Sioux Chief. Where lavatory manufacturer drain outlet complies with ADA requirements, offset drains are not required. Supplies must be lead-free, AB 1953 certified by recognized authority and bear manufacturer and testing mark. Refer to Architectural plans for mounting heights.

Provide lead-free mixing valve (ASSE 1070) with tempered water line to faucet. Mixing valve must be provided with wall bracket, dual check valves and 40-mesh stainless steel screen. Mixing valve must be Watts LFUSG-B-SC-M2, Leonard 170D-LF, Symmons 8210CK, Cash Acme or Zurn-Wilkins ZW3870XLT. The entire assembly must comply with ADA and ANSI standards.

Provide for each fixture an ADA compliant, heavy-duty, impact-resistant, stain-resistant and chemical-resistant rigid vinyl vandal-resistant enclosure with vandal resistant fasteners that shields all piping, electronic faucet components (as applicable), mixing valves and instantaneous water heaters. If plans indicate an instantaneous water heater to be installed at the lavatory, the Contractor must contact the Lav Shield Manufacturer for guidance on the required installation. **Do not install Lav Shield until Engineer has inspected the piping installation.**

The Lav Shield must contain an antimicrobial additive that resists fungal and bacterial growth. The Lav Shield must comply with ASME A112.18.9-2001, ADA article 4.19.4

(606.5), ANSI A117.1, BOCA P 1203.4, and other required State and Local regulations. The Lav Shield must be provided in standard white finish for the exact fixture specified or custom color, fit to field Lav Shield in the color selected by the Architect. Furnish standard **and** custom color chart to Architect for selection. Lav Shield must be manufactured by Zurn Model Z6900-VG, Truebro/IPS corporation or approved equivalent.

P – 5 Mop Basin: American Standard 7741.000 Florwell, Zurn Model Z5850-D3-RG-HH-MH-WG or Kohler K-6710-0 acid resisting enameled cast iron corner model floor type service sink, complete with American Standard 8354.112, Zurn Z843M1-XL or T&S Brass B-0665-CR-BSTRK wall mounted faucet with offset shanks and integral stops, levered vandal resistant handles, vacuum breaker, integral check valves, adjustable wall brace, pail hook, 3/4" hose thread on spout, four foot rubber hose and wall bracket for spout hose mounted approximately 4" above the mop sink stainless steel backsplash, Bradley 9933 combination utility shelf/broom holder and utility shelf constructed of 18 ga. 304 stainless steel with 16 ga. stainless steel gussets and hooks, 7745.811 rim guard, strainer for 3" screw connection, 304 stainless steel wall guards and silicone sealant at all points where wall guard meets the basin, wall and floor.

P – 6 Bi-Level ADA Indoor Electric Water Cooler with Bottle Filler: Elkay # LZSTL8WSSP, bi-level, ADA cooler, refrigerated stainless steel high capacity lead reduction filtered, wall mounted, front and side bubbler push bar, electronic bottle filler sensor, ADA and ICC A117.1 compliant with cane apron, stainless steel cabinet and receptor, safety bubbler and 5-year warranty on refrigeration system. It must provide 8 gal/hr. of filtered water at 50°F based on 80°F inlet water and 90°F ambient temperature, per ASHRAE 18 testing. Unit must be certified to UL 399 and CAN/CSA C22.2 No. 120 and NSF/ANSI 42, 53, 61 & 372 for lead free compliant design. Unit must be provided with quick filter change wrapper providing easy access to filter from the front and side of cooler for efficient filter changes. Furnish with 1-1/4" McGuire, Dearborn Brass, Brasscraft or Zurn rough brass p-trap, 17-gauge brass tailpiece and waste with wheel stop valve, concealed Elkay MLP200 or equivalent by Zurn or J.R. Smith bi-level floor mounted support, related floor support plates and base as required for applicable wall construction. Refer to Architectural plans for wall type. Equivalent units by Halsey Taylor, Oasis or Murdock will be considered.

Provide three (3) extra stock 51600C Water Sentry Plus Replacement Filters for each set of coolers shown on the plans, 6,000-gallon filter tested and certified to NSF 42 and 53 under manufacturer's name to reduce lead, Class 1 particulates and chlorine taste and odor certified to NSF 42, NSF 53, NSF-401 and NSF 372 at greater than stated product flow rate for each bi-level water cooler provided. Upon completion of the project, turn over replacement filters to Architect for transfer to Owner.

P – 7 ADA Sink: Elkay LRAD-332250, 33" x 22" x 5" deep double compartment 18 gauge, 304 stainless steel sink with self-rimming construction complete with one LKGT4083, forward lever faucet with deck plate and escutcheon, pull down spray, LKWRB1316SS stainless steel rinsing basket, two LK-35 crumb cup strainers and tail pieces, Oatey 8912, McGuire, Dearborn Brass, Brasscraft or Zurn 1-1/2" p-trap 17 gauge continuous waste, and two Brasscraft XR1720A with full turn wheel handles and angle stops. Sink must have drains at rear of each compartment as required to meet ADA regulations. Verify cabinet depth and slope with Architectural plans prior to ordering sink.

Provide lead-free mixing valve (ASSE 1070) with tempered water line to faucet. Mixing valve must be provided with wall bracket, dual check valves and 40-mesh stainless steel screen. Mixing valve must be Watts LFUSG-B-SC-M2, Leonard 170D-LF, Symmons 8210CK, Cash Acme or Zurn-Wilkins ZW3870XLT.

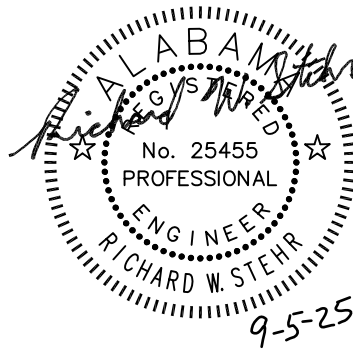
Insulate supplies, trap and drain with premolded ADA compliant protectors with internal fasteners as Manufactured by Truebro Lav Guard 2, Oatey/Dearborn or McGuire Pro-Wrap only.

END OF SECTION

Goshen High School Arts Center Renovation
to
Goshen High School
for the
Pike County Board of Education
Troy, Alabama

These specifications sections were prepared by and under the direct supervision of the Engineer of Record for this project.

Division 15 – MECHANICAL
15500 Sprinkler System



September 5, 2025

SECTION 15500 - SPRINKLER SYSTEM

PART 1 – GENERAL

1. General Provisions: Section 15010 is applicable in full hereto.
2. Qualifications of Contractor: The systems shall be installed by an approved contractor regularly engaged in the installation of automatic sprinkler systems with satisfactory experience in at least 3 equivalent projects.
3. Scope: Furnish all labor, material, equipment, design, service and supervision for and incidental to the installation of wet-pipe and dry-pipe fire sprinkler systems complete and as specified herein. The systems shall be installed complete, satisfactorily tested, and fully operational. The entire building shall be completely sprinklered. All areas shall be designed for hazard required to meet International Building Code, NFPA 13 and Local Codes.

The work includes, but is not necessarily limited to, the following:

- Extension of underground fire line from 5'-0" outside the building to 1'-0" above finished floor in the building, including all necessary excavation, trench work, flushing, hydrostatic testing, backfill, and repair of pavement, sidewalks, etc.
- Installation of main wet and dry system sprinkler risers including control valves, check valves, gauges, compressors, drains, fire department connection(s), main water-flow switches and valve tamper switches.
- Installation of all other piping, fittings, hangers, seismic bracing (where required), corrosion prevention equipment, sprinklers, valves, drains, sleeves, escutcheons, devices, and accessories required for complete system installations.

4. Codes and Standards: All work shall be in accordance with local, state, and federal laws, codes, rules, regulations, and standards applicable to this particular class of work, including the lawful requirements of the City Fire Department; the State of Alabama Fire Marshal; the Owner's Insurance Underwriter; and National Fire Protection Association Standards No.13 and No.24 latest editions. If any part of the plans or specifications conflicts with these laws, secure clarification before the work is started. The specifications outlined in this section shall be followed where they are in excess of the minimum requirements of the above-mentioned authorities.

5. Site Inspection: Bidders shall visit the site of the work before submitting bids, and satisfy themselves as to the nature and scope of the work to be done. The submission of a bid shall be taken as evidence that the bidder is aware of all existing conditions.

Later claims for labor, materials, or equipment required for any difficulties encountered shall not be recognized.

6. Shop Drawings and Equipment Submittals: Contractor shall employ the services of an Alabama licensed professional engineer that is qualified by education and/or experience to be in responsible charge of the preparation of fire sprinkler system shop drawings, hydraulic calculations and seismic bracing calculations (where seismic bracing calculations are applicable). Shop drawings, hydraulic calculations and seismic bracing calculations shall bear the seal and signature of the Alabama licensed professional engineer in responsible charge prior to submitting for review. Engineer in responsible charge shall perform site observations where required by authorities having jurisdiction.

Within forty-five days of contract award, submit one set of shop drawings submittals in electronic format (PDF) to the Project Architect for approval. At the same time, also submit drawings to the Owner's Insurance Underwriter (where applicable) and local authorities having jurisdiction. Make all modifications and/or additions necessary to meet the requirements of these authorities. There will be no extra cost to the Owner for any changes necessary. Submit letters of approval (or prints of drawings with approval affixed) before any work is begun.

Contractor shall provide Alabama Fire Marshal's Office permit number, NICET certification number and Alabama Department of Finance Division of Construction Management project number on all shop drawings

Shop drawings (minimum 1/8" scale) shall show in detail dimensioned piping, sprinkler heads, valves, alarms, drains, underground piping, etc. Outline all ductwork, lights, and other obstructions on shop drawings to show proper coordination and installation of all sprinkler work. As the work progresses, the drawings shall be coordinated with other trades and dimensions at the site verified. Drawings shall be revised as required by conditions at no additional cost to the Owner.

Submittals shall include at minimum a schematic site plan showing relative location and routing of underground piping to point of hydrant flow test. Schematic need not be to scale, but material type, pipe size, distances, valves, backflow preventer pits, fire department connections and hydraulic reference nodes shall be shown.

Submit equipment submittals of all materials proposed for use in work, giving name of manufacturer, trade name, catalog number, and all information hereinafter requested.

7. Layout of Heads: Within practical limits, locate ceiling heads symmetrically about at least one axis of the room or space. Lay out heads so that they do not occur in the same ceiling board as light fixtures, HVAC diffusers, etc. The centerline of each head shall be centered in the suspended ceiling grid.

8. As-Built Drawings: Upon completion of the work, Contractor shall provide a set of reproducible transparencies corrected to show all changes and noted "as-built drawings".

9. Materials, Equipment and Workmanship: Material and equipment shall be the standard catalogued products of manufacturers regularly engaged in the manufacture of such products. Similar types and items of equipment shall be produced by the same manufacturer.

All materials and equipment used in installation of fire protection systems shall be listed as approved by Underwriter's Laboratories, Inc., list of approved equipment, Factory Mutual (FM), and shall be the latest design of the manufacturer.

All materials and equipment shall be installed in strict accordance with NFPA Standards. Except as noted, all piping in finished areas shall be concealed above ceilings, in walls, and in pipe chases indicated on Architectural Drawings. All vertical piping between floors shall occur only in pipe chases or stair enclosures. Locate risers near the rear or side walls so that access to the chase is impeded as little as possible. Locate vertical piping in stairs outside of the path of egress and in accordance with ADA requirements. Maintain minimum space required for repairs to other piping. Install all exposed piping in unfinished areas as high as possible.

10. Coordination: Piping shall be offset, relocated or resized or additional piping shall be furnished and installed as necessary to provide space for other trades. Coordination of the sprinkler work with all other trades is the responsibility of this Contractor, and all changes shall meet approval of specified agencies. The Architect assumes no responsibility for coordination by approval of shop drawings. No extra charges will be approved for any changes required for coordination of sprinkler work with other trades, nor for changes required by NFPA, or code requirements. No ceiling heights shall be lowered because of limitation of space for mechanical equipment.

11. Identifications of Signs: Provide at all control, drain and test valves, signs of approved design identifying function and noting special cautions, all as is required by NFPA and by the authorities having jurisdiction. Provide and affix to the outside of doors to rooms where sprinkler and standpipe control valves are located suitable signs making note of such valve locations. Submit for Architect's review and approval a list of all signs, noting sizes, materials, nomenclature and colors.

12. Equipment Nameplates: Each item of equipment is to be identified by a permanently attached nameplate made of brass or other corrosion-resistant metal with incised letters and bearing the following information:

Manufacturer's name and address
Serial and model numbers

Rated capacity
Temperature, pressure or other limitations

13. Corrosion Control: For all dry-pipe and preaction systems, provide a vapor corrosion inhibitor system on the compressed air line supply to the dry system(s). Vapor corrosion inhibitor system shall have replaceable cartridges that do not require dismantling of air supply piping.

14. Service and Maintenance Manuals: Furnish at each riser, bound manual containing for each piece of equipment the following materials:

Manufacturer's descriptive literature
Maintenance instructions
Parts list

Where fire pumps or preaction/deluge system cabinets are provided, include as-installed control diagrams, including color coded wiring diagrams for all electrical motor controller connections and interlock connections.

PART 2 – PRODUCTS

1. Interior Piping: Interior piping shall be Schedule 40 or schedule 10 black steel, ASTM A-120, A-53 or ASTM A-135, in accordance with NFPA standards for wet systems. All exterior or dry system piping and fittings shall be hot-dipped galvanized.

2. Underground piping: Underground piping shall be ductile iron, Class 50, cement-lined, centrifugally cast in metal or sand-lined molds, meeting the requirements of AWWA C-151. Joints shall be rubber-gasket, slip-joint or mechanical-joint type. Underground pipe and fittings shall be restrained in accordance with NFPA 24 requirements.

3. Interior fittings: Fittings for above-ground piping shall be threaded, flanged, shop-welded or grooved.

Threaded fittings shall be Class 125 cast iron or Class 150 malleable iron in accordance with ANSI B16.3 and hot-dipped galvanized for dry system in accordance with ASTM A-153.

Flanged fittings shall be cast iron, short body, Class 125, black (painted for dry system), and in accordance with ANSI B16.1. Gaskets shall be full face of 1/8" minimum thickness red sheet rubber. Flange bolts shall be hexagon head machine bolts with heavy semi-finished hexagon head nuts, cadmium plated, having dimensions in accordance with ANSI B18.2.

Shop-welded fittings shall be steel standard weight, black (galvanized for dry system), in accordance with ANSI B16.9, ANSI B16.25, ASTM A234, ANSI B16.5, or ANSI B16.11.

Grooved couplings and mechanical fittings shall be malleable or ductile iron, 175 psi minimum working pressure. Gasket material shall be butyl rubber.

4. Underground fittings: Underground fittings shall be cast iron, Class 150, mechanical-joint type, in accordance with AWWA C110 and C111.

5. Hangers: Per NFPA 13. Provide supports where required. Attach to structural steel with malleable iron beam clamps with cup-pointed set screws and locknuts; attach to concrete slabs of 3" or greater thickness with pre-drilled drop-in expansion anchors. Powder-driven studs will not be permitted. Toggle hangers may be used for 2" and smaller branch lines subject to the limitations outlined in NFPA-13; if used, hanger spacing shall be limited to 10'-0". Where strut channel is used for trapeze hangers, the model of strut employed shall meet or exceed the requirements for section modulus in NFPA 13.

6. Seismic Bracing: Refer to structural design documents for information regarding overall seismic design category for the building. Where the seismic design category is identified as C, D, E, or F on the structural design documents, provide seismic bracing for the fire protection system piping in accordance with the 2019 edition of NFPA 13. Seismic Bracing of fire protection piping is not required for seismic design categories A or B.

7. Drains: Provide drain valves on the system in accordance with NFPA 13 requirements and drain lines throughout the system to permit complete system drainage. Provide sprinkler system test pipes and flushing connections required by NFPA 13. Provide additional test/drain valves where indicated on the contract drawings and/or as required by state or local authorities. Discharge locations of all drain and test lines shall be subject to specific approval.

8. Valves: Gate valves, 2" and smaller, shall be bronze body, 175 psi working pressure, threaded ends, wedge disc, OS&Y pattern. Gate Valves, 2 ½" and larger, shall be iron body, 175 psi working pressure, flanged ends, solid wedge or double disc, OS&Y pattern. Butterfly valves listed and approved for fire service with built-in tamper switches may also be furnished.

All valves controlling fire protection system shall be furnished with tamper switches – including post indicator valves and valves in backflow preventer pits or enclosures located outside the building.

Check valves, 2 ½" and larger shall be iron body, bronze-mounted, 175 psi working pressure, flanged ends, rubber-faced disc.

9. Alarm Valves: Provide U.L. listed flanged or grooved type for vertical riser complete with necessary test and drain facilities. Alarm valve shall be installed complete with gauges, retard chamber and trim piping. Where shutoff valve is installed in water motor gong test line, provide tamper switch on valve. Coordinate with electrical / fire alarm for connection to fire alarm system.

10. Dry pipe valves: Provide UL listed low differential type with protection against accumulation of water above the clapper by an automatic draining device. Provide drains suitable for dry pipe systems according to NFPA 13. Provide pressure type flow switch, high/low supervisory air pressure switch and control valve tamper switch. Connection to fire alarm system to be provided under division 16.

11. Air compressor: provide automatically maintain pressure system capable of restoring normal air pressure in the system within 30 minutes. Provide domestically manufactured assembly. Air compressor may be riser-mount oil-less type or tank-mounted type as manufactured by General Air Products, Gast Manufacturing, Speedaire, Jenny or approved equal.

12. Automatic Air Vent: provide at least one automatic air vent near the top of the system piping for each wet sprinkler system in accordance with NFPA 13 requirements.

13. Pressure relief valve: provide ½" pressure relief valve piped to drain to exterior for each wet sprinkler system in accordance with NFPA 13 requirements.

14. Hose Stations: Provide hose rack assembly, factory painted red with 1-1/2" brass angle valve, hose rack nipple, brass fog nozzle and 100 ft. of lined 1-1/2" hose on each side of the stage. Hose rack assemblies shall be Potter-Roemer model 2510 or equal by Fire-end Croker or Elkhart Brass.

15. Auxiliary antifreeze system: Provide auxiliary antifreeze system to supply sprinkler system piping where included in the scope of work and shown on the drawings in accordance with NFPA 13 requirements. Provide listed reduced pressure zone (RPZ) backflow preventer with expansion chamber to isolate from supply system. Provide testing isolation valve and hose valve for testing backflow preventer. Provide drain valves required by NFPA 13. Provide fill cup at highest point of antifreeze piping. Provide air gap and drain piping for RPZ backflow preventer to discharge at exterior location or where shown on drawings. Antifreeze system shall meet the requirements of NFPA 13

Installing contractor shall be responsible for sealing antifreeze system piping penetrations in outside walls.

Provide pre-mixed antifreeze solution specifically designed for use in automatic sprinkler system piping connected to potable water supply. Pre-mixed solution shall be U.L. listed.

16. Fire Department Connection: Refer to Civil division documents for location and arrangement of the Fire Department Connection. Connection shall be 2-way, polished brass, free standing with polished brass plugs and chains. Threads shall match local Fire Department. Provide polished brass escutcheon lettered "Auto-Sprinkler". FDC location and arrangement shall meet the requirements of the local Fire Department.

17. Sprinkler Heads: Typical heads shall be of the approved automatic spray-type, upright, pendant, or horizontal sidewall. Heads in finished areas shall be white painted; heads in unfinished areas may be bronze. Temperature rating shall be as conditions require. Unless otherwise noted, types shall conform to the following requirements:

- a. In all areas with finished ceilings, sprinklers shall be white pendant with 1/2" white recessed escutcheon; or white horizontal sidewall with 1/2" white recessed escutcheon.
- b. Provide brass upright sprinklers in areas without finished ceilings.
- c. Sprinklers in areas subject to damage shall be installed with head guards.
- d. All sprinklers shall be listed as quick response.
- e. Sprinklers in NFPA 13 Ordinary Hazard areas may be standard response where quick response type suitable for the space are not available.
- f. Pendant sprinklers installed on dry-pipe systems shall be factory pressurized dry-pendent type.
- g. Provide special sprinklers as may be indicated on the contract drawings.

18. Tamper Switches: Tamper switches shall be OS&Y type, butterfly type, or indicator post type as required, containing one SPDT circuit switch set to operate within two revolutions of the valve control wheel or when the stem has moved no more than one-fifth of the distance from its normal position. Switch shall have a minimum rated capacity of one amp 125 volt A.C. - .25 amp 24 volt D.C. The unit shall be arranged to cause a switch operation if the housing cover is removed or if the unit is removed from its mounting. Mounting shall not interfere with the normal operation of the valve.

19. Flow Switches: Provide U.L. listed and Factory Mutual approved flow switch at the system riser(s) or other location(s) indicated on the drawings. Provide adjustable retard type set for 20 to 30 seconds with SPDT auxiliary contacts. Flow switch shall be Notifier, Potter Signal, or System Sensor. Electrical/Fire Alarm contractor to provide wiring to central station alarm system under Division 16.

20. Backflow Preventer: Refer to Civil division and Site Utilities drawings for location and arrangement of the backflow preventer for the required sprinkler systems. Identify the size, brand and model of backflow preventer on the sprinkler shop drawings and include the associated pressure loss for the specific backflow preventer in the hydraulic calculations.

Where backflow preventer is not provided under Civil division, provide and install a double check detector assembly (DCDA) at each underground fire service entrance stub-in inside the building upstream of any sprinkler system risers.

21. Hose valves for forward flow testing: where no fire hydrants or other means of forward flow testing are located downstream of the backflow preventer, furnish 2-1/2" Fire Department hose valves at the sprinkler system riser or manifold. Provide one fire hose valve for each 250 gpm of the maximum flow demand for the system.

PART 3 – EXECUTION

1. Field Supervision: The sprinkler contractor shall have a responsible representative of his organization at the site of the work for coordinating this sprinkler installation with other trades as early as is required by the progress of the work. Details of proposed departures due to field conditions and/or requirements of local codes must be approved in writing.

2. Flushing and Sterilization: All sections of the fire protection systems, including building sprinkler and standpipe systems, and all site piping, are to be thoroughly flushed at flow rates and for a period of time as described in NFPA 13 and NFPA 24. After flushing, all piping is to be treated with a biocide specifically designed to combat microbiologically influenced corrosion (MIC). Follow manufacturer's specific instructions for the treatment procedure. Provide complete documentation of the MIC treatment to Owner upon completion with recommendations for future maintenance of the system.

3. Tests: All Sections of the sprinkler system are to be hydrostatically tested at not less than 200 psi for two hours. Test pressure is to be maintained by a small capacity pump to minimize water damage in the event of a break. Tests are to conform to requirements of NFPA 13, 14, and 24 where applicable with leakage from underground piping not to exceed the quantities therein listed. Perform all tests in the presence of the Architect and authorities having jurisdiction. Records of all tests are to be made available for Owner's inspection as required. Repair defects disclosed by tests, replace defective materials as required. Contractor shall provide all labor and materials required for the tests, and assume all costs, including those for the repair of damage caused to other work, including the work of other trades. Tests are to be performed only at such times that the ambient temperature throughout the test period will be high enough to prevent freeze- up

in any portion of the system and to assure complete drainage afterward. Flushing of piping shall be performed in accordance with NFPA 13, 14 and 24 requirements.

4. Acceptance: The operation of the equipment and the fire protection installation by the Owner does not constitute an acceptance of the work. The final acceptance is to be made after the Contractor has adjusted his equipment, demonstrated that it fulfills the requirements of the Specifications and Drawings, and has furnished all the required certificates.

5. Guarantee and Service: Guarantee in writing to maintain and service the entire installation for a period of one year from the date of final acceptance of the installation. Consult General Conditions for detailed requirements.

6. Protection during construction: Materials shall be protected during the construction period from corrosion, exposure to the elements and physical damage as required by NFPA Standards, the general conditions of the contract and local authorities.

7. Inspection contract proposal: At the conclusion of the project, installing contractor shall furnish an inspection, testing and maintenance contract proposal to the Owner. The contract proposal shall cover the systems installed and shall be based on the requirements contained in NFPA 25. The contract proposal shall include separate pricing for quarterly, semi-annual and annual inspection options.

8. General Workmanship: Cut accurately to measurement established at site and work into place without springing or forcing, properly clearing all windows, doors and other openings. Route thru previously built in sleeves. Ream all pipes to remove burrs. Make changes in direction and size with fittings (no bushings will be allowed). Cap or plug open pipe ends during installation to keep out foreign material.

Make connections carefully to insure unrestricted circulation and to permit complete drainage of the systems.

Provide valved drain lines throughout the sprinkler system to permit complete system drainage. Provide sprinkler system test pipes and flushing connections. Provide at least one automatic air vent for each wet-system near the high point of the system as required by NFPA 13. All of the above shall be as shown on drawings and/or as required by NFPA and the local authorities. All test and drain connections intended to flow water under pressure shall discharge to the exterior of the building. Drains intended to discharge water at atmospheric pressure may be routed to floor drains or service sinks as approved by Architect.

Refer to, and carefully check the installation against all architectural drawings and details, and note where walls, ceilings, beams and pipe shafts are furred or enclosed. Refer to and check with the contract drawings for the heating, ventilation, plumbing and

electrical work and other work of mechanical trades.

Install all piping to be concealed in ceiling or wall construction so as not to cause delay to other work, and to allow ample time for the necessary tests and approval. All piping in areas with dropped ceilings unless otherwise noted on plans shall be concealed above ceilings.

Hang all horizontal piping runs from the structure above, and locate as close as possible to the bottom of HVAC ducts, so as to attain the maximum headroom.

Install swing joints or expansion loops wherever necessary to allow for pipe expansion. Securely anchor pipes connected to expansion loops as required for proper operation.

Covered Loading docks and similar exterior canopies used for temporary storage or handling of combustibles shall be provided with automatic sprinkler protection in accordance with NFPA 13 requirements. Provide auxiliary dry-pipe system or dry-type sprinklers to protect areas subject to freezing.

Take care to prevent contact between pipes and building structure which could cause noises upon pipe expansion and contraction.

9. Joining of Pipe and Fittings: Join Schedule 40 black (galvanized) steel pipe by threaded joints in accordance with ANSI B2.1, by flanged joints, by shop-welded joints in accordance with the requirements of AWS D10.9, Level AR-3, or by mechanical grooved couplings. Grooves on schedule 40 pipe shall be rolled or cut and they shall be dimensionally compatible with the coupling. Pipe end preparation for the grooved couplings shall be in accordance with the manufacturer's recommendations.

Join schedule 10 black (galvanized) steel pipe by shop-welded joints as outlined above, or by roll grooved couplings as outlined above. Do not thread or use cut grooves on schedule 10 pipe.

10. Freeze Protection: Pipes or risers that pass through unheated spaces in or under the Building shall be protected from freezing in accordance with the applicable methods outlined in NFPA13.

11. Excavation and Backfill: As specified in Section 15010.

12. Sleeves and Escutcheons: As specified in Section 15010.

13. Clean-up: At regular intervals remove all refuse and debris accumulated from the system installation.

END OF SECTION 15500

SECTION 15700

HEATING, VENTILATING AND AIR CONDITIONING

PART 1. GENERAL

- 1.1. **General Provisions:** Section 15010 is applicable in full hereto. No materials or products that contain asbestos, formaldehyde, polychlorinated biphenyl (PCB), lead or mercury, in excess of limits mandated and defined by OSHA, LEED and the EPA, must be utilized.

Do not fabricate any duct or install any pipe or equipment until all coordination has been accomplished. Refer to Section 15010 for coordination requirements.

Manufacturers not mentioned in the specifications require prior approval, seven (7) days prior to bid date. Follow procedures set forth in Division 1 of the specifications. All prior approvals must be submitted through the Architect.

- 1.2. **Qualifications:** The Mechanical Contractor and the required third party external duct Insulation Contractor must be properly licensed and established at the location of the work and must maintain locally adequate service facilities. They must have had previous experience in the satisfactory installation of at least six (6) systems of this type, size, complexity and scope. Each Contractor must have an adequate service facility to provide complete service and maintenance of the facility within 100 miles of the installation.

- 1.3. **General Scope:** Include all equipment, material, and labor required for complete and proper installation and operation of mechanical systems, even though not every item involved is indicated. Do not attach any items to other trades' assemblies. Items must be separately attached to the building structural system.

The Mechanical Contractor must not install the external duct insulation. All external duct insulation work must be provided by an independent third party licensed and experienced Insulation Subcontractor whose primary business is the sale and installation of insulation materials in accordance with insulation manufacturers' requirements and these specifications. Refer to Part Duct Insulation Work (External) for detailed requirements.

Advisory provisions listed in all Codes referenced in the Contract Documents are mandatory. Where conflicts occur between a Code, Standard, the contract drawings or specifications, the most stringent requirements must govern and be applied.

Manufacturers not mentioned in the specifications require prior approval, seven (7) days prior to bid date. Follow procedures set forth in Division 1 of the specifications. All prior approvals must be submitted through the Architect. Where substitutions are proposed, unless the Contractor states in writing, on a separate recap/summary sheet in front of the respective submittal, the differences of the substituted equipment or material, he must be responsible to replace such items any time discrepancies are found.

Where units of the same class of equipment are required or specified, these units must be products of a single manufacturer, however, the component parts of each unit need not be. All major equipment (split systems, packaged equipment, etc.) must be provided by the same manufacturer throughout the project. No mix matching of equipment Manufacturers is allowed unless specified otherwise.

Architect must select all colors where a choice exists.

- 1.4. Record Documents:** Provide in such detail, as is set forth under General and Supplemental Conditions and in Section 15010.
- 1.5. Access Panels and Doors in Finished Areas:** Do not locate serviceable items above inaccessible, hard ceilings or in partitions without written approval from the Architect. Coordinate all items locations with the Architectural plans before installing any items. Furnish access panels and doors to the General Contractor for installation wherever required for access to any items requiring maintenance.

Access panels/doors in finished areas or areas exposed to view must be suitable for wall or ceiling finish involved, 24" x 24" unless otherwise indicated or as required to permit removal of equipment and provide acceptable maintenance access. Access panels and doors must be fire rated where rated assemblies are penetrated.

Access panels and doors must be manufactured by Milcor, Elmdor, Zurn, Mifab or approved equivalent. The Architect must approve the use of, and type of, all panels and doors to be installed in areas that are exposed to view or in finished areas.

Exposed access panels and doors must be factory cleaned and primed for painting in the field. Colors, materials and methods must be as directed by the Architect. Refer to Architectural Section, Painting, for additional information.

For detention and similar institutional type facilities, refer to Section 1122 for type of access panels/doors required.

Refer to Section 15010, Part Access Panels and Doors for additional requirements.

- 1.6. Access Panels/Doors for Miscellaneous Areas:** Refer to Section 15010 and above for access doors required for equipment, valves, etc. in exposed/finished locations.

Provide double wall access door in the side of the duct for each fire damper, motorized dampers, smoke detectors and elsewhere indicated, specified or required for proper maintenance. Size and position to provide maximum access to all items with minimum 12"x12".

Typical doors must be double metal faced, 22 ga. steel door panels and 22 ga. frame, internally insulated same as duct (1" minimum) fiberglass insulation, neoprene gasket seal and full length plated steel piano hinges with cam lock. Provide access panels/doors with cam locks only, where hinged access panels/doors cannot be completely opened without obstruction. When access panels/doors are provided with cam locks only, they must be provided with a safety chain. Access panels/doors must be rated for the anticipated duct pressure, plus 1". All access doors located outside must be airtight and weatherproof.

Hinged access doors must be Ruskin Series ADH22. Removable access doors/panels with cam locks must be Ruskin Series ADC22 with minimum of two cam locks and safety chain. Nailor Industries Model 08SCL/Model 08SH, Kees ADH/ADC, Greenheck HAD or Pottorff Series HAD/CAD will be acceptable.

For ducts 10" round and smaller, access doors must be flush mounted, flat oval, 1" insulated, low leakage, 20 ga. steel door panels and frame, except with two large hand knobs or cam locks with safety chain, and equivalent to Ruskin Model ADR1 for round ducts or equivalent by Nailor, Greenheck, Kees or Pottorff.

Hinged access doors for round ductwork over 10" must be flush mounted, flat oval, 1" insulated, low leakage, 20 ga. steel door panels and frame, except with two large hand knobs or cam locks with safety chain, and equivalent to Ruskin Model ADR2 for round ducts 12" round up to and including 16" round duct. Nailor Series 0800, Pottorff Series DMR, Greenheck RAD or equivalent by Kees will be acceptable.

Refer to other sections for access doors required in kitchen hood exhaust ducts, moisture-laden ductwork, medium/high pressure, high velocity ductwork, etc.

1.7. Refer to Section 15010 for additional access door/panel requirements including Section 15010, Part Identification for identification requirements.

1.8. Site Visits: It is the contractor's responsibility to have the job ready for site visits when they are scheduled. If the project is not ready for the requested site visit and the Architect, any governmental agency or any other entity requires an additional site visit with the Engineer present, the contractor must pay Zgouvas, Eiring & Associates a re-visit fee of \$2,000. The payment must be made directly to Zgouvas, Eiring & Associates 5 days prior to the scheduled site visit.

The Contractor is urged to carefully review the extensive requirements of Paragraph Identification and Refrigerant Piping Identification in Section 15010 of the specifications. Note that certain identification is required to be completed before certain site visits. **There are specific identification requirements prior to the above ceiling and final site visits, respectively, that are mandatory. The State of Alabama Department of Construction Management (DCM) will cancel on-site, the site visit if not completed as specified. Failure to comply with this provision will be cause for cancellation of the site visit, and a fee imposed for the additional site visit, with all costs of the additional site visit to be borne by the Contractor.**

1.9. Miscellaneous: Bidders must visit the site and become acquainted with all job conditions that may affect the work shown on the plans. Report to the Architect, prior to bid, any new or existing conditions that require modifications to accomplish the installation of all items. Provide for required adjustments to complete the intent of the work. No consideration will be given after bid opening for alleged misunderstanding regarding new or existing job conditions, utility connections, permits, fees, construction documents, etc.

The Contractor must carefully examine the contract documents during the bidding phase. Any missing information, clarifications, etc. in the contract documents that is required to obtain accurate pricing must be brought to the attention of the Architect, **prior to bid date**, so all may be clarified and/or corrected. Failure to identify and resolve any issue prior to bid must require the Contractor to provide said items, complete, without additional cost to the Owner or the Owner's Project Design Professionals, using materials and methods specified by, and as directed by, the Owner's Design Professionals.

Refer to Section 15010 for additional requirements.

1.10. Identification: Custom factory fabricated refrigerant piping labels are required. Stick-on, painted, stenciled or hand written identification is not allowed. The Contractor is urged to carefully review the extensive requirements of Part Identification in Section 15010 of the specifications and note that certain identification is required to be completed before certain site visits. There are specific identification requirements prior to the above ceiling and final site visits, respectively, that are mandatory. **The State of Alabama Department of Construction Management (DCM) will cancel on-**

site, the site visit if not completed as specified. Failure to comply with this provision must be the cause for cancellation of the site visit, and a fee imposed for the additional site visit, with all costs of the additional site visit to be borne by the Contractor.

- 1.11. **Painting and Colors:** Furnish to the Architect, color cards for standard and premium colors available. **The Architect must select color where choices exist.** Refer to the Architectural Painting Section of the specifications for additional requirements.

- 1.12. **Coatings and Finishes:** Pipe hangers, Unistrut pipe supports and duct Unistrut support assemblies of galvanized, zinc and similarly coated items are considered to **NOT** be coated. All must be painted, powder coated, epoxy coated or plastic coated. Hanger rods and associated bolts, and clamps on Unistrut assemblies are not required to be painted or coated.

All damaged or rusted steel pipe and all hangers, Unistrut and other support assemblies must be cleaned, primed and painted with two coats of compatible black enamel paint as specified below. Any rusted items must have the rust removed, then etched and primed for painting as recommended by the respective manufacturer. After prepping the surfaces, then paint with two coats of compatible black, rustproof enamel paint. Do not use spray paint.

All paint and coatings must have a fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed as determined by ASTM E84. See specification Section 15010, Part Identification for detailed requirements.

In lieu of painted surfaces as specified hereinbefore, the Contractor may provide factory fabricated hangers and Unistrut assemblies with rust resistant powder coating, epoxy coating or plastic coating. All paints/coatings/finishes must meet or exceed a fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed as determined by ASTM E84. Refer to Section 15010 for additional requirements.

- 1.13. **Safety Provisions:** Provide covers or guards on all hot, moving and projecting items that may be deemed by the Engineer, Architect or Owner to be a hazard to occupants of the building or to service personnel. Provide full size expanded metal grilles over all exhaust/relief air assemblies on all packaged equipment to protect against any intrusion to motorized dampers, gravity backdraft dampers, etc.
- 1.14. **Spare Parts:** Manufacturer of any equipment specified must have a wholesale outlet for readily available replacement parts in the nearest major USA city.
- 1.15. **Submittals:** Refer to Section 15010 for **strict requirements** and, especially as it applies to format, project cost constraints, addendums and Value Engineering (VE) items.

Only ONE complete submittal will be accepted. Providing submittals piecemeal is not allowed. If a partial or incomplete submittal is provided, it must be cause for immediate rejection.

- 1.16. **Firestopping:** Refer to Section 15010, Part "Partial Work to be Coordinated With Other Trades", Paragraph "Firestopping". **Note that Division 15 firestopping specifications require firestopping of all penetrations regardless of wall/ceiling/floor construction. Refer to Division 1 regarding additional requirements.** Where there is a conflict between Division 1 specifications and Division 15 specifications, the most stringent requirements must govern, be

applicable and must be provided.

- 1.17. Service, Charges, Lubrication, Filters, etc.:** Furnish complete first charges of refrigerant, lubrication, oils, etc., and be responsible for such full charges for the guarantee period. Provide service and maintenance for all equipment and systems during the guarantee period. As a minimum, quarterly service calls and reports are required. Make the last service call two weeks prior to the year-end site visit. All quarterly service must include lubrication of all motors, bearings, calibration and adjustment of all controls and equipment, full refrigerant charge, new filters, belts, etc.

The Contractor is responsible for quarterly filter changes of all disposable filters, and cleaning of all washable filters, during the guarantee period. The Contractor must inscribe onto the disposable filters' casing the date filters were installed/replaced.

The Contractor must furnish to the Architect and the Owner individual written service reports for all work done under this warranty. Failure to provide the Architect with the Owner's written acknowledgement of service calls must be construed to mean that the service calls have not been accomplished and are still required.

- 1.18. Field Instructions:** The Contractor must operate all systems for a period of six (6) days after completion of the work. During this time, provide competent personnel to thoroughly instruct representatives of the Owner in the proper operation and care of all equipment and control systems, to include the installation of the air conditioning equipment maintenance tool on the personnel's mobile devices. Example: For Trane equipment, install the Symbio Maintenance App.

Secure written acknowledgement of such training and the installation of the Maintenance App from the Owner. Failure to provide the Architect with the Owner's written acknowledgement of this training must be construed to mean that the instructions have not been accomplished and are still required.

- 1.19. Operating and Maintenance Manuals:** Two weeks before the final site visit, furnish three complete sets of operating and maintenance instructions, bound in hard cover, indexed and tabbed.

The Contractor must also provide this information in digital Adobe Acrobat PDF format, on a CD-R CD. The PDF file must be provided with an embedded index for each specified item. The index must appear in the left hand window of the opened document so that the Owner or his maintenance personnel can "click" on the indexed item and move immediately to that specific item.

Minimum requirements for the Operating and Maintenance Manuals must be as follows:

- a. The first page of the bound instructions must be a listing of:
 1. The Owner/Project Title.
 2. The Architect and Architect's Job Number.
 3. The Engineer and Engineer's Job Number (Found in the Engineer's Logo in the Bottom Right Corner of the Mechanical Plans).
 4. The General Contractor and Contact Information.
 5. The Mechanical Subcontractor and Contact Information.
 6. HVAC Controls Subcontractor and Contact Information.

- b. Second page must be a Table of Contents listing all products in the order which appear in the specifications and label the tab accordingly. Include all equipment using nomenclature shown on the Mechanical plans, UV-C lights, and similar devices, control valves, motorized dampers, fire dampers, etc.
- c. The third page must be a summary page that lists each item with its respective warranty, including all extended warranties.
- d. All warranty card information must be filled in by the Mechanical Contractor; Serial numbers, Model Numbers, etc. all as required for proper warranty registration. The warranty registration date must be the date of substantial completion as determined by the Architect.
- e. Provide copies of all filled in warranty cards.
- f. Provide a local source of supply for parts and replacement, including names and telephone numbers of parts suppliers.
- g. Provide a general maintenance summary section. Section must be a list of each piece of equipment or device using the designations as shown on the plans, and the routine maintenance procedures based on the respective manufacturer's recommended intervals. As a minimum, maintenance must be grouped and individually tabbed to indicate maintenance operations required:
 - 1. Once a month
 - 2. Quarterly
 - 3. Once every six months
 - 4. Once a year
- h. Provide copy of the results of all specified tests.
- i. Copy of Test and Balance Report.
- j. Copies of all the Mechanical Engineer's Site Visit Reports including Contractor's written response that items listed were corrected.
- k. Copies of all certificates of all site visits, comments and approvals from all Governing Authorities.
- l. Provide copy of all the specified start-up reports.
- m. Copies of equipment Manufacturers' certified factory test results of the equipment testing before shipping.
- n. Provide copy of all Division 15 Specifications except Section 15400.
- o. Provide a copy of all shop drawings/submittals.
- p. Provide drawings of system control and wiring diagrams, condensed operating instructions, specified sequences of operation. Include hard copy in binder and digital copy on CD in PDF format. All components must be numbered and identified on the diagram. Laminate, frame under plastic and mount in each mechanical room in an optimally viewed location.
- q. Provide record drawings of the Mechanical drawings, in hard copy and PDF format on CD. Refer to Section 15010, Part 1, General, Paragraph, Record Drawings for detailed requirements. Record drawings must also indicate all valve numbers from the specified valve chart.

- 1.20. Warranty:** Guarantee work as set forth in Section 15010 and Division 1. Guarantee in writing to make good without cost any defects in materials and workmanship for one year following the date of substantial completion of the project, as determined by the Architect, and unless specified otherwise a 5-year warranty on all air conditioning compressors. Provide free maintenance and service during the guarantee period to **include furnishing and replacing of filters, and the cleaning of all washable filters.** Refer to other parts for additional requirements and extended warranty requirements.

PART 2. ELECTRICAL WORK AND EQUIPMENT

- 2.1. **Power:** All power wiring required for installation of equipment is specified under the Electrical Division. Electrical equipment must be compatible with the electrical power shown on electrical drawings. **The contractor must verify all voltage and power requirements with the Electrical Contractor, Electrical plans, and at the project site, prior to ordering equipment.**

- 2.2. **Motors:** All furnished motors must be designed, manufactured, and tested in accordance with the current applicable standards of NEMA, ANSI, IEEE, and ASTM. As a minimum requirement, all motors must conform to the current applicable sections of NEMA Standard No. MG-1, Part 3. Motors must meet or exceed The Consortium for Energy Efficiency (CEE) Premium Efficiency™ full load efficiencies. All motors 1 HP and over must be premium efficiency. All motors with scheduled capacity of less than 1 HP must be ECM type as required by ASHRAE 90.1 and with minimum motor efficiency of 70% when rated in accordance with DOE 10 CFR 431. Premium efficient motors must be **warranted for 36 months** from the date of substantial completion of the project as determined by the Architect.

All motors must be listed under the UL recognized component file as applicable. All motors must be suitable for installation according to the requirements of NEC. Motors must be wound for the specified voltage and a 1.5 service factor, 1750 RPM open drip proof construction and minimum of Class "F" insulation unless otherwise shown or specified.

The bearings must have a rated fatigue life of B-10 of 150,000 hours for direct-coupled applications and 50,000 hours for belted applications minimum. Belted rating must be based on radial loads and pulley sizes called out in NEMA MG 1. Load on motors must not exceed 100% nominal horsepower. Routine factory testing must be conducted in accordance with Method B of IEEE 112 (current edition), Standard Test Procedure for Polyphase Induction Motors and Generators and must be as described in Article 12.55 of NEMA MG1, Motors and Generators.

Where shown, specified or required, furnish increment wound motors for two-step starting. All motors must be provided with overload protection and phase protection on all legs. Do not run motors until correct overload elements are installed in starters. Trading overload elements for elements of correct size for motors actually furnished must be included in this Section.

All motors serving outdoor equipment exposed to weather must have TEFC motors meeting the requirements set forth previously.

Motors must be manufactured by Regal Rexnord Corporation, Emerson Electric, Franklin Electric, AMETEK, Inc, Baldor Electric Company/ABB, Nidec Corporation, Siemens AG or ABB Group.

- 2.3. **Fusing:** Provide factory installed fuses in all equipment requiring fusing for branch circuit protection.
- 2.4. **Motor Starters as Required:** To be furnished under this Section; installation thereof is specified under the Electrical Division, except for those which are specified to be factory assembled. Starters must be U.L. and NEMA approved. Where required for interlocks provide built-in step down transformer. Motors for VFD drives must be designed for NEMA MG-1, Part 30.

Motor starters must be mounted on wall at accessible height standing from floor. Equipment mounted on Uni-strut type frame mounting is not acceptable.

Provide for each motor or group of motors requiring a single control (and not controlled from a motor-control center), a suitable controller and devices that must function as specified for the respective motors.

Provide overload protection for each ungrounded conductor to each motor 1/8 HP or larger (manual reset type unless indicated otherwise). The overload-protection device must be integral with the motor or controller. Unless indicated otherwise, furnish pilot lights with all remote starters. Where auxiliary control devices are connected into control circuit, these devices must not bypass safety controls (motor-overload protective devices, high-pressure cutouts, low pressure cutouts, etc.). Provide "Hand - Off - Auto" switches, auxiliary contacts, etc. for all starters.

Motor starters must be manufactured by Siemens AG, Schneider Electric, ABB Group, Rockwell Automation, Eaton Corporation, Danfoss A/S, Yaskawa Electric Corporation, Emerson Electric, Fuji Electric or GE Vernova.

- 2.5. Unit Protection:** All fan motors, indoor units, outdoor units, condensing units, packaged units, etc., must be provided with equipment manufacturer, factory installed surge protection and phase protection to ensure against voltage unbalance, over/under voltage loss, phase loss, reversal, incorrect sequencing and rapid short cycling. When not available from the equipment manufacturer, protection must be provided for all 3-phase equipment utilizing ICM Controls Model 450 A Plus+ or equivalent. All single phase equipment with horsepower greater than or equal to 1/8 HP must be provided with protection utilizing ICM Controls Model ICM 492 or equivalent. The Contractor must consult with the Owner's maintenance personnel and set up all programmable options based on the Owner's requirements, within the device's capabilities. Phase protection is not required on equipment being controlled via a variable speed frequency drive; if the specified protection is inherent with the variable speed drive furnished.

- 2.6. Controls:** All HVAC controls cabling and wiring must be in EMT conduit (no "whips") or on J-hooks. Above accessible lay-in ceilings, control wiring must be installed on J-Hook assemblies. Above all hard, inaccessible ceilings, in all mechanical rooms and in areas with exposed structure (no ceilings), controls wiring must be in conduit. Do not attach any wiring, cabling or conduits to refrigerant piping.

Do not route control wiring through sleeves containing piping. Do not route any control wiring through or within any ductwork. **All wiring penetrating any exterior wall, interior partition, floor, and similar construction must be in conduit with protective grommets on the conduit ends. HVAC outdoor control wiring must terminate above the ceiling in an accessible location.**

EMT control conduit must be as specified in the Electrical Division of the specifications and/or as shown on electrical drawings. Minimum HVAC Controls conduit size must be 3/4" in size. All control conduit, power, relays, contactors, transformers, wiring, etc., required for a complete functional system as specified, shown on the plans, or as required to accomplish the specified sequences of operation, which is not shown or specified by the Electrical Division, must be furnished and installed by the HVAC Controls Contractor. This must include all power, interlock control wiring between the various components of the heating, ventilating and air conditioning system, lighting interlocks and all smoke detection system electrical wiring.

Electrical work performed under this Section must conform to requirements set forth in the Electrical Division(s) of the specifications. All wiring must be in accordance with the National Electrical Code, and all State and local codes. Coordinate all requirements with the Electrical Sub-Contractor prior to bid and provide all as required.

All thermostat and humidistat boxes must be mounted 46" A.F.F. to the center of the box (ADA height). Where wall mounted CO₂ Sensors are indicated, they must be mounted 58" A.F.F to the center of the box. All wall-mounted devices must be provided with hinged, locking metal covers with rounded edges.

Provide drawings of system control and wiring diagrams, condensed operating instructions and specified sequences of operation. Include hard copy in Operating and Maintenance Manuals binder and digital copy on CD in PDF format. All components must be numbered and identified on the diagram. Laminate, frame under plastic and mount in each mechanical room in an optimally viewed location.

All work must be done by an approved, independent HVAC Controls Contractor whose primary business is the installation and servicing of HVAC controls systems.

- 2.7. **Controls and Instrumentation Cable:** Instrumentation cable must be minimum AWG as recommended by the equipment Manufacturer or the HVAC controls system Manufacturer. The most stringent cable requirement must be provided. All wiring, cabling, conduit, connections, etc., must be plenum rated and rated for use at temperatures and conditions expected in the location of mounting. Do not attach any wiring, cabling or conduits to refrigerant piping.
- 2.8. **Wiring Diagrams:** Furnish to the Electrical Contractor for the specific makes and models of electric-motor operating equipment to be installed. **The contractor must verify all voltage and power requirements with the Electrical Contractor, Electrical plans, and at the project site, prior to ordering equipment.**
- 2.9. **Modifications:** The cost of any modifications of the electrical power wiring, breakers, and/or control wiring conduit, etc. that is required for any items specified in Section 15700, or controls having electrical power requirements differing from that shown on the electrical drawings and/or as specified, must be the responsibility of the Mechanical Contractor.

PART 3. VIBRATION AND NOISE CONTROL

- 3.1. **General:** Elimination of objectionable vibration and noise is the responsibility of the Contractor, who must provide all foundations, spring isolators, flexible connections, air chambers, curbs, etc. required thereby. Pay special attention to vibration problems at year end site visit and correct all deficiencies noted.

All items of mechanical equipment must be properly isolated from the structure by means of the Engineer's approved vibration absorbing accessories, foundations or supports.

- 3.2. **Sound Levels:** Sound levels caused by operation of pumps, fans, air handling systems, etc., whether generated within rooms or transmitted to rooms through ducts, walls or floors, pipes, etc., must not exceed specified NC rating at any point within room not more than 6 feet from an air outlet in accordance with ASHRAE octave band method. Offices, classrooms, conference rooms, libraries and similar spaces

must have maximum NC-25; kitchens, shops, corridors, gymnasiums and lobbies, NC-35; toilets, NC-40; auditorium, stage and band room NC15 .

PART 4. TESTING, START-UP, BALANCING, ETC.

4.1. General: Conduct tests upon completion of the heating, ventilation and air conditioning installations, and at times as designated by the Architect. Furnish written reports to the Architect of all tests results. Provide copies of all test results in the Bound and Framed Instructions specified hereinbefore. Furnish all necessary personnel, test instruments, power, fuel, etc., as required to complete the specified requirements.

4.2. Refrigerant Piping Testing: The Mechanical Contractor must provide two tests for the refrigerant piping installation. The medium used for pressure testing the refrigerant system must be oxygen-free nitrogen, helium or argon. Oxygen, air, combustible gases and mixtures containing such gases must not be used as a test medium. Systems erected on the premises with tubing not exceeding 5/8 inch outside diameter must be allowed to use the refrigerant identified on the nameplate label or marking as the test medium.

The refrigerant piping system must be tested as a whole, or separate tests must be conducted for the low-pressure side and high-pressure side of the piping system. The refrigerant piping system must be tested in accordance with both of the following methods:

Test 1: The system must be pressurized for a period of not less than 60 minutes to not less than the lower of the design pressures or the setting of the pressure relief device(s). The design pressures for testing must be the pressure listed on the label nameplate of the condensing unit, compressor, compressor unit, pressure vessel or other system component with a nameplate. Additional test gas must not be added to the system after the start of the pressure test. The system must not show loss of pressure on the test pressure measuring device during the pressure test for a minimum 24 hours.

Test 2: A vacuum of 500 microns must be achieved. After achieving a vacuum, the system must be isolated from the vacuum pump. The system pressure must not rise above 1,500 microns for a period of not less than 60 minutes.

Where using refrigerant as a test medium as specified above, the test pressure must be not less than the saturation dew point pressure at 77°F.

As required by IMC 1110.8, the installation contractor must issue on his company letterhead, to the Local Code Official and the Authority Having Jurisdiction, a certificate of testing for all systems containing 55 pounds or more of refrigerant. The certificate must give the unit number as shown on the plans, the test date, name of the refrigerant, test medium and the field test pressure applied to the high pressure side and the low-pressure side of the system. The certification of the test must be signed by the installation contractor.

4.3. Ductwork for Systems Less Than 2,000 CFM: The Mechanical Contractor must test all supply, return, relief and outside air, exhaust ducts, plenums and casings and make substantially airtight before covering with external insulation or concealing masonry. Substantially airtight must be construed to mean that no air leakage is noticeable to the senses of touch or sound at joints.

- 4.4. **Ductwork for Systems 2,000 CFM or Greater:** The Mechanical Contractor must test all supply, return, relief and outside air, exhaust ducts, plenums and casings and make airtight before covering with external insulation or concealing in masonry. Test supply ductwork under the positive pressure for the respective system. Test return and exhaust ducts, plenum and casing under a positive pressure of 0.75"WG. The maximum allowable leakage must be 10%. Vacuum clean ducts, plenums, casings and coils. Demonstrate operation of fire dampers before testing and starting. Check that flexible connections are installed in folds (not pulled tight) and not transmitting vibration.
- 4.5. **Testing of Smoke Detectors:** The Mechanical Contractor must attend the testing of all smoke detectors which are a part of the mechanical system. The Mechanical Contractor must provide a smoke machine to be used for testing the smoke detectors. Any means other than a smoke machine is unacceptable and not allowed. **If a smoke machine is not present at the time of testing, DCM will cancel on-site, the site visit and a reinspection fee imposed, with all costs of the reinspection to be borne by the Contractor.**
- 4.6. **Domestic Water Circulating System:** The Testing and Balancing Contractor must test and adjust domestic water recirculation system to ensure hot water circulation in all mains. Provide flow rate of pump and determined head.
- 4.7. **Performance Tests:** After cleaning, balancing, and testing are completed as specified, test each system as a whole to see that all items perform as integral parts of the system, and that temperatures and conditions are evenly controlled throughout the building. Verify all sequences of operation and submit report. Make corrections and adjustments as necessary to produce the indicated conditions.

All work must be performed by an independent test and balancing agency whose primary business is the testing and balancing of heating and air conditioning systems and its related components. The Test and Balancing Contractor must hold a current NEBB or AABC certification. Proof of certification must be provided at the submittal stage.

The test must cover a period of not less than three days and must demonstrate that the entire system is functioning properly. Provide the following:

Date of testing, space temperature and humidity, outdoor air temperature (DB & WB), air temperature entering condenser coil; and load amperes for all motors. Also, provide CFM readings at all grilles, registers and diffusers and entering and leaving air temperatures at each evaporator coil.

Provide a typed list indicating job setting of all automatic controls. Include settings of thermostats, humidity controls, CO₂ sensors, safety controls, minimum damper settings, fire-safety thermostats, pressure controls, temperature controls, and other similar items. Tabulate to show type of control, location, setting and function. Verify that all safety settings and limits are appropriate and comply with current safety Codes and Regulations for the respective system.

After building is occupied, adjust as requested by Owner.

- 4.8. **Balancing:** The Testing and Balancing Contractor must check airflow at all supply air, return air and exhaust air devices, all diffusers and outside air intakes with a recently calibrated direct-reading velocity instrument. Adjust systems to deliver, supply air, return air, outside air and exhaust air quantities to within 10 percent of the

indicated amounts. Provide instruments and otherwise assist the Architect in checking balancing at final site visit.

- 4.9. Settings:** Contractor must permanently mark the settings of all valves, dampers, and other adjustment devices in a manner that will allow the settings to be restored. If a balancing device is provided with a memory stop, it must permit the closing and reopening of the device to its balanced position.
- 4.10. Unit Protection Verification:** The Test and Balance Contractor, with cooperation from the Mechanical Contractor, must verify that all phase protection specified has been installed where specified, and installed per the Manufacturer's requirements. The verification of this requirement must be furnished in tabular form with findings included in the test and balance report. The summary must list all equipment specified to have the protection, verification that the device is installed per the Manufacturer's recommendation and has been programmed to the Owner's requirements.
- 4.11. Test Data:** The Testing and Balancing Contractor must submit typewritten report as specified above. Include schedules of readings taken during the testing and balancing operations and a line diagram or plan of the system indicating specified quantities and final balanced quantities **seven (7) days prior to final site visit. The Alabama Department of Construction Management (DCM) will cancel on-site, the site visit if the test and balance report has not been submitted as specified. Failure to comply with this provision will be cause for cancellation of the site visit, and a reinspection fee imposed, with all costs of the re-inspection to be borne by the Contractor. No final site visit must be made without this data.** Report the required or specified reading, the first reading taken, and final balanced reading for the following items:

Fans: Size, type, fan motor speed in rpm, outlet velocity in fpm, static pressure inches water, air quantity in cfm, and motor load in amperes.

Air Handling Equipment: Size, type, fan speed in rpm, outlet velocity in fpm, external static pressure inches water, total static pressure inches water, air quantity cfm, and motor load in amperes.

All Air Outlets and Inlets: Size, velocity in fpm, and air quantity in cfm.

Coils: CFM, size, face velocity in fpm; air temperature entering coil and air temperature leaving coil, wet-bulb and dry-bulb degrees F.

Refrigerant Hot Gas Reheat Coils: The Mechanical Contractor, with assistance from the Testing and Balancing Contractor, must adjust the humidistat so that the hot gas reheat coil valve opens. Verify modulation of the coil valve. Provide coil size, face velocity in fpm; air temperature entering coil and air temperature leaving coil, wet-bulb and dry-bulb degrees F.

Ducts: Size, velocity in fpm, and air quantity in cfm.

Air Cooled Condenser Sections of All Outdoor Units: Air temperature entering condenser coil; refrigerant suction temperature and pressure at compressor and evaporator coil; condensing temperature and pressure and load amperes for all motors.

- 4.12. Control Settings:** In cooperation with the HVAC Controls Contractor and/or the Mechanical Contractor as required, must calibrate, adjust, and verify sequences of

operation and the control systems, including the refrigerant hot gas reheat coils, to show that the requirements of these specifications have been met.

Verify all specified sequences of operation and provide report.

Provide a tabulation of setting on all controls indicating set point and throttling range, etc. after controls and systems have been finally adjusted. Include settings on safety controls and cutouts. Verify that all safety settings and limits are appropriate and comply with current safety Codes and Regulations for the respective system. Provide a typed list indicating job setting of all automatic controls. Include settings of thermostats, humidity controls, CO₂ sensors, safety controls, minimum damper settings, fire-safety thermostats, pressure controls, temperature controls, and other similar items. Tabulate to show type of control, location, setting and function. Verify that all safety settings and limits are appropriate and comply with current safety Codes and Regulations for the respective system.

- 4.13. Seasonal Adjustments:** At the beginning of the first heating season adjust and balance operating phases and repeat at the beginning of the first cooling season or vice versa as requested by the Architect or Owner.
- 4.14. Notification:** Notify the Architect one week prior to all testing. The Contractor must provide all testing equipment and must furnish written reports to Architect of all tests results. Additionally, provide copies in the Bound and Framed Instructions specified hereinbefore.

PART 5. SHEET METAL DUCT WORK (LOW VELOCITY 2" S.P.)

- 5.1. General Scope:** Provide as shown and as required for the air conditioning, heating and ventilation systems. Make changes in dimensions, offsets or crossovers as necessary to clear piping, lights and structural members, and to maintain scheduled headroom. Provide all accessories required. Refer to architectural drawings and specifications.

All exposed internally lined or double wall ductwork must be paint grip finished or must be primed in the field to receive paint. Refer to Architectural section "Painting" for painting of exposed ductwork. In case of the absence of painting requirements in the aforementioned Specification Section(s), the interior and exterior of ductwork visible from any finished space must be cleaned, primed and painted with two coats of paint as directed by the Architect. Ductwork visible through all grilles, registers, diffusers, ceilings, etc. must be painted flat black with paint having a fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed as determined by ASTM E84.

- 5.2. Protection of Interior of Duct from Debris:** ALL open portions of ductwork must be covered with a self-adhesive film or airtight sheet metal caps to prevent the intrusion of contaminants. All duct taps, duct take-offs, etc., must be protected immediately after the tap, take-off, etc. has been fabricated in the field. When sections of sheet metal are delivered to the facility for fabrication in the field, which cannot be protected with the specified material, the sheet metal must be covered with Visqueen. Prior to erecting the same, ductwork must be manually cleaned to remove all dust, dirt and construction debris. All ductwork must be erected clean. After each section of ductwork is erected, immediately protect all openings as specified herein before. In effect, there must be no ductwork opening that is exposed to the ambient air. The material must be a minimum 3-mil thickness and have a minimum tensile strength of 10 psi. It must be UV resistant, waterproof and recyclable. Material must be DuroDyne Dyn-O-Wrap or approved

equivalent. **Any ductwork discovered to be unprotected as specified is subject to immediate rejection for use on this project.**

5.3. Protection of Interior Ductwork and Equipment When Any Air Moving Equipment is Operating During Construction and Prior to Owner's Occupancy:

It is the Mechanical Contractor's responsibility to ensure the inside of each air handling unit and associated air distribution system is kept clean and not allow construction dust to infiltrate the system. Should the system become contaminated as determined by Architect, Engineer or Owner, the Mechanical Contractor must be responsible for cleaning.

If air moving equipment must be used during construction, temporary filtration media with a Minimum Efficiency Reporting Value (MERV) of 8, as determined by ASHRAE 52.2 and must be installed at each return air grille, return air register, exhaust grille, exhaust register, and unit return air inlet.

The General Contractor must make a written request to the Architect for permission to temporarily operate any equipment during construction. The request must be made a minimum of seven (7) days prior to the desired date of the interruption. Do not operate any equipment without the Architect's written approval.

5.4. Sizes: Take measurements at job and fit work into available space. Report to the Architect any unworkable conditions encountered and alter layout or duct sizes as directed without additional cost to the Owner or the Owner's Project Design Professionals. Unless otherwise approved, conform to dimensions indicated. Duct dimensions shown indicate NET FREE AREA after installation of duct liner; increase sizes indicated to allow, therefore.

5.5. Sheet Metal: ARMCO, or equal, prime quality, G-90 galvanized sheet steel conforming to ASTM A653. Unless indicated otherwise on the plans, gauges must be as recommended in SMACNA "Duct Construction Standards", 4th Edition, 2021 **but in no case must be less than listed in the table below for the respective duct largest dimension or diameter. No 26 gauge ductwork is allowed unless specified otherwise.**

4 to 18 inches	24 ga.
19 to 30 inches	22 ga.
31 to 42 inches	20 ga.
43 to 84 inches	18 ga.
Over 84"	16 ga.

5.6. Acceptable Manufacturers: McGill Airflow, Southeastern Metals (SEMCO), Hamlin Sheet Metal, ECCO Manufacturing, Conklin, Spiral Systems Inc or Eastern Sheet Metal, Inc. All other manufacturers require 7-day prior approval.

5.7. General Fabrication: Construct and erect in a skillful manner, meeting requirement of the current SMACNA "HVAC Duct Construction Standards", 4th Edition, 2021 for 2" static pressure unless noted or specified otherwise. **Where conflicts occur between current SMACNA requirements and the contract drawings or these specifications, the most stringent requirements must apply. In general, the heaviest gauge metal and the strictest installation/fabrication methods must be provided.** Form straight and smooth on the inside, with joints neatly finished. Make up in sections of such length that mechanic can reach through the open end to seal insulation at previous joint. Assemble and anchor to be completely free from vibration and drumming under all conditions of operation. Make takeoffs at round ducts with factory fabricated round-to-rectangular and rectangular-to-round transitions.

All rectangular ductwork traverse joints must be made with all metal DuctMate joints system manufactured by DuctMate Industries, Inc., Quikduc Transverse Duct Connection Systems or Duro Dyne Dyn-O-Mate. DuctMate system must be installed in strict accordance with current SMACNA and Manufacturer's recommendations and instructions.

Where ductwork penetrates non-rated partitions above the ceiling or insulation support/attic air barriers, draft stops and similar partitions, the openings must be sized as required for duct and insulation, plus 2" and sealed as specified below. Provide duct supports as specified within 12" of each side of the partition penetrated.
DO NOT ALLOW DUCT TO REST ON PARTITION WALLS.

Demolish and modify existing roof, walls, floors, partitions and ceilings as required to accomplish the required work. Remove existing ductwork, valves, hangers, supports, existing piping, etc. and saw cut or core drill new and existing floors, walls, partitions, ceilings, etc., as required to install new piping, duct, etc. Do not reuse any existing hangers, supports, valves, piping, etc. All items must be new.

All penetrations of new floors and partitions are required to be built-in as work progresses. All penetrations of new construction that were not built-in as required by these specifications, and all new penetrations of existing floors, walls and partitions must be core drilled or sawcut large enough to allow all conduits, piping, ductwork, firestopping assemblies, etc., to continue uninterrupted, and to provide proper firestopping of the penetration as required to install new items as shown and/or specified.

Reconstruction and repair of the demolished/modified items must be as directed by the Architect. Coordinate demolition and repairing/rebuilding of items with General Contractor prior to bid to allow for installation of the new items as required.

Where penetration occurs at rated assemblies, provide appropriate fire damper and install as specified and detailed.

Where penetration occurs at non-rated assemblies, the maximum allowable gap/void around the duct penetration must be 2". Any penetration larger than 2" must be filled to the 2" mark using the same materials used to construct the assembly. Thereafter, the penetration between the assembly and the duct must be filled with fire resistant mineral wool insulation and sealed on both sides of the assembly with a fire stopping compound to prevent the passage of smoke and fire. After sealing, provide a 6" wide, 16 gauge galvanized steel closure plate around the penetration on each side of the assembly. Closure plates must fit snugly to the duct and must be secured to the wall. All ductwork and closure plates that are exposed to view in finished areas must be primed and painted as directed by the Architect. **Do not install closure plates until Engineer or Architect has verified the proper sealing of the penetration. If closure plates are installed prior to the Architect's or Engineer's inspection, they will be removed to verify proper sealing as specified above.**

Where ducts pass through floors that do not require fire dampers, fill void with fire retardant mineral wool insulation and seal with fire stopping material to prevent the passage of smoke and fire. Thereafter, support duct and close opening with minimum 2"x2"x1/4" steel angles on all sides and, secured to both floor and duct. At plenums and risers just above the floor, provide suitable chair assemblies of welded structural shapes. **Do not install angle iron around opening until Engineer or Architect has verified the proper sealing of the penetration.**

Provide additional supports to raise ductwork off any metallic item above the ceiling. Wherever any bare metallic piping, conduits and metallic structural members are in contact with externally insulated duct or bare sheet metal duct, there must be dielectric separation provided. The Contractor must provide 3/4" thickness, unslit AP Armaflex insulation of sufficient inside tubular diameter to snugly and completely cover the respective metallic item. The insulation must extend the full length of the affected area plus 6" on both sides. Refer to Part "Pipe Insulation and Miscellaneous Insulation Work" in this division for AP Armaflex material specification. The use of Rubatex insulation between piping and the ductwork will only be allowed when providing the proper supports is not an option.

Refer to Paragraph "Hangers and Supports" in this Section 15700 for additional requirements.

- 5.8. Exposed Ductwork:** Install tight against the wall, overhead structure or ceiling with drive slip joints and other supports as required. Refer to Architectural plans for duct locations. If duct locations are not shown on the Architectural plans, coordinate locations with the Architect prior to fabricating or installing any ductwork.

Required openings in exterior perimeter walls, and interior walls and partitions must be saw cut or properly blocked out and present a neat appearance. Where penetration occurs at rated assemblies, provide appropriate fire damper and install as specified and detailed. Where penetration occurs at non-rated assemblies, it must be installed as specified hereinbefore in Paragraph, General Fabrication.

All floor penetrations must be as specified in Paragraph "Hangers and Supports" in this Section 15700.

All ductwork and closure plates that are exposed to view in finished areas must be primed and painted as directed by the Architect. Penetrations and closure of the penetrations must be as specified above. **Do not install closure plates until Engineer or Architect has verified the proper sealing of the penetration. If closure plates are installed prior to the Architect's or Engineer's inspection, they will be removed to verify proper sealing as specified above.**

All exposed rectangular ductwork traverse joints must be made with all metal DuctMate joints system manufactured by DuctMate Industries, Inc., Quikduc Transverse Duct Connection Systems, Duro Dyne Dyn-O-Mate or approved equivalent. DuctMate system must be installed in strict accordance with current SMACNA and Manufacturer's recommendations and instructions.

All exposed internally lined or double wall ductwork must be paint grip finished or must be primed in the field to receive two coats of paint. Refer to Architectural section "Painting" for painting of exposed ductwork. In the absence of painting requirements in the aforementioned Specification Section(s), the exterior of ductwork visible from any finished space must be cleaned, primed and painted with two coats of paint as directed by the Architect.

Ductwork visible through all grilles, registers, diffusers, ceilings, etc. must be painted flat black with paint having a fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed as determined by ASTM E84.

- 5.9. Cross-Joints, Seams, Stiffening and Sealing:** Join and stiffen with combination of joint types, connectors and structural angles that are a minimum of two gauges heavier than the duct for the sizes shown as recommended in current SMACNA

"HVAC Duct Construction Standards", 4th Edition, 2021. **Cross break all flat areas over 35 inches wide.** Install internal ends of slip joints in the direction of flow.

All transverse joints with long dimension over 23" must be made with all metal DuctMate joints system manufactured by DuctMate Industries, Inc., Quikduc Transverse Duct Connection Systems or Dyn-O-Mate with roll-formed flanges, corner pieces, gasket, and cleat. The system used must be installed in strict accordance with current SMACNA and Manufacturer's recommendations and instructions.

Make all cross joints and all branch, grille and diffuser take-offs, except DuctMate joints, air tight by applying fibrated, low VOC, LEED v4 (UL 2818) compliant duct sealer. Sealer must meet and pass UL 181B-M, ASTM G21 (fungus resistant), ASTM D5590, NFPA 90A/90B and EPA/NSF/ANSI regulations. Sealer must meet the requirements for the pressure classification of the ductwork installed.

The sealant must be Hardcast Iron Grip 601, Duro Dyne Duro Seal EDS-RS, Design Polymerics DP1020 or United McGill Uni-Mastic 181.

- 5.10. Branch Ducts to Diffusers:** Round runouts to diffusers, up to and including 14" round, must be 24 ga., G-60 galvanized, DuctMate Series GreenSeam +Snap Lock pipe with factory sealed longitudinal and transverse gaskets. Gasket for GreenSeam +Snap Lock pipe must contain antioxidants, fungicides, adhesion promoters, zero VOCs and must meet or exceed ASTM E-84 test requirements. 16" round to 20" round runouts must be 24 ga. and equal to DuctMate Series Reeves Lock Pipe, G-60 galvanized pipe.

All runouts to diffusers associated with PHAC-1, PHAC-2 and PHAC-3 must be factory fabricated and insulated double wall duct and fittings and required manual volume dampers. See Paragraph Factory Fabricated Duct and Fittings below for detailed requirements.

- 5.11. Branch Duct Take-Off:** Provide at all points where branch ducts take off from trunks, and where ducts divide. Refer to details on the drawings. Damper must be minimum 22 Ga., G-90 Galvanized steel with 2" build out. Body must be a minimum of 24 Ga., G-90, galvanized steel with 4" W.G. construction. Fitting must have 1" flange with corner clips, pre-punched mounting holes and adhesive coated gasket. Take-off must be Flexmaster LDS, BO3, GSI HETO, HTS2, Elgen HETO or Crown 3300-DS2.

- 5.12. Turns and Transitions:** Fabricate turns with an inside radius equal to width of duct. At 90-degree turns, Contractor may substitute square elbows, with standard factory-made, multiple, double-blade constructed vanes. Vanes must be a double wall, true airfoil contour with smoothly rounded entry nose with extended trailing edge. Vanes must be formed from a single piece of 26 ga., hot dipped galvanized steel and must be 3" radiused vanes on 2.4" centers. Vanes must be provided with two (2) tie rods and continuous internal tubes for stiffening and rigidity. Maximum pressure drop must be .06" W.G. at 1500 FPM. Generated sound power level must not exceed 54 decibels in band 4 at 2000 FPM (24"x24" duct size). **Single wall turning vanes are not allowed.** Vanes must be manufactured by Aero/Dyne Series HEP, Duro Dyne HTV/DHV, DuctMate, Hamlin Sheetmetal or Spiral Systems Inc. Avoid abrupt changes in shape, with a slope of 4:1, the minimum allowed.

- 5.13. Volume Dampers:** For round ducts less than 12" diameter and rectangular ducts less than 12" in height in either dimension: Class 1A leakage, single leaf, blade constructed with 20-gauge galvanized metal frame and locking type control quadrant, single center U-bolt and pivot rod extending through opposite side of duct with brass bushing at both ends. Dampers must be manufactured by Ruskin MD-35, United

Enertech MD-105, Greenheck MBD-10, Nailor 0800 or Pottorff CBD-01.

- 5.14. Volume Dampers:** For round ducts greater than or equal to 12" diameter or rectangular ducts greater than or equal to 12" height in either direction, provide opposed blade, airfoil blades of 16 ga.-galvanized steel mounted in steel frames by 3/8" steel trunnions riding in brass bushing with dual U-bolts. Blade width must not exceed 10 inches and individual blade length must not exceed 48 inches. Extend one trunnion to permit operation from outside the duct. Provide manually operated dampers with cadmium plated steel locking quadrant. Dampers opening to the outside must have felt edges. Dampers must be manufactured by Ruskin MD-35, United Enertech MD-105, Greenheck MBD-15, Nailor 0810 or Pottorff CBD-01.
- 5.15. Stand-Off Mounting Brackets:** Locking-type quadrant operators for dampers, when installed on ducts to be externally insulated, must be provided with standoff mounting brackets, bases and adapters as required to provide clearance between the duct surface and the operator not less than 2" greater than the thickness of the insulation. Standoff mounting items must be integral with the operator or standard accessory of the damper Manufacturer as specified above.
- 5.16. Duct Instrument Test Holes:** Provide for each system four test holes (two in supply duct and two in return air plenum) at opposite ends near air handling units with screwed caps. In addition, at duct mounted coils and electric duct heaters provide one on either side of the coil or duct heater.
- 5.17. Flexible Connections and Bonding Jumpers:** Install so that the cloth is in folds (not drawn tight). Connect all ducts to air handling equipment and fans, except dome type fans, with preassembled flexible connection. Fabric width must be 6" for all air handling equipment. Ceiling mounted exhaust fans must be 4" width.

Connectors for all air handling equipment must be a factory fabricated and assembled unit with 6" dual fabric, heavy duty, 20 oz/sq. yd polyester/polyester fabric with flame resistant coating and mildew resistant per ASTM G-21. The assembly must comply with NFPA 701, NFPA 90A, NFPA 90B and ASTM E-84. The unit must be constructed of a minimum of 24 ga. galvanized steel meeting ASTM A-653-94-G60. Metal to fabric connectors must be double locked, airtight and waterproof to 10" W.C. positive pressure and 10" W.C. negative pressure. The assembly must be DuctMate PROflex with power lock connection or approved equivalent by DuroDyne.

Flexible connections for ceiling exhaust fans must be preassembled flexible connection of 29 ounce fire-resistant, neoprene coated glass fiber cloth equal to Ventfabrics "Ventglas" (4" fabric width) and manufactured by Ventfabrics, Wiremold or Thermaflex.

Provide preassembled flexible connections for all ducts that cross building expansion joints. Flexible connections must be 6" in width as specified hereinbefore. Coordinate requirement with Architectural plans and provide as required.

Externally insulate all flexible connectors to prevent condensation with 2" thickness external duct insulation as specified later in this section. **Do not insulate flexible connectors until the installation of the below specified bonding jumper has been verified.**

Prior to insulating, provide copper jumpers across all flexible connectors taking care that jumpers do not bind flexible connections. Provide compression lug and grounding connector screwed into the duct with two (2) screws, on both side of the

flexible connector. Bonding wire must be shielded 12 AWG.

- 5.18. Miscellaneous Bonding/Grounding of Metallic Items:** Wherever any bare metallic piping, conduit, structural elements or any other metallic assembly is in contact with externally insulated duct or bare sheet metal duct, bonding/grounding must be provided. The Contractor must provide 1/2" thickness, unslit AP Armaflex insulation of sufficient inside tubular diameter to snugly and completely cover the respective metallic item. The insulation must extend the full length of the affected area. Where channel shapes are used, orient the open side of the Unistrut assembly down. Materials that are not supported by Unistrut, sheet Armaflex may be used provided it is properly attached to the duct or affected items. Refer to Part "Pipe Insulation and Miscellaneous Insulation Work" for AP Armaflex material and installation methods specification.

- 5.19. Register and Grille Connections:** Where take-offs are in side of a duct, clinch lock short tee sections onto trunk. Install collars with slip joints and 3/4" flange at outlet end. At sheetrock and other hard surfaces, set the collars exactly flush with surface.

Install boots above lay-in ceilings simultaneously with ceiling work.

At return air, relief air and exhaust air grilles 36" or more in either dimension, collars must be 1" x 2" x 1/8 inch steel angle frames with corners mitered, welded and ground smooth. Frames in the ceiling must be independently suspended from the ceiling structure, or the duct must have special reinforcing to prevent sagging of the boot.

The interior of all ductwork visible through grilles and diffusers must be painted flat black with paint having a fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed as determined by ASTM E84.

- 5.20. Hangers and Supports:** Duct hangers must NOT penetrate the external insulation vapor barrier. All duct hanger materials must be external of the insulation materials, insulation jacket and vapor barriers. All vapor barriers must be continuous and without penetrations. All supports, assemblies, related components, attachments and required appurtenances must be sized for a minimum of 300% (3 times) the anticipated load carried by the respective assembly. Where the Contractor has doubt as to proper supporting requirements, he must consult with, and seek the guidance of, the Architect and the Project Structural Engineer.

Where duct supports are specified to be a Unistrut assembly, the Unistrut must be painted, powder coated or plastic, same as specified above and in Section 15010, Part 4, Para. Coatings and Finishes. Duct Unistrut support assemblies of galvanized, zinc and similarly coated items are considered to **NOT** be coated. All must be painted, powder coated, epoxy or plastic coated. Hanger rods and associated bolts, and clamps on Unistrut assemblies are not required to be painted.

All paint and coatings must have a fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed as determined by ASTM E84.

"Sammy" bolts are prohibited. Contractor must provide supplemental steel between structural purlins, bar joists, etc., for duct support as required to meet support spacing specified. Supplemental steel must be welded in place as directed and specified by the Structural Engineer. Support small (less than 40 united (w+h) inches) horizontal ducts without external insulation with 1-1/4" x 20 ga. band hangers. Provide in pairs close to each transverse joint and in no case more than six feet

apart. Bands must be turned 3" under the lower corner of ductwork and fastened with one (1) self-tapping screws into the bottom of the duct surface. Bands must be attached up the sides of the ductwork at a maximum of 6" intervals and in the bottom of the duct. Seal all screws with duct sealer as specified for ductwork.

Support vertical runs larger than 40 united (w + h) inches with structural brackets with welded joints.

Support all non-externally insulated horizontal ducts larger than or equal to 40 united (w+h) inches **NOT** associated with PHAC-1, PHAC-2 AND PHAC-3 on trapeze type hanger assembly same as specified below for externally insulated duct except without AP Armaflex surround on the Unistrut. Spacing must not exceed 8 feet. Note that supports associated with PHAC-1, PHAC-2 and PHAC-3 will require the Armaflex surround on the Unistrut assembly.

All 14" or less concealed round ducts with external insulation must be provided with band hangers and saddles. Suspend ducts, at six (6) foot intervals with 8" long, 3" wide, 22 gauge galvanized metal saddles hung from structure with 22 gauge, 1" wide straps. Bands must pass completely under and around round ducts. Loop strap under duct and attach to strap with two (2) galvanized bolts. Thereafter, loop top end of hanger over steel structural members above and fasten with two (2) galvanized bolts. Where concrete joists occur overhead, secure straps to side of joist with galvanized expansion or ramset bolts. Where flat concrete surface occurs overhead, secure with ramset or expansion bolt fasteners. See other Specification Sections in the Contract Documents for limitations on use of power driven fasteners.

All concealed and externally insulated rigid round metal ducts greater than or equal to 16", all externally insulated rectangular ductwork, all externally insulated square ductwork, and all externally insulated flat oval ductwork that is specified to have external insulation with a vapor sealed facing **must be supported with trapeze hangers consisting of Unistrut, threaded rods and inserts or clamps as required to accommodate overhead construction.** Threaded rods must be of size required to provide support of three (3) times the anticipated load of the assembly. Trapeze hanger assembly spacing must not exceed 8 feet. Hanger rods must not be in contact with external duct insulation nor metal duct work.

Where ducts are specified to have external insulation with a vapor sealed facing or ducts associated with PHAC-1, PHAC-2 and PHAC-3, support duct on trapeze hangers consisting of a Unistrut assembly, Armaflex and threaded rods.

Externally insulated ducts and internally insulated ducts associated with PHAC-1, PHAC-2 and PHAC-3, install 3/4" thickness, unslit AP Armaflex insulation of sufficient inside tubular diameter to slide over the Unistrut support, completely cover and snugly fit to the bottom horizontal Unistrut duct support. The AP Armaflex insulation must extend the full width of the insulated/uninsulated duct plus a minimum of 6", each side. Space hanger rods a minimum of 6" (maximum of 12") from the sides of the ductwork to permit the duct to be placed within the trapeze hanger assembly without being in contact with the externally insulated ductwork or bare metal ductwork. Where channel type Unistrut shapes are used, orient the open side, down. Refer to Part "Pipe Insulation and Miscellaneous Insulation Work" for AP Armaflex material and installation methods specification.

All concealed internally insulated round ducts associated with PHAC-1, PHAC-2 and PHAC-3 must be supported as specified above for externally insulated ductwork. All other concealed internally insulated round ducts must be supported as specified above for externally insulated ductwork except without insulation saddle. Coordinate

duct support requirements with plan details.

Wherever any duct hanger support exceeds 36" length from the top of the supported duct to the structure above, do not use band hangers. The Contractor must provide a Unistrut support assembly and provide bracing of the assembly with minimum 1"x1"x1/4" angle iron, or as required for the weight of the particular duct, to prevent swaying of the duct work. Weld angle iron to the Unistrut and attach to the overhead structure, as specified and directed by the Structural Engineer, to prevent swaying.

Where ducts pass through floors, fill the void with fire retardant mineral wool insulation and seal with fire stopping material to prevent the passage of smoke and fire. Thereafter, support duct and close opening with minimum 2"x2"x1/4" steel angles on all sides and, secured to both floor and duct. At plenums and risers just above the floor, provide suitable chair assemblies of welded structural shapes. **Do not install angle iron around opening until Engineer or Architect has verified the proper sealing of the penetration.**

Where the ducts rise at the outside walls, the contractor must provide a welded chair assembly, required support, attachments, related and required appurtenances. The duct riser at the outside wall must maintain a distance between the wall and the finished insulated assembly as required to insulate the back side of the ductwork.

Where trapeze type hangers or DuctMate is used to support exposed ductwork in finished areas, the width of the support must not exceed the duct width by more than six (6) inches on either side of the duct.

- 5.21. Roof Exhaust Caps:** For exhaust ducts up to and including 12x12, must be low profile, sloped, galvanized steel construction with built-in bird screen, integral flashing flange and all accessories required for a complete installation. The cap must be Greenheck Series RJ, Gemini RJ, Fantech RC or equivalent as required for sloped shingle roofs. Provide similar device for standing seam metal roofs or flat roofs as required by the roofing Manufacturer. All items furnished must adhere to roofing Manufacturer's requirements so as not to void the roofing warranty. Hoods must be factory primed for painting in the field or factory baked enamel finish as selected by the Architect.

- 5.22. Flexible Air Ducts:** Flexible air duct must be factory made and composed of an inner duct of woven and coated fiberglass providing an air seal and permanently bonded to coated steel wire helix, a fiberglass insulating blanket and low permeability outer vapor barrier of fiberglass reinforced metallized film laminate. R-value must be a minimum R=8 per ASTM C-518.

Duct must be rated for a maximum pressure of 16" (4-10 in. ID) or 10" (12-16 in. ID) water column positive and 2" water column maximum negative pressure and 5000 FPM maximum velocity and Listed by Underwriters Laboratories, Inc., under UL Standard 181 as a Class 1 air duct and complying with NFPA Standards 90A and 90B. Duct must have a maximum flame spread of 25 and a maximum smoke developed rating of 50.

Flexible duct length must not exceed six (6) feet. Supply each duct with 1/2" wide, 200 Series **stainless steel worm gear driver and stainless steel band** at take-off fitting and supply fixture connections equal to Thermaflex Snaplock clamp. Zip tying is not allowed.

Suspend ducts, at three (3) foot intervals with 8" long, 3" wide, 22 gauge galvanized metal saddles hung from structure with 22 gauge 1" wide straps. Loop strap under

duct and attach to strap with two (2) galvanized bolts. Thereafter, loop top end of hanger over steel structural members above and fasten with two (2) galvanized bolts. Branch duct connectors for connecting round low velocity branches to rectangular low velocity trunks must be factory fabricated rectangular to round or round to rectangular (as applicable) take-off fittings as detailed on the drawings with damper and standoff mounting bracket.

Provide a full size radiused, 90 degree galvanized sheet metal elbow transition piece from flexible duct connection to each diffuser boot/neck. Where conditions in the field do not allow for 90 degree elbow, a 45 degree full size radiused elbow may be used. Note that this provision to use a 45 degree full radiused elbow must not be used when a 90 degree elbow can be otherwise provided. Elbow gauge must be as specified hereinbefore in Part, "Sheet Metal Ductwork" for respective duct size.

Seal all joint connections as specified.

The flexible duct must be GreenGuard Level 4 certified, Thermaflex M-KE, ATCO UPC #031 or Flexmaster Type 1M.

- 5.23. Factory Fabricated Duct and Fittings:** All supply air ducts and fittings associated with PHAC-1, PHAC-2 and PHAC-3 must be factory fabricated and insulated duct and fittings must be equal to McGill Airflow K27 with metal perforated inner shell. Duct to duct joints in diameters up to 48", and 42" major axis and 24" minor axis must be by the use of sleeve couplings, reinforced by rolled beads. All duct-to-duct connections or duct to fitting connections for exposed double wall ductwork, regardless of size, must be provided with factory-fabricated couplings to provide a neat, smooth appearance tack welds and rated for 2" static pressure. All divided flow fittings must be manufactured as separate fittings, not as tap collars welded into spiral duct sections. Refer to plan details for 90° and/or 45° duct required at each diffuser neck. Do not cut the duct in the field for take-offs, etc. without approval from the Architect or the Engineer.

Insulation must be Acousti-Line with EPA registered anti-microbial, erosion-resistant acrylic coating. The coating must resist the growth of fungus and bacteria as determined by ASTM C 1071, ASTM G21 and ASTM G22. The insulation thickness must be 2" thickness where. Ductwork must comply with NFPA 90A.

Provide as shown and as required for the air conditioning, heating and ventilation systems. Make changes in dimensions, offsets or crossovers as necessary to clear piping, lights and structural members, and to maintain scheduled headroom. Provide all accessories required.

Construction and installation must comply with current SMACNA Standards. Required duct gages must be same as specified in Part Sheet Metal Duct Work (Low Velocity 2" S.P.) with minimum 24 ga. required. Where conflicts occur between current SMACNA requirements and the contract drawings or specifications, the most stringent requirements must apply. In general, the heaviest gauge metal and the strictest installation/fabrication methods must be provided.

All duct-to-duct connections or duct to fitting connections for exposed double wall ductwork, regardless of size, must be provided with factory-fabricated couplings to provide a neat, smooth appearance. All factory-fabricated ducts must be shipped from the factory with factory installed heavy duty protective plastic to cover duct and all openings.

Where ductwork is indicated or specified to be exposed to view in occupied spaces, provide materials which are free from visual imperfections, including pitting, dents and other imperfections including those which would impair post painting. Exposed to view ductwork must be as outlined above. Any ductwork installed, which is damaged, must be replaced at no cost to the Owner, at the discretion of the Architect.

Provide additional supports to raise ductwork off any metallic item or as a minimum, provide Rubatex insulation between ductwork and the respective metallic item. The use of Rubatex insulation between piping and the ductwork will only be allowed when providing supports is not an option.

Refer to architectural drawings and specifications. Refer to Architectural section "Painting" for painting of exposed ductwork. In case of the absence of painting requirements in the aforementioned Specification Section(s), the interior and exterior of ductwork visible from any finished space must be cleaned, primed and painted with two coats of paint, as directed by the Architect. Ductwork visible through all grilles, registers, diffusers, ceilings, etc. must be painted flat black with paint having a fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed as determined by ASTM E84.

Acceptable Manufacturers are McGill Airflow, Southeastern Metals (SEMCO), Hamlin Sheet Metal, ECCO Manufacturing or Eastern Sheet Metal, Inc. All other manufacturers require 7-day prior approval.

PART 6. DUCT INSULATION WORK (EXTERNAL)

6.1. General: The Mechanical Contractor must not install external duct insulation.

All external duct insulation work must be provided by an independent third party licensed and experienced Insulation Subcontractor whose primary business is the sale and installation of insulation materials in accordance with insulation manufacturers' requirements and these specifications.

Factory fabricate double wall duct, and fittings do not require external insulation except as specified for the exterior ductwork from the packaged units to the respective duct chase. See Paragraph 6.8 below for external insulation required for exterior ductwork.

The Insulation Subcontractor must provide a complete insulation submittal on his company letterhead detailing materials and methods as specified. **The Mechanical/HVAC submittal will be automatically rejected** and not reviewed without a submittal from the required Insulation Subcontractor.

Where a conflict exists between these specifications and the Manufacturer's requirements, the strictest installation must be provided.

The finished insulation system must provide complete thermal barrier throughout the equipment and air distribution system, including effective and durable vapor barriers and vapor stops for any system or condition potentially subject to condensation. An insulation system must be provided to prevent condensation or potential thereof, to prevent the transmission of water vapor into the insulation system (vapor barriers), and to prevent transmission of water vapor within the insulation system should vapor barrier compromises occur during operation and/or maintenance of the building (vapor stops).

The duct must be clean, dry, sealed and pressure tested before covering is applied. Cover flexible connections with insulation material as hereinafter specified to same thickness as adjacent duct. Install insulation with longitudinal seams at top and bottom of horizontal runs. Install multiple layers of insulation with longitudinal and end seams staggered. All insulation materials, coatings and mastics must be fire resistive per NFPA Pamphlet No. 90, ASTM C 411, must be UL listed and must have a fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed as determined by ASTM E84, NFPA No. 255 or UL 723.

Refer to Section Sheet Metal Ductwork, Paragraph "Hangers and Supports" in this Section 15700 for additional requirements and for miscellaneous insulating requirements for externally insulated ductwork.

- 6.2. Material:** Provide GreenGuard certified glass fiber duct insulation with reinforced foil kraft laminate jacket, formaldehyde-free.

All **supply air and return air ducts** located in the attic or outside the building insulation envelope must be provided with a total of 3.5" thickness external insulation, in addition to the specified acoustical liner. The first layer must be **1.5" thickness, 0.75 lb. density, without reinforced foil kraft laminate jacket** and with characteristics specified above. The second layer must be **2" thickness, 1.5 lb. density, with reinforced foil kraft laminate jacket** and with characteristics specified below. When using this requirement, the insulation sub-contractor may use bare stainless steel wire or a single strip of FSK tape to hold the butt joints of the first layer together until the second layer of insulation is installed.

OPTION: In lieu of providing two layers of insulation for supply and return air ducts as specified above, the Contractor may substitute one layer of 4.25" thickness, 0.75 lb. density **with reinforced foil kraft laminate jacket** with characteristics specified below.

All **supply air and return air** ductwork located above the ceiling within the building insulation envelope and below the ASHRAE required air barrier, in chases and other similar areas, but not in the attic, or outside the building insulation envelope, must be provided with **2" thickness, 1.5lb. density, duct wrap with reinforced foil kraft laminate jacket** as specified below. Note that this requirement does not apply to ductwork that is exposed to view in finished areas. Refer to internal duct insulation requirements for duct exposed to view in finished areas.

All **exhaust air** ductwork must be provided with **1.5" thickness, .75lb. density, with reinforced foil kraft laminate jacket** as specified below.

Thermal conductivity for **1.5" thickness** per ASTM C-518, **0.75 lb. density** must be not less than $k=0.27 \text{ BTU}\cdot\text{in}/(\text{hr}\cdot\text{ft}^2\cdot^\circ\text{F})$ and minimum installed $R=4.2$ at 75°F mean temperature with test based on material thickness compressed 25%.

Thermal conductivity for **2" thickness** per ASTM C-518, at its rated thickness, and **1.5 lb. density** must be not less than $k=0.24 \text{ BTU}\cdot\text{in}/(\text{hr}\cdot\text{ft}^2\cdot^\circ\text{F})$ and minimum installed $R=6.3$ at 75°F mean temperature with test based on material thickness compressed 25%.

Thermal conductivity for **4.25" thickness** per ASTM C-518, **0.75 lb. density** must be not less than $k=0.27 \text{ BTU}\cdot\text{in}/(\text{hr}\cdot\text{ft}^2\cdot^\circ\text{F})$ and minimum installed $R=12.0$ at 75°F mean temperature with test based on material thickness compressed 25%.

See "Duct Insulation (Internal)" for internal acoustical insulation required in addition to the external insulation specified hereinbefore.

- 6.3. Thickness:** Toilet/shower and janitor closet/housekeeping exhaust ducts, louver and brick vent plenums, back panels of ceiling diffusers, ceiling return air, ceiling relief air and ceiling exhaust air registers and grilles: 1.5" thickness, 3/4 lb. density with reinforced foil kraft laminate jacket. All other locations: Minimum 2.0" thickness and density specified above with reinforced foil kraft laminate jacket. Coordinate with variations specified above for additional layers or 4.25" thickness and provide as required.

See limits of acoustic insulation in Part Duct Insulation Work (Internal) below. Where duct board is specified within the mechanical rooms, external duct wrap insulation is not required.

- 6.4. Manufacturer:** Johns-Manville Micro-Lite EQ, Type 150 or Type 75 with thickness and density as specified above. Equivalent material from Knauf, Schuller, Owens Corning or CertainTeed will be accepted.

- 6.5. Ducts to be Insulated Externally:** Supply air and return air ducts including ducts with acoustical liner and not associated with PHAC-1, PHAC-2 and PHAC-3, toilet/housekeeping/janitor closet areas exhaust ducts, louver and brick vent plenums, short branch duct collar connections to grilles, registers and diffusers, all flexible canvas connectors and exterior rim/cone/panel of all ceiling diffusers, ceiling exhaust grilles and registers and ceiling return registers and grilles.

Factory fabricated and insulated supply air ducts and fittings do not require external insulation unless they are located outside of the building insulation envelope or in the attic.

Single wall return air ducts with 2" thickness acoustical liner throughout the entire return air duct system associated with PHAC-1, PHAC-2 and PHAC-3 do not require external duct insulation unless they are located outside of the building insulation envelope or in the attic.

See Part "Duct Insulation Work (Internal)" for sound attenuating insulation requirements of externally insulated ductwork.

Do not externally insulate flexible canvas connectors until installation of the specified bonding jumper has been verified by the Engineer or the Authority having jurisdiction. If insulated at the time of the site visit, the insulation will have to be removed to verify the proper installation.

- 6.6. Application:** Sheet metal duct must be clean, dry and tightly sealed at all joints and seams before applying duct wrap. Installation must be in strict accordance with the Manufacturers recommendations and these specifications. Adhere insulation to sheet metal with a brush or roller in manufacturer recommended workable sections with a water based, LEED compliant, low VOC liquid, not spray, insulation bonding adhesive. Wrap insulation tightly on the ductwork with all circumferential joints butted and longitudinal joints overlapped a minimum of 2". The 2" flange of the facing must be secured using 9/16" flare-door staples applied 6" on center and taped as specified hereinafter. On longitudinal joints, the overlap must be secured using 9/16" flare-door staples applied 6" on center and taped as specified hereinafter. For rectangular ducts wider than 23", additionally support insulation with weld pins and speed clips 18" on center with a minimum of two pins and washers for each section.

The liquid adhesive must be UL-723, ASTM E-84, NFPA 90A and 90B, LEED and ASTM C916 compliant, low VOC, moisture and mildew-resistant with suitability for high-humidity environments. The liquid adhesive must be Design Polymeric DP 2502, Foster 85-60, Vimasco 581 or Childers Chil-Quik CP-127.

Stop and point insulation around access doors and damper operators to allow operation without disturbing duct wrapping. Insulate standing seams and stiffeners that protrude through the insulation with 2" thick, faced, flexible blanket insulation.

Vapor seal all seams, joints, pin penetrations, other breaks, circumferential and longitudinal joints with reinforcing mesh and coat with vapor barrier facing. Mesh must be **4" wide pre-sized glass cloth** adhered and finished with two (2) coats of UL 181A-M compliant for sheet metal and duct board applications and UL 181B-M compliant for flexible ducts and flexible connectors. The sealant must be McGill Uni-Mastic 181, Hardcast Versa-Grip 181, Vimasco Vima-Seal 749 or Childers Chil-Tuff CP-181, vapor barrier coating as required to completely cover the mesh. Fiberglass cloth must be Great Lakes Textiles Style GL1658, 20x10 thread count per square inch, 0.004-inch thickness and 1.60 oz. /sq. yd., Childers Chil Glas #10 glass mesh, Foster Mast-A-Fab polyester mesh or equivalent product by 3M. **No FSK or any metallic tape will be allowed.**

Any externally insulated duct with metallic vapor barrier that is in contact with metallic piping, conduits or metallic structural members must be provided with a section of Rubatex insulation between ductwork and the metallic member. Rubatex must be 3/4" thickness, AP Armaflex insulation of sufficient inside tubular diameter to slide over, completely cover and snugly fit the contacted item. The insulation must extend the full width of the duct plus a minimum of 6", each side of the duct. Refer to Part "Pipe Insulation and Miscellaneous Insulation Work" for AP Armaflex material and installation methods specification. The use of AP Armaflex insulation between piping and ductwork will only be allowed when raising the effected duct is not an option.

6.7. Insulation Pins and Washers: The use of adhesives for attaching pins and washers to the ductwork is prohibited. Pins must be cupped-head, capacitor-discharge-weld pins, zinc-coated steel pin, fully annealed for capacitor-discharge welding, 0.135 inch diameter shank, length to suit depth of insulation specified with integral 1-1/2 inch galvanized carbon-steel washer. Insulation retaining washers must be self-locking type formed from 0.016-inch thick galvanized steel with beveled edge sized as required to hold insulation securely in place but not less than 1-1/2 inches in diameter.

6.8. Ducts From Outdoor Packaged Equipment to Point Inside Building/Chase: Must be insulated externally (in addition to duct liner) with 2" thickness, 4.25 lb. density, R=9.1 duct board equal to Owens-Corning Series 815 Spin-Glas. Protect external insulation with open weave glass or polyester cloth by Johns-Manville Duramesh, Childers Chil Glas #10 or Foster Mast-A-Fab, embedded between two 1/8" coats of Foster 60-91 (gray) Monolar Mastic or Childers Encacel X-1 (gray). After insulating, cover all ductwork with 24 ga. cross-broken or beaded prefinished Kynar 500 sheet metal and slope to drain away from the building and to sides of ductwork with so as not to discharge rain water to the supply and return air connections of the unit. Provide a trough as required. Sheet metal cover must be cross broken or beaded. **The Architect must select color.**

PART 7. DUCT INSULATION WORK (INTERNAL)

- 7.1. **General:** All work by experienced applicators in accordance with Manufacturer's recommendations and these specifications. Where a conflict exists between these specifications and the Manufacturer's recommendations, the strictest installation must be provided.

Duct liner, mastics and materials must comply with all requirements and other building code requirements. All insulation materials (coatings and mastics) must be fire resistive per NFPA Pamphlet No. 90A and 90B and must be UL listed and must have a fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed as determined by ASTM E84. Liner materials must conform to the performance based ASTM C1071, which includes ASTM C518 Thermal Conductivity, ASTM C411 Temperature Resistance, ASTM C665 Corrosiveness, ASTM E84 Surface Burning Characteristics, ASTM C1338 Fungi Resistance, ASTM C1304 Odor Emissions and ASTM C1104 Moisture Vapor Sorption.

- 7.2. **Material:** Liner must be a GreenGuard certified, low VOC, Type I liner as defined by ASTM C1071 and characteristics complying with ASTM E 84, UL 723, NFPA 255, NFPA 259 and ASHRAE 62. It must have an acrylic coating formulated with an immobilized, EPA registered, protective agent to protect against growth of fungi and bacteria as required by ASTM C1071 and tests conducted in accordance with ASTM C 1338, ASTM G21 and ASTM G 22. It must not support microbial growth and have glass fibers bonded with a thermosetting resin. The airstream surface must be protected with a reinforced coating with flexible glass cloth reinforcement. The liner must have a reinforced factory applied edge coating and operate in an environment of a maximum of 250°F and maximum of 6,000 fpm air velocity. Thermal conductivity per ASTM C-518, at its rated thickness, must be not less than $k=0.16 \text{ BTU} \cdot \text{in} / (\text{hr} \cdot \text{ft}^2 \cdot ^\circ\text{F})$ and $R=6.3$ at 75 F mean temperature in accordance with ASTM C18. Sound absorption coefficients for the liner must be per ASTM C 423 and ASTM E 795 test methods and the table below. **Furnish sound characteristics for review with the material submittal.**

Sound Absorption Coefficient at Frequency

Thickness (In)	(Cycles per Second)						NRC
	125	250	500	1000	2000	4000	
2.0	0.25	0.66	1.00	1.05	1.02	1.01	0.95

- 7.3. **Manufacturer:** Must be Johns Manville Linacoustic RC or equivalent material by Schuller, Knauf, Pittsburgh, CSG, Owens Corning or CertainTeed.
- 7.4. **Acoustical Duct Lining:** Line the first ten (10) linear feet of all single wall, supply air and return air ducts associated with PHAC-4 and transfer air (jumper and ATD) ducts with insulation equal to Johns Manville Linacoustic RC and 2.0" thickness.

All return air duct work associated with PHAC-1, PHAC-2 and PHAC-3 must be provided with insulation equal to Johns Manville Linacoustic RC and 2.0" thickness.

Sound absorption characteristics must be as specified above.

- 7.5. **Application:** Sheet metal duct must be clean, dry and tightly sealed at all joints and seams before applying duct installation. Installation must be in strict accordance with the Manufacturers recommendations and these specifications. Adhere insulation to

sheet metal with a brush or roller in manufacturer recommended workable sections with a water based, LEED compliant, low VOC liquid, not spray, insulation bonding adhesive. Adhere insulation to the manufacturer's recommended workable section of the sheet metal surface prior to breaking the sheet metal. Cutting of the insulation and then adhering the insulation to the sheet metal is prohibited. Insulation joints must be straight and smooth and must be buttered with the specified adhesive to prevent erosion and improve airflow. The product must have a factory applied edge coating to assure sealing of transverse edges per current SMACNA and NAIMA installation standards. Secure all insulation on ducts wider than 23 inches with washers or stud pins and clips 16 inches on center, each way.

The liquid adhesive must be a premium, water-based, brush/roller applicable adhesive designed for bonding fibrous insulation (e.g., fiberglass duct liner) to the interior of HVAC ductwork. It must be UL-723, ASTM E-84, NFPA 90A and 90B, LEED and ASTM C916 compliant, low VOC, moisture and mildew-resistant with suitability for high-humidity environments.

Sealing exposed portions of the insulation joints and damage to the liner must be repaired using the specified adhesive products following recommendations provided by the Manufacturer of the adhesive.

Adhesive must be Design Polymerics DP 2502 Duct Liner and Insulation Adhesive, Childers Chil-Quik CP-127 or Foster Quick-Tack 85-60 Duct Liner Adhesive.

- 7.6. Metal Nosings: All exposed leading and trailing edges must be secured with sheet metal nosings to protect insulation edges.** Metal nosings must be securely installed over all transversely oriented liner edges facing the airstream at forward and rear discharge towards coils, dampers, ducts, plenums, changes of insulation thicknesses of adjoining insulation, any exposed insulation ends and at any point where lined duct is preceded by unlined duct. See detail on the plans. All remaining miscellaneous exposed edges must be sealed/coated. There must be no exposed fiberglass insulation.

PART 8. REGISTERS, GRILLES AND DIFFUSERS

- 8.1. General:** All grilles, registers and diffusers must be product of a single Manufacturer with baked enamel finish and standard **or** custom color as selected by the Architect. Architect may require painting of the diffusers, grilles, registers, etc., in the field. Where field painting is required, diffusers, grilles and registers must be factory primed for painting in the field. Refer to Architectural Section "Painting", coordinate requirements and provide finish as required.

Where lay-in ceilings occur, all specified items must have integral 2' x 2' or 2' x 4' aluminum modular lay-in ceiling panel with finish to match diffuser. Refer to Architectural reflected ceiling plan, check ceiling suspension system, wall and ceiling finishes and provide for proper interface as required.

All ceiling grilles, registers and diffusers not in integral lay-in metal panels and installed in gypsum board or other hard surfaces must be mounted with aluminum-countersunk screws with finish to match respective items.

Where ceiling mounted devices are installed in hard ceilings, provide appropriate trim ring as required such that screws are not visible in the face of the device. Flat countersunk screws are only allowed when concealing them is not an option.

All ceiling diffusers, ceiling return air registers and grilles, ceiling exhaust grilles and registers, and ceiling mounted relief air grilles back panels must be insulated with 1" thickness, foil backed insulation and securely attached. Contractor has the option of insulating manually or furnishing the item with factory furnished insulation from the item Manufacturer. Factory provided insulation must be attached as shown on the plan details.

All grilles, registers and diffusers must be ADC or approved equivalent Agency certified.

- 8.2. **Square Ceiling Diffusers with Round Neck:** Titus Model TMSA-AA, Price ASCDA, removable core type, aluminum construction, with baked enamel standard or custom finish color selected by the Architect, designed for four-way diffusion complete with Titus AG-85, Price VCR8E steel butterfly blade damper. Diffuser face must be 24" x 24" with type frame to interface with ceiling system. Use lay-in type frame where lay-in ceilings occur. Refer to the plans and note that all ceiling diffusers for the stage area are to be provided with black factory baked on enamel finish. The specified AG-85 butterfly dampers are not required behind the ceiling diffusers serving the PHAC-1, PHAC-2 and PHAC-3 systems.
- 8.3. **Square and Rectangular Neck Ceiling Diffusers:** Titus Model TDCA-AA 6-95-125-25, Price Model AMDA-6-3LAL, removable core type, extruded aluminum construction, with baked enamel standard or custom finish color selected by the Architect, designed for one, two, three and four-way diffusion as indicated on plans, complete with AG-95 aluminum opposed blade damper, AG-125 Dua-Trol and adjustable vanes.
- 8.4. **Wall Return Air and Wall Exhaust Air Registers:** Titus Model 33R-PF, Price Model 91-L-D-A-VCS3 gymnasium heavy duty steel register with 38 degree deflection 14 ga. blades, support bars on 6" centers, Allen key operated aluminum opposed blade damper and auxiliary mounting frame for all 48" or less in size, with baked enamel standard or custom finish color selected by the Architect. Refer to plans and note that all wall return air registers on the stage area are to be provided with black factory baked on enamel finish.
- 8.5. **Wall Mounted Transfer Air / Wall Mounted Exhaust Air Grilles:** Same as wall return air registers except without dampers.
- 8.6. **Ceiling Mounted Exhaust Air and Return Air Registers:** Titus Model 50-F-0-5-D-25, Price Model 80DAL-F-SW-A all-aluminum fabricated egg-crate type, Allen key operated aluminum opposed blade damper and lay-in type frame with baked enamel standard or custom finish color selected by the Architect.
- 8.7. **Ceiling Mounted Return Air or Exhaust Air Grilles and Air Transfer (Jumper Duct) Grilles:** Same as return air registers except without dampers.
- 8.8. **Linear Ceiling and Sidewall Supply Air Diffusers:** Titus Model ML, Price Series SDS with 3/4" slots, extruded aluminum construction, complete with all accessories including MP-SP pattern controller, flanged border and concealed mounting (no visible screws), Type X end border, end caps, type MC mitered corner as required. Refer to Architectural ceiling plans and ceiling specifications and coordinate frame types, etc. and provide as required for proper installation for the respective ceiling type.

Diffusers must be provided with Titus Series Type MPI, Price Series UP factory fabricated and insulated air plenum supply. Insulation must be minimum 1" thickness

and be factory coated to prevent erosion. Diffuser plenum must be provided with G-90 galvanized sheet metal, factory fabricated duct fitting for proper connection to the plenum.

Provide concealed mounting for all diffusers/registers located in gypsum board or other hard surfaces. Exterior finish, including frame and screws, must be baked enamel standard or custom finish color selected by the Architect. The interior finish must be flat black and must have a fire hazard rating not to exceed 25 for flame spread and 50 for fuel contributed and smoke developed as determined by ASTM E84.

- 8.9. **Manufacturers:** Equivalents by Titus, Price, Metalaire and Krueger will be accepted. Titus and Price are basis of design.

PART 9. CONDENSATE DRAINAGE PIPING

- 9.1. **General:** Cut accurately to measurements established at site and work into place without springing or forcing, properly clearing all building features. Arrange and install piping systems sizes as shown, as close as practical, straight, properly supported and run as directly as possible forming right angles or running parallel with building lines, true to line and grade, free of sags and bends. Locate piping as high as practical and in parallel groups as close together as practical. Route through previously built-in sleeves and avoid cutting or other weakening of the structure. Ream all pipes to remove burs. Make changes in direction and size with fittings. Bushings are prohibited. Cap or plug open pipe ends during installation to keep out foreign material.

Before installation, piping must be checked, upended, swabbed, and all dirt from storage or from lying on the ground must be removed. **All piping must be clean when it is installed.**

Make all connections to equipment using screwed unions. Install unions in all piping connections to each piece of equipment, including traps, pumps, coils, etc. **Per IMC 307.2.5, condensate drain lines must be configured to permit the clearing of blockages and performance of maintenance without requiring the drain line to be cut.** Refer to plan details for detailed requirements of the assembly.

All piping must be concealed within walls, chases, above ceilings, etc., unless specifically noted otherwise.

- 9.2. **Condensate Drain Piping and Drain Piping from All Drain Pans to Floor Drains; Hub Drains and Other Miscellaneous Condensate Receivers:** Interior condensate drainage piping material must be Type L hard copper tubing with wrought copper solder joint fittings with 45° or 90° offset fittings. **ProPress or similar type fittings/joints are not allowed.**

Outdoor condensate drainage piping must be Schedule 80 solid wall PVC pipe conforming to ASTM Standard D1785. Schedule 80 fittings must be injection mold and must conform to ASTM D 2464. Pipe and fittings must be manufactured from virgin rigid PVC (polyvinyl chloride) vinyl compounds with a cell class of 12454 as identified in ASTM D 1784. PVC Schedule 80 pipe must be Iron Pipe Size (IPS) conforming to ASTM D 1785. Injection molded PVC Schedule 80 fittings must conform to ASTM D 2467. PVC Schedule 80 threaded fittings, where specified, must conform to ASTM D 2464. Pipe and fittings must be manufactured as a system and be the product of one manufacturer. All pipe and fittings must conform to NSF

International Standard 61 and the health effects portion of NSF Standard 14. Installation must comply with the latest installation instructions published by the piping manufacturer and must conform to all applicable plumbing, fire, and building code requirements. Solvent cement joints must be made in a two-step process with a primer meeting ASTM F 656 and a medium- or heavy-bodied solvent cement conforming to ASTM D 2564. The system must be protected from chemical agents, fire-stopping materials, thread sealant, plasticized vinyl products or other aggressive chemical agents not compatible with PVC compounds. The system must be hydrostatically tested after installation as specified hereinbefore. All Schedule 80 piping and fittings must have factory applied UV protective coating and tested for sunlight resistance according to UL 651 requirements.

All cooling coils and evaporator coils horizontal condensate drainage piping must be sloped a minimum of 1/8" per foot. The condensate drain line size must be full size of unit condensate outlet and in no case, less than 3/4 inch.

The condensate drainage assembly must be made up of materials specified above. The assembly must consist of p-trap, unions, air bleeder/open vent with 1/8" screen over open portion, etc., as required by the equipment Manufacturer. **Running p-traps are not allowed.**

Ductless mini-split equipment that produces condensate shall be provided with an inline check valve located in the drain line or a trap as required by IMC 307.2.4.1.

In absence of the Manufacturer's requirements, condensate drainage assembly must be as shown on the plans. **Per IMC 307.2.5, condensate drain lines must be configured to permit the clearing of blockages and performance of maintenance without requiring the drain line to be cut.** Refer to the details on the plans and the requirements below for unions required in the condensate piping.

Install a UL 508 and UL 2043 (as applicable) conforming electric switch in the secondary drain line of each condensate producing piece of equipment. The switch must automatically shut off the equipment served in the event the primary drain line becomes restricted.

- 9.3. Copper Joints:** Make assemblies with tin-antimony (95-5) solder and non-corrosive flux (this does not apply to refrigerant piping). Clean and polish the tube and the inside of the fittings, using No. 60 steel wool. Apply flux and place fitting on the tube. Heat joint evenly but take care not to overheat fitting. Apply solder until a solder line shows completely around the joint. Remove surplus solder and allow joint to cool. **ProPress or similar type fittings/joints are not allowed.**
- 9.4. Escutcheons:** Where pipes pass through cabinets, walls and ceilings of finished rooms provide one-piece, cast-brass type with polished, chrome-plated finish and setscrew fastener or stainless steel type securely fastened in place. Pack penetrations with mineral wool insulation, seal with firestopping compound and install escutcheons to prevent passage of fire, smoke and vermin. Do not use split ring type escutcheons.
- 9.5. Unions:** Unions must be of the following types:
- Copper Lines:** Ground joint, copper to copper.
- Schedule 80 PVC:** Solid wall PVC schedule 80 DWV pipe and fittings as specified hereinbefore.

Dielectric Unions: Provide where copper pipe joins to steel pipe, EPCO or approved equivalent. Contractor must provide a globe valve on each side of each dielectric union to allow for replacement of the union.

9.6. Expansion: Provide for expansion and contraction of all piping and make proper provisions so that there must be no undue strain on any pipe or equipment.

9.7. Sleeves: Refer to Section 15010, Pipe Sleeves.

PART 10. REFRIGERANT PIPING AND ACCESSORIES

10.1. General: All refrigerant piping must be identified. **Note that refrigerant piping will require custom identification.** Refer to Section 15010, Part Identification for requirements.

10.2. Refrigerant Piping Sleeves: Refer to Section 15010 and plan details and provide sleeves, firestopping and escutcheons as specified for typical piping. Sleeves for pipe passing through exterior walls that contain refrigerant piping must be Schedule 80, ASTM D1785 PVC pipe, 1/2" larger in diameter than piping and piping covering. Refer to Section 15010 and below for requirements.

Coordinate wall sleeve sizes required for refrigerant piping with insulation and aluminum jacket requirements. Piping within wall cavities must be seamless with no joints.

10.3. Piping Diagram: System must be complete and sized to conform to current ACRMA standards, except that refrigerant suction risers must be sized for a gas velocity not less than 2000 fpm.

Various Manufacturers of heat pump mini-split systems have different reasons for the use of loops, traps, accumulators, receivers, etc., in piping arrangements, therefore, submit for review, the air conditioning equipment Manufacturer's recommended, dimensioned plan view and isometric piping diagram proposed for use for each system, showing all valves, loops, pipe sizes and all appurtenances, required for the proper operation of the respective system.

Submit catalog data and Manufacturer's ratings for all valves, catch-alls, etc. with diagram for each system. Identify all items for respective system and list capacities, pressure drops, etc. Secure approval of the heating and air conditioning equipment, and compressor Manufacturer before submitting for review.

Failure to provide the Manufacturers' approved diagram(s) must make the Mechanical Contractor responsible for all required changes to the piping system and equipment without additional cost to the Owner or his Design Professionals should the installation not be as required by the Manufacturers.

Refrigerant piping support spacing must be a maximum of eight (8) feet horizontally and six (6) feet vertically. Cut accurately to measurements established at site and work into place without springing or forcing, properly clearing all building features. Arrange and install piping systems, as close as practical, straight, properly supported and run as directly as possible forming right angles or running parallel with building lines, true to line and grade, **free of sags and bends**. Locate piping as high as practical and in parallel groups as close together as practical. Route through previously built-in sleeves and avoid cutting or other weakening of the structure.

Refrigerant piping for all outdoor units mounted slab on grade must enter the building at the respective building finish floor or crawl space level and at a maximum of 12" above finish floor of the facility. The contractor must coordinate the final refrigerant piping entrance into the building with the Architect's Field Representative prior to installing any refrigerant piping.

All refrigerant piping, including mini-split piping, must be ACR - ASTM B 280, Type L hard drawn, ACR copper refrigerant tubing with ASME B16.22 wrought copper fittings and unions with solder joints of 95-5 tin antimony. **Coiled copper and precharged line sets are NOT allowed unless specifically noted or specified.** All offsets and changes in direction must be made with 90° or 45° elbows.

Where refrigerant piping is shown rising in the wall cavity and requires modifications to the block wall due to the size of the piping and insulated assembly, the block must be neatly saw cut. Provide reinforcing to the affected portions of the wall as indicated on the structural drawings and details, the same as required at window and door openings. See the structural drawings for specifics. Extreme coordination is required prior to the erection of the structural slab and wall. Coordinate with the General Contractor.

- 10.4. Refrigerant Piping Testing:** Two tests are required. The medium used for pressure testing the refrigerant system must be oxygen-free nitrogen, helium or argon. Oxygen, air, combustible gases and mixtures containing such gases must not be used as a test medium. Systems erected on the premises with tubing not exceeding 5/8 inch outside diameter must be allowed to use the refrigerant identified on the nameplate label or marking as the test medium.

The refrigerant piping system must be tested as a whole, or separate tests must be conducted for the low-pressure side and high-pressure side of the piping system. The refrigerant piping system must be tested in accordance with both of the following methods:

Test 1: The system must be pressurized for a period of not less than 60 minutes to not less than the lower of the design pressures or the setting of the pressure relief device(s). The design pressures for testing must be the pressure listed on the label nameplate of the condensing unit, compressor, compressor unit, pressure vessel or other system component with a nameplate. Additional test gas must not be added to the system after the start of the pressure test. The system must not show loss of pressure on the test pressure measuring device during the pressure test for a minimum of 24 hours.

Test 2: A vacuum of 500 microns must be achieved. After achieving a vacuum, the system must be isolated from the vacuum pump. The system pressure must not rise above 1,500 microns for a period of not less than 60 minutes.

Where using refrigerant as a test medium as specified above, the test pressure must be not less than the saturation dew point pressure at 77°F.

- 10.5. Joints: Brazed joints only. Flare joints nor press connect type joining systems are allowed.** Brazed Joints (Nitrogenized ACR Hard Drawn Copper – ASTM B280,) with joints made according to AWS's "Braze Handbook," Chapter "Pipe and Tube."

Joint surfaces must be cleaned. An approved flux must be applied where required by the braze filler metal Manufacturer. The piping being brazed must be purged of air to remove the oxygen and filled with oxygen-free nitrogen, helium or argon. The piping system must be prepurged with an inert gas for a minimum time corresponding to five

volume changes through the piping system prior to brazing. The pre-purge rate must be at a minimum velocity of 100 feet per minute. The inert gas must be directly connected to the tube system being brazed to prevent the entrainment of ambient air.

After the pre-purge, the inert gas supply must be maintained through the piping during the brazing operation at a minimum pressure of 1.0 psi and a maximum pressure of 3.0 psi. The joint must be brazed with a filler metal conforming to American Welding Society Publication AWS A5.8, Current Edition.

Piping within wall cavities and other inaccessible areas must be seamless with no joints.

- 10.6. Solenoid Valves (Where Required):** Comply with AHRI 760 and UL 429; listed and labeled by an NRTL. Install in liquid refrigerant connection to the evaporators. Valves must be designed for the operating pressure and capacity as listed in the Manufacturer's catalog with a pressure drop not exceeding 2 psi and must be sufficient for the requirements of the installation. Install in horizontal runs with body vertical.
- 10.7. Expansion Valves (Where Required):** AHRI 750 compliant, steel shell with ductile-iron cover, stainless-steel screws, and neoprene gaskets properly sized diaphragm or bellows type, with external superheat adjustment set for 10 degrees F. superheat. Install in the liquid refrigerant supply lines to the evaporators. Expansion valves up to and including 7-1/2 tons capacity must be Sporlan Type "S" or approved equivalent. Expansion valves over 7-1/2 ton capacity must be Sporlan Type "O" or approved equivalent. Install Sporlan full size catch-all filter-drier ahead of valve.
- 10.8. Refrigerant Service Valves:** Provide for the proper service of the equipment. Per IMC 1101.9, all refrigerant circuit access ports located outdoors must be fitted with color coded, all brass, and locking tamper resistant caps.
- The locking caps must be red or red banded color code for the refrigerant used. Caps must be Novent Series 8668 for R-454B refrigerant with 86698 NV Multikey unlocking mechanism for R-454B refrigerant or equivalent by JB Industries Series Shield and DiversiTech Series Sentry. Provide Owner with minimum of six (6) spare keys.
- 10.9. Refrigerant Filter Drier (Catch-all):** AHRI 730 compliant, Sporlan, three desiccants type filter drier or approved equivalent. Filter driers up to and including 10-ton capacity must be sealed type. Filter driers over 10-ton capacity must be replaceable core type. Units must have minimum surface filtering area and capacity not less than that shown in Sporlan Valve Company Bulletin 40-10 2022 and 40-10-8, as applicable, under sizes for "field replacement or field built up sizes". Careful attention must be given to providing the correct type of filter drier as it pertains to the type of equipment and type of refrigerant used in the respective system.
- 10.10. Refrigerant Piping Identification:** Custom factory fabricated refrigerant piping labels are required. Stick-on, painted, stenciled or hand written identification is not allowed. The Contractor is urged to carefully review the extensive requirements of Part Identification in Section 15010 of the specifications and in particular the custom labels and installation requirements prior to certain site visits.
- 10.11. Miscellaneous Requirements:** Taping or zip tying of liquid lines to suction lines is not allowed. Coordinate wall sleeve sizes required for refrigerant piping with insulation and aluminum jacket requirements.

PART 11. PIPE INSULATION AND MISCELLANEOUS INSULATION WORK

- 11.1. General:** All work by experienced applicators in accordance with Manufacturer's recommendations and these specifications. Where the specified installation conflicts with the Manufacturers recommendations, the strictest application must be provided.

Piping must be clean, dry and pressure tested before covering is applied. Size pipe hangers to fit over insulated pipe size. **Hangers and supports must not be in contact with bare pipe and must not penetrate the vapor barrier.**

Cover fittings, valves and flanges with insulation material as hereinafter specified to same thickness as adjacent pipe covering except screwed unions and other specifically mentioned items. Neatly bevel covering edges or use prefabricated fittings as specified, adjacent to unions and other points of termination.

All insulation materials including coatings and mastics must have a composite rating for insulation, jacket or facing, including adhesives, not to exceed 25 flame spread and 50 for fuel contributed and smoke developed as determined by ASTM E-84, NFPA 255 and UL 723.

All piping must be provided with sleeves/firestopping assemblies. Refer to Section 15010 for sleeve and firestopping requirements.

- 11.2. Refrigerant Suction Lines, All Exterior Refrigerant Piping Including Liquid Lines and Mini-Split System Liquid Lines:** Preinsulated refrigerant piping is not allowed unless insulation meets the requirements specified below. Coiled nor precharged line sets are allowed unless noted or specified otherwise. Refer to other portions of this specification for refrigerant piping requirements. All liquid lines located outdoors must be insulated and installed within the specified aluminum jacket with the insulated refrigerant suction line. i.e., one aluminum jacket for both insulated pipes. Refer to aluminum jacket requirements below for additional information.

Insulate with 1" thickness, UL fire and smoke rated unslit, black, flexible foamed, elastomeric, closed cell pipe insulation by AP Armaflex or equivalent by K-Flex or Aerocel AC EPDM. It must be GreenGuard certified tubular insulation with Microban antimicrobial protection. Insulation must have a 'k' factor of not more than 0.256 at 90°F mean temperature, water absorption percent by volume of 0.2 and a water vapor transmission rate of 0.05 perm-inches or less.

Slip insulation onto pipe prior to erecting. Longitudinal cutting of the insulation is prohibited. Do not stretch or bend insulation at any turn, tee, etc. Insulate sweat/brazed fittings with miter-cut pieces of insulation as recommended in AP Armaflex installation instructions or, provide factory fabricated, made to order prefabricated fittings for tees, elbows, unions, etc. the same size as on adjacent piping and manufactured by AP Armaflex, Aeroflex Aerofit, K-Flex K-Fit or Aerocell.

On piping with screwed fittings, make up fitting covers from Armaflex with an inside diameter large enough to overlap the insulation on the pipe next to the fitting. Fitting cover must be long enough to overlap the pipe insulation by a minimum of one inch on each side. Glue the 1" overlap and seal to the adjacent pipe insulation with same adhesive and tape specified below.

Seal all butt joints of insulation and all butt joints at the specified refrigerant piping clamp with AP Armaflex BLV, Black, low VOC, liquid, air-drying contact adhesive. Do not use aerosol adhesive. After gluing joints, wrap all joints with 2" wide, 1/8" thick AP Armaflex self-adhering tape.

All insulated piping must be continuous without cutting at clamp/support assemblies. All interior refrigerant liquid lines NOT required to be insulated by the equipment Manufacturer must not be insulated except, they must be provided with insulated insert at clamps to Unistrut assemble as specified below.

Note that Various Manufacturers of mini-split systems require the insulating of refrigerant liquid lines. When required by the Manufacturer, they must be insulated using materials specified above and in thickness required by the respective Manufacturer. Where the mini-split system Manufacturer requires less than 1" insulation, install thickness recommended with materials specified above using methods specified below.

- 11.3. Condensate Drain Lines Insulation:** To include discharge lines on all equipment specified with or provided with air conditioning condensate drainage pumps Insulate with 3/4" thickness, UL fire and smoke rated unslit, black, flexible foamed, elastomeric, closed cell pipe insulation by AP Armaflex or equivalent by K-Flex or Aerocel AC EPDM. It must be GreenGuard certified tubular insulation with Microban antimicrobial protection. Insulation must have a 'k' factor of not more than 0.256 at 90°F mean temperature, water absorption percent by volume of 0.2 and a water vapor transmission rate of 0.05 perm-inches or less. See below for clamp and pipe supports assembly.
- 11.4. Refrigerant Pipe Supports and Clamp Assembly:** **Do not use clevis hangers for refrigerant piping.** Refrigerant piping supports must be provided with an insulated piping clamp assembly attached to a Unistrut assembly. The Unistrut assembly must support the horizontal and vertical refrigerant piping on intervals not exceeding 8 feet. Provide dielectric separation between dissimilar metals. Support piping so that no vibration will be transmitted to the building structure.

The insulated piping clamp assembly must be provided at each Unistrut hanger for each liquid line, suction line and any other bare copper line attached to the assembly. The insulated clamp must provide a crush resistant airtight seal and must consist of a rigid, closed cell, foam insulation to support tubing and absorb vibration. The outer cover must consist of a rubber coating that seals the cushion completely after installation. Clamps must be steel with electrochromate finish. The rated assembly temperature range must be -50°F to +250°F. It must be self-extinguishing as tested under ASTM D 635.

After installing the device, glue each butt joint and tape each joint with 2" wide, 1/8" thick AP Armaflex self-adhering tape.

Insulated lines must use Wesanco Series Cush-A-Therm ZSI UX with specified rigid insulation thickness for the required pipe size, gold electro-galvanized channel clamp assembly and required hardware or equivalent by ArmaFix Eco Light, Aerofix by Aeroflex. Wesanco Series Cush-A-Therm ZSI UX is the basis of design.

For units on concrete pad, support piping with rustproof coated, 1-1/2" x 1-1/2" x 1/8" galvanized steel angle supports anchored to pad with stainless steel base plate, bolts and clamp assembly. The above specified clamp assembly is not required on exterior refrigerant piping that is covered with an aluminum jacket. Anchor aluminum jacket to support assembly.

- 11.5. Interior Condensate Drain Lines Pipe Supports and Clamp Assembly:** **Do not use clevis hangers for condensate drainage piping.** Condensate drain line support, including discharge lines on all equipment specified with or provided with air

conditioning condensate drainage pumps, must be provided with an insulated piping clamp assembly on a Unistrut assembly. The Unistrut assembly must support the horizontal and vertical condensate drainage piping on intervals not exceeding 8 feet. Provide dielectric separation between dissimilar metals. Support piping so that no vibration will be transmitted to the building structure.

The insulated clamp must provide a crush resistant airtight seal and must consist of a rigid, closed cell, foam insulation to support the tubing. The outer cover must consist of a rubber coating that seals the cushion completely after installation to prevent condensation. Clamps must be steel with electrochromate finish. The assembly must be self-extinguishing as tested under ASTM D 635.

After installing device, glue each butt joint with liquid adhesive and tape each joint with 2" wide, 1/8" thick AP Armaflex self-adhering tape. Spray adhesive is not allowed.

For piping located on the finished floor, support piping with rustproof coated, 1-1/2" x 1-1/2" x 1/8" galvanized steel angle supports anchored to the floor with steel base plate and bolts. Condensate drainage piping must be attached to the support with the insulation assembly specified above. Insulate using same methods and materials as specified for refrigerant piping except 3/4" thickness.

Insulated condensate drain lines must use Wesanco Series Cush-A-Therm ZSI UX with specified rigid insulation thickness for the required pipe size, gold electro-galvanized channel clamp assembly and required hardware or equivalent by ArmaFix Eco Light, Aerofix by Aeroflex. Wesanco Series Cush-A-Therm ZSI UX is the basis of design.

- 11.6. Refrigerant Piping and Condensate Drainage Piping Aluminum Jacket:** All insulated exterior refrigerant piping and all insulated condensate drainage piping terminating in mop sink must be covered with an aluminum jacket.

Where refrigerant piping rises within the wall cavity to above the ceiling, attic or similar space, **the aluminum jacket must terminate within the exterior wall cavity and sealed weather tight to the sleeve in the wall.**

The aluminum jacket must be 18 ga., .04" thick, **smooth finish**, 3003 and 3105 series aluminum conforming to ASTM B-209 standards. Fittings must be 18 ga., .04" thick, die shaped, and **smooth finish**, Type 1100 aluminum jacket meeting ASTM C585. Provide 1/2" wide, 18 ga., .04" thick, Type 3003 aluminum bands on maximum 24" centers but not less than two bands per jacket section. **Venture Clad or similar product is prohibited.** Exterior refrigerant piping within the sheet metal enclosure does not require an aluminum jacket.

- 11.7. Painting and Identifying:** Paint and identify after installation is completed as specified in Section 15010, Part Identification. Where piping is specified with an aluminum jacket, painting is not required.

Refer to Section 15010, Part Identification and note special refrigerant piping identification requirements. **Custom factory fabricated refrigerant piping labels are required. Stick-on, painted, stenciled or hand written identification is not allowed.**

The Contractor is urged to carefully review the extensive requirements of Part Identification in Section 15010 of the specifications and note that certain identification is required to be completed before certain site visits.

- 11.8. **Submittal Data:** Submit for review complete data on materials and application methods proposed.
- 11.9. **Manufacturers:** Approved equivalents by Pittsburgh Corning, CertainTeed, Baldwin-Ehret-Hill, Manville, Owens Corning, Armstrong Childers and 3M Company will be accepted.

PART 12. VENTILATION

- 12.1. **General:** All fans must be furnished completely with ducts, grilles and required accessories. All other fan wheels must be steel. No plastic or non-metallic wheels are allowed unless specified otherwise.

All fans must be certified in accordance with AMCA/ANSI Standards 210 and ANSI/ASHRAE 51. Fans wheels must be balanced in accordance with AMCA Standard 204-05. Fans must be listed at UL 705 and must bear the UL Label. Furnish for review capacity and sound power ratings.

All motors 1/2 HP and smaller must have built-in overload protection.

All motors with scheduled capacity of less than 1 HP must be ECM type as required by ASHRAE 90.1 and with minimum motor efficiency of 70% when rated in accordance with DOE 10 CFR 431.

- 12.2. **Power:** Contractor must verify all voltage and power requirements with Electrical Contractor, Electrical plans and at the site, prior to ordering equipment.
- 12.3. **Ceiling Mounted Cabinet Fans:** Penn Ventilator Company Model Zephyr, Series Z-3H thru Z-15H with RA right angle arrangement or TDA arrangement as shown on the plans, or approved equivalent, complete with all accessories, including unit mounted solid state speed control switch, factory baked enamel white metal ceiling grille, metal flanged inlet and outlet connections, acoustically insulated metal housing, direct drive, ECM motors, internally isolated centrifugal fan, integral backdraft damper and terminal cap, cast aluminum brick vent, or soffit grille as shown on the plans. Fan wheel must be steel or aluminum. No polypropylene, plastic or other non-metallic wheels. Fan must be supported from the structure with 1/4" hanger rods, rubber in shear vibration isolators and Manufacturer furnished bracket for attaching rods to the fan and structure above. Refer to the plan details for additional requirements.
- 12.4. **Acceptable Manufacturers:** Cook, Greenheck, Penn Barry. Penn Barry is the basis of design.

PART 13. PACKAGED PAD MOUNTED HEATING AND AIR CONDITIONING UNITS (PHAC)

- 13.1. **General Description:** One-piece, high efficiency, combination air-to-air DX mechanical cooling system and LP gas fired heating system, premium efficiency motors, powered exhaust, powered relief, complete with automatic controls, condensate overflow switch the condensate line and auxiliary drain pan wired to shut down the unit upon detection of condensate in the auxiliary drain pan or obstruction in the condensate drain line, removable stainless steel IAQ drain pan, factory installed refrigerant monitors and related safeties, and powered GFI convenience power outlet. All equipment (condenser/compressors) scheduled cooling capacities

are based on 95°F ambient temperature. Unit must be provided with color touchscreen interface with USB port to indicate data trending, historical alarm messages, real-time sensor measurements, on board system setpoints and customized reports. The unit must be designed for direct side handling of the conditioned air as shown on the plans. Any unit with arrangement different from shown on the plans requires prior approval. The equipment must be shipped completely assembled, pre-charged, piped and wired internally ready for field connections. **The Manufacturer must test operate the unit before shipment and provide factory certified documentation of the factory testing as part of the equipment documentation.** All units must have factory installed refrigerant monitors and related safeties and must have heavy-duty metal condenser coil hail guards. All equipment and curbs must be installed level and plumb.

Each unit is specified to be provided with UV-C lights. The unit Manufacturer must coordinate with the UV-C Manufacturer the placement of the UV-C lights within the unit. UV-C lights must be placed in number and location as required by the UV-C device Manufacturer for maximum irradiance. The HVAC unit Manufacturer must provide equipment such that any part subjected to irradiance from the UV lamp system must be shielded from the UV-C light or constructed of a material that is capable of withstanding UV-C exposure levels expected in provided product without degradation.

The entire unit must be factory wired for single point power connection. Coordinate requirement with the electrical plans and electrical contractor and provide as specified. **The contractor must verify all voltage and power requirements with the Electrical Contractor, Electrical plans, and at the project site, prior to ordering equipment.**

- 13.2. Testing of Refrigerant Leak Detection System:** The Alabama Department of Construction Management (DCM) **requires** that the unit manufacturer provide a factory-trained mechanic, employed by the unit Manufacturer, not a sales representative, onsite the day of the final site visit to test the refrigerant monitoring system and verify proper operation, shutdown, safeties, etc. as required. No beneficial occupancy, substantial completion or certificate of occupancy will be granted by DCM without this testing. Failure to comply with this provision will be cause for cancellation of the site visit, and a reinspection fee imposed, with all costs of the re-inspection to be borne by the Contractor.
- 13.3. Pad Mounted Supports:** Units shown on finished grade must be provided with factory base rail and must be anchored to the concrete pad. Concrete pads are specified under Division 2. Where concrete pads are not specified or not shown elsewhere, the Mechanical Contractor must provide a minimum 4" thickness, 5,000-psi concrete pad with rounded edges and corners. Pad must extend a minimum of 12" around three (3) sides of the unit and terminate at the building outside wall. Provide a strip of asphalt expansion joint between the concrete pad and the building exterior wall. Expansion joint must be full width by full depth of concrete pad, 1" thickness, non-absorbing, self-sealing, ASTM D 994 compliant and manufactured by W.R. Meadows Inc. or approved equivalent. All equipment and curbs must be installed level and plumb.
- 13.4. Economizer Package:** All units must be provided with a 100% outside air economizer. The economizer must be provided completely with all controls, powered exhaust, powered relief, and air mixing damper assembly consisting of an enthalpy controller, fresh air, recirculated air and exhaust air dampers and protective guard over relief/exhaust unit discharge. The fresh air intake section must be equipped with 1" thick washable air filters. The assembly must be mounted within the confines of

the unit casing. The system must be interlocked so that when room thermostat calls for cooling or heating, the outside air dampers must return to minimum position.

- 13.5. Cooling System:** Total certified cooling capacity must be not less than indicated. Coils must be of non-ferrous construction with aluminum fins mechanically bonded to seamless copper tubes. Condenser coils must have sub-cooling rows. The compressors must be resiliently mounted - have built-in three mode crankshaft lubrication, crankcase heater, discharge temperature limiter, current and temperature sensing motor overloads, factory furnished holding charge of ASHRAE Safety Classification A2L, R-454B refrigerant and guarantee as specified below. The system must be protected by high and low pressure switches, a five minute compressor timed off cycle controller, lockable refrigerant charging valves, and head pressure controls down to 40°F ambient.

All units must be provided with multiple compressors, or 2-stage compressors as required by ASHRAE 90.1. Units with more than one compressor must have complete separate/independent refrigerant circuits to the evaporator. Where dual compressors are required for Manufacturer approved use of the hot gas reheat coil, dual compressors must be provided in lieu of a single, two-stage compressor.

- 13.6. Refrigerant Leak Detection System (LDS):** The Leak Detection System (LDS) must consist of one or more refrigerant detection sensors and is required in any system that has more than 3.91 lbs. of A2L refrigerant charge, per safety standard UL 60335-2-40. Equipment with R-454B and charge amounts less than or equal to 3.91 lbs. per circuit, this UL standard does not prescribe a room area limit and does not require a refrigerant leak detection system or any circulation airflow or ventilation airflow mitigation strategies. **The LDS must be factory-installed for all units.**

When the LDS detects a leak in units with charge amounts greater than 3.91 lbs. per circuit, the following mitigation actions must be automatically initiated until the refrigerant has not been detected for at least 5 minutes:

- a. Unit must automatically revert to its outside air economizer mode to deliver 100% outside air in tandem with its associated powered exhaust/relief.
- b. The compressor(s) operation must cease/shutdown.
- c. Gas heat must be automatically disabled.

- 13.7. Refrigerant Service Valves:** Provide for the proper service of the equipment. Per IMC 1101.9, all refrigerant circuit access ports located outdoors must be fitted with color coded, all brass, and locking tamper resistant caps.

The locking caps must be red or red banded color code for the refrigerant used. Caps must be Novent Series 8668 for R-454B refrigerant with 86698 NV Multikey unlocking mechanism for R-454B refrigerant or equivalent by JB Industries Series Shield and DiversiTech Series Sentry. Provide Owner with minimum of six (6) spare keys.

- 13.8. Gas Heating System:** Output capacity as indicated. Automatic controls furnished must give a minimum of 2-1 turndown operation. Heat exchanger must be constructed of aluminized steel. Heat exchanger must be capable of handling 100 percent outdoor air and any temperature and have a 10-year warranty when handling uncontaminated air. Stainless steel power burner must use 100 percent secondary air and have intermittent spark ignition and 100 percent safety shutoff electronic flame sensing controls. Visual inspection of burner flame must be possible without removing casing panels.

- 13.9. Fans and Motors:** Supply air fans must be multi-speed, centrifugal type with premium efficiency motors and permanently lubricated ball bearings, adjustable belt or high static direct drive with cfm capacity as specified.

All units must be provided with belt drives.

All units must be 2-speed as required by ASHRAE 90.1.

External static pressure indicated on the plans is estimated. The equipment Manufacturer must provide additional belt sheaves as required to match field conditions for the ductwork as installed.

Condenser fans must be direct driven. All motors must have inherent protection devices on all legs.

- 13.10. Ultraviolet (UV-C) Lights:** Mechanical Contractor is responsible for wiring the devices and providing power for the UV-C lights if not shown on the Electrical plans. Air handling units must be provided with power supply and connections within the unit cabinet for powering the UV-C lights. Mechanical Contractor must be responsible for circuitry to UV-C lighting. UV-C lighting must cycle on and off with the fan or operate continuously as recommended by the UV-C lighting Manufacturer.

Comply with UL / C-UL or ETL for Ultraviolet Fixturing. Store UV-C Fixturing in a clean, dry place and protect from weather, construction traffic and construction debris. UV-C products supplier must provide proof of 100% inbound and outbound testing of equipment. The UV-C Power supply must have been tested, listed and labeled as compliant with UL, CSA and CE. The plenum wiring loom must meet UL Subject 13 and UL 1581, Article 725 of the NEC and meet UL VW-1 material ratings. There must be a metallic Loom cladding, and it must be UL recognized DXUZ2 and constructed of flexible galvanized steel and cover the entire Loom. Each lamp must contain no more than 5 milligrams of mercury consistent with current environmental practices. Lamp Watts must be printed on all lamps, no exceptions. Lamps must not produce ozone and must be hermetically sealed within a layer of UV-C transmissible FEP to protect against lamp breakage and to contain lamp contents should breakage occur.

Lamps must be installed in sufficient quantity and in such a manner to provide an equal distribution of UV-C energy. When installed, the UV-C energy produced must be of the lowest possible reflected and shadowed-losses and must produce 360-degree UV-C irradiance from the lamps within the UV cavity. Lamp Watts must be printed on all lamps, no exceptions. Each lamp must contain less than 5 milligrams of mercury, consistent with current environmental practices. Lamp useful life must be a minimum of 9,000 hours with no more than a 15% output loss at the end of the lamp's life (12 months of continuous use). Lamps must be constructed with UV-C resistant bases and must not produce ozone. Lamps must produce the specified output in moving air of up to 1000 fpm and temperatures of 0-200°F. Lamps must be hermetically sealed within a layer of UV-C transmissible FEP to provide protection against lamp breakage and to ensure Lamp contents from a broken Lamp are contained.

Fixture modeling must be included in the submittal and must contain the necessary calculations to demonstrate that a minimum of 6 lamp watts, as recommended by ASHRAE, are distributed equally to each square foot of coil surface area to achieve a minimum of 100 microwatts per square centimeter equally distributed to the surfaces at the plenum sides, top and bottom. All calculations are to be at 55 degrees F and 500 fpm air velocity, no exceptions.

The power supply housing must be capable of installation within the air stream, secondary compartment or NEMA enclosure. Lamps must be mounted to irradiate the intended surfaces as well as all of the available line of sight airstream through proper placement, 360° irradiation and incident angle reflection.

To protect personnel, all unit access panels and doors to the UV-C assembly and/or within view of the UV-C assembly must include mechanical interlock switches to ensure that the UV-C assembly automatically de-energizes when any equipment access is opened. All UV-C devices must fit and be installed within the unit cabinet. Devices must be hardwired, and UL labeled for the installation. Plug-in devices are not allowed per NEC. The assembly must be powered by 120v circuit or as required by the AC unit Manufacturer. Coordinate requirement and provide as required.

A redundant weatherproof disconnect service switch must be installed to provide a method to more specifically de-energize the UV-C lamp circuits prior to entering the lamp plenum. If not shown on the Electrical plans, the Mechanical Contractor must provide a weatherproof redundant disconnect service switch for the UV-C lighting device(s). The redundant weatherproof disconnect switch must be a manual single pole, a single throw switch mounted beside the Electricals' unit disconnect circuit to nearest receptacle circuit with (2) #12 and (1) #12 Ground in 1/2" conduit.

Provide warning signage on each access point to the UV-C lights and on each side of the unit. Signage materials, methods and colors must be as specified in Section 15010, Part Identification. Signage must read as follows: **"DANGER!! UV-C LIGHT SOURCE! DISCONNECT POWER BEFORE SERVICING UNIT OR UV-C LIGHTING!"** Do not use stick-on signage provided by the UV-C Manufacturer.

The weatherproof redundant UV-C disconnect switch specified above must be labeled with materials and methods specified in Section 15010, Part Identification. Signage must read as follows: **"UNIT XX-YY UV-C LIGHTING REDUNDANT SHUT-OFF SWITCH"** XX denotes the unit, and YY is the unit number or type, all as scheduled on the plans.

- 13.11. Frame and Casing:** The frame must be of welded construction. The casing must be of hinged galvanized access panels with a baked on outdoor acrylic finish. The cabinet bottom must be insulated with Styrofoam; cabinet panels must be insulated with 1" fiberglass. All components, wiring and inspection areas must be completely accessible through hinged panels with quarter turn latching handles.

- 13.12. Filters:** Provide 1" thick metal washable filters at the unit outside air intake. Provide 2" thick, MERV 11, disposable type filters for each filter location in the return air stream. All disposable filters must be common industry standard size filters that are readily available and do not have to be fabricated. Cutting and taping of filter segments to make a proper filter is prohibited.

The Mechanical Contractor must be responsible for the quarterly filter cleaning of the outside air intake filter and quarterly replacement of the return air filters during the guarantee period. The Mechanical Contractor must inscribe onto the disposable filters' casing the date filters were installed/replaced.

- 13.13. Hot Gas Reheat Coil:** Each unit must be provided with refrigerant hot gas reheat coil with modulating reheat coil valve and located in the reheat position. The coil must be of sufficient size to reheat all of the air supply. Provide, complete, with all necessary valves, controls, etc., as required for a complete and properly functioning installation. Provide manual isolation valves for each hot gas and liquid lines. Furnish for review

air conditioning equipment Manufacturer approved refrigerant piping and controls diagram, and statement by the air conditioning Manufacturer on company letterhead that use of the hot gas reheat coil with the equipment is acceptable to the Manufacturer and will not affect any warranty or guarantee. **Equipment submittal will not be reviewed without a Manufacturers' approved diagram and referenced statement.** Minimum reheat capacity for supply air must be 10°F. Maximum coil pressure drop is 0.10" static pressure.

- 13.14. Indoor Thermostat:** The Manufacturer must provide a combination of 7-day programmable, two-stage heating automatic changeover thermostat. Thermostat must have sub-base fan switch for "On-Auto" selection and manual "Heat-Cool" switch. The thermostat must be hardwired and be provided with battery backup. Coordinate the thermostat with specified sequence of operation and provide as required.

Provide hinged metal guard with rounded corners, lock and key for each thermostat.

- 13.15. Humidistat:** Humidistat is specified in "Automatic Controls" at the end of this 15700 Specification. At his option, the Unit Manufacturer may substitute a combined thermostat/humidistat. Verify with the Controls Sub-Contractor that the furnished thermostat/humidistat will perform all sequences of operation else provide separate devices as specified.
- 13.16. CO2 Sensors:** Where demand ventilation is specified, the system must be provided with a separate CO2 sensor of the type specified at the end of this Section 15700. Combination devices are not allowed due to the required mounting height of the CO2 sensor.
- 13.17. Unit Protection:** All equipment must also be provided with equipment manufacturer factory installed surge protection and phase protection to insure against voltage unbalance, over/under voltage, phase loss, reversal, incorrect sequencing and rapid short cycling. Where manufacturer factory installed devices are not available, protection must be provided for all 3-phase equipment utilizing ICM Controls Model 450 A Plus+ or equivalent. Where phase protection device cannot be mounted within the respective equipment, provide a NEMA 4x or NEMA enclosure appropriate for the installation. The Contractor must consult with the Owner's maintenance personnel and set up all programmable options based on the Owner's requirements, within the device's capabilities.
- 13.18. Smoke Detectors:** See Controls at end of this Section.
- 13.19. Warranty:** General warranties are specified in Section "General Mechanical Provisions". The Mechanical Contractor and equipment Manufacturer must provide a non-prorated, total of five years replacement warranty for this equipment, to include all parts and components, belts, lubricants, compressors, refrigerant, etc., all labor, and shipping of the items required to return the installation to its original operating condition.

The Mechanical Contractor must be responsible for any parts, labor, etc. as specified above that is not provided by the equipment Manufacturer.

The Contractor and/or the Manufacturer must respond within 24 hours upon notification that there has been a failure under the terms of the specified warranty. "Respond" must mean having a Manufacturer certified technician onsite to evaluate the extent of the needed repairs/replacement and ordering of all items required for repair/replacement.

Shipping of the replacement compressor and any other related unit parts must be via maximum 2-day delivery if the unit is inoperable or cannot maintain a minimum indoor temperature of 78°F to the affected facility.

The warranty period must begin on the date of substantial completion of the installation, as determined by the Architect, and must continue for the full product warranty period specified above. Refer to Part, Air Cooled Condensing Units for condensing unit and compressor warranty.

- 13.20. Manufacturers:** Trane Series Precedent, Model YSJ. Equivalents by Carrier or Lennox will be considered.

PART 14. WALL MOUNTED DUCTLESS SPLIT HEAT PUMP SYSTEM UNIT (DHP)

- 14.1. General:** Provide ductless, wall mounted, split system type heat pump unit, equal to Trane/Mitsubishi Electric Series NTXWST/NTXSST for units with specified cooling capacity up to 9 MBH and TPKA/TRUZ units with specified cooling capacity of 12 MBH to 36 MBH complete with all accessories including wall hung evaporator blower unit, pad mounted outdoor condensing unit operating with full factory furnished charge of ASHRAE Safety Classification A2L, R-454B refrigerant, factory installed refrigerant monitor and related safeties, lockable refrigerant charging valves, filter frame, washable filter, fixed, wall mounted, hardwired 7-day programmable, microprocessor electronic thermostat and control module, metal, hinged locking thermostat guard, adjustable discharge louvers, factory installed heavy duty condensate pump (if drainage indicated on plumbing and mechanical plan is not gravity type), low ambient indoor coil thermistor, low ambient control to 14° F, outdoor microprocessor control, heavy duty metal condenser coil hail guard, sweat/brazed connection fittings from the Manufacturer's factory and other accessories required for a complete functional installation. Flare connections are not allowed unless **specifically** required by the Manufacturer. Refer to Part Condensate Drainage Piping of this specification for drainage requirements. Compressors must be warranted for 5 years. Where the indoor unit is powered by the outdoor unit, wiring must be installed as specified in Division 16.

All condensate and refrigerant piping that cannot be concealed in the walls in finished spaces must be provided with Mitsubishi Line-Hide Linset Cover System. Note that this provision must not be used to cover piping that can be otherwise concealed.

- 14.2. Refrigerant Service Valves:** Provide for the proper service of the equipment. Per IMC 1101.9, all refrigerant circuit access ports located outdoors must be fitted with color coded, all brass, and locking tamper resistant caps. This requirement must not apply to refrigerant circuit access ports on equipment installed in controlled areas such as on roofs with locked access hatches or doors.

The locking caps must be red or red banded color code for the refrigerant used. Caps must be Novent Series 8668 for R-454B refrigerant with 86698 NV Multikey unlocking mechanism for R-454B refrigerant or equivalent by JB Industries Series Shield and DiversiTech Series Sentry. Provide Owner with minimum of six (6) spare keys.

- 14.3. Refrigerant Piping:** Coiled line sets and preinsulated line sets are not allowed. See other parts of 15700 for piping and insulation requirements. The equipment Manufacturer must size the refrigerant piping for all the units and must furnish all accessories and auxiliaries required for a complete and proper installation for the specific application shown on the drawings and the specified sequence of operation.

Piping connections must be brazed/sweat connections from the Manufacturer's factory. Flare connections are not allowed unless **specifically** required by the Manufacturer. Refer to Section Refrigerant Piping and Accessories for additional requirements.

- 14.4. Condensate Pump:** Where gravity drainage is not indicated on the plans, condensate pumps for all indoor units must be Blue Diamond, Series MaxiBlue or approved equivalent. The pump must be thermally protected, up to 3.7 GPH flow rate, 23 ft. head, 15 ft. suction, self-priming, powered by the indoor unit and maximum 21-db sound level. The pump must be provided with mounting feet, extension cables and multi-tank configuration as required. Mechanical Contractor to coordinate power requirements for pump, prior to bid, and provide as required.
- 14.5. Condensate Drainage:** Refer to Part Condensate Drainage Piping of this specification for drainage requirements.
- 14.6. Power Wiring Connection:** Coordinate wiring requirements (separate power for each indoor and outdoor unit or indoor unit powered by outdoor unit) with electrical plans and provide as required.
- 14.7. Pad Mounted Supports:** The concrete pad is specified under Division 2 for all units mounted on grade. Where concrete pads are not specified or shown, the Mechanical Contractor must provide a minimum 4" thickness, 5,000 psi concrete pad with rounded edges and corners. Pad must extend a minimum of 12" around three (3) sides of the unit and terminate at the building outside wall. Provide a strip of asphalt expansion joint between the concrete pad and the building exterior wall. Expansion joint must be 1" thickness, non-absorbing, self-sealing, ASTM D 994 compliant and manufactured by W.R. Meadows Inc or equivalent. All equipment and curbs must be installed level and plumb.
- 14.8. Unit Protection:** All equipment must also be provided with equipment manufacturer factory installed surge protection and phase protection to insure against voltage unbalance, over/under voltage, phase loss, reversal, incorrect sequencing and rapid short cycling. Where manufacturer factory installed devices are not available, protection must be provided for all single phase equipment with horsepower greater than or equal to 1/8 HP utilizing ICM Controls Model ICM 492 or equivalent. Where phase protection device cannot be mounted within the respective equipment, provide a NEMA 4x or NEMA enclosure appropriate for the installation. The Contractor must consult with the Owner's maintenance personnel and set up all programmable options based on the Owner's requirements, within the device's capabilities.
- 14.9. Warranty:** General warranties are specified in Section "General Mechanical Provisions". The Mechanical Contractor and equipment Manufacturer must provide a non-prorated, total of five years replacement warranty for this equipment, to include all parts and components, belts, lubricants, compressors, refrigerant, etc., all labor, and shipping of the items required to return the installation to its original operating condition.

The Mechanical Contractor must be responsible for any parts, labor, etc. as specified above that is not provided by the equipment Manufacturer.

The Contractor and/or the Manufacturer must respond within 24 hours upon notification that there has been a failure under the terms of the specified warranty. "Respond" must mean having a Manufacturer certified technician onsite to evaluate the extent of the needed repairs/replacement and ordering of all items required for repair/replacement.

Shipping of the replacement compressor and any other related unit parts must be via maximum 2-day delivery if the unit is inoperable or cannot maintain a minimum indoor temperature of 78°F to the affected facility.

The warranty period must begin on the date of substantial completion of the installation, as determined by the Architect, and must continue for the full product warranty period specified above. Refer to Part, Air Cooled Condensing Units for condensing unit and compressor warranty.

- 14.10. Manufacturers:** Trane or equivalent by Mitsubishi, Lennox, LG or Carrier. **Trane is the basis of Design.**

PART 15. SPLIT SYSTEM CASSETTE TYPE HEAT PUMP (CCHP)

- 15.1. General:** The heat pump air conditioning system must be equal to Trane/Mitsubishi Electric Series TPLA/TRUZ split system operating full factory furnished charge of ASHRAE Safety Classification A2L, R-454B refrigerant. The system must consist of a slim silhouette; compact ceiling mounted packaged evaporator section and matching slim line outdoor unit with lockable refrigerant charging valves, factory installed refrigerant monitors and related safeties, refrigerant piping sweat/brazed connections from the Manufacturer, wall mounted, hardwired 7-day programmable thermostat with clear plastic locking cover, occupancy sensor with override, outside air connection (if shown on the plans) and supply air connection (if shown on the plans). whenever possible, the unit must fit within a nominal 2'x2' lay-in ceiling grid. Flare connections are not allowed unless **specifically** required by the Manufacturer. The units must be listed by Electrical Laboratories (ETL) and/or Underwriters Lab (UL) and bear the ETL and/or UL label. All wiring in accordance with the National Electrical Code (N.E.C.). The units must be rated in accordance with ARI Standard 240 and bear the ARI label. All units must be provided with phase protection.

Where the indoor unit is powered by the outdoor unit, installation must be as specified in Division 16.

All condensate and refrigerant piping that cannot be concealed in the walls in finished spaces must be provided with Mitsubishi Line-Hide Linset Cover System. Note that this provision must not be used to cover piping that can be otherwise concealed.

- 15.2. Refrigerant Service Valves:** Provide for the proper service of the equipment. Per IMC 1101.9, all refrigerant circuit access ports located outdoors must be fitted with color coded, all brass, and locking tamper resistant caps.

The locking caps must be red or red banded color code for the refrigerant used. Caps must be Novent Series 8668 for R-454B refrigerant with 86698 NV Multikey unlocking mechanism for R-454B refrigerant or equivalent by JB Industries Series Shield and DiversiTech Series Sentry. Provide Owner with minimum of six (6) spare keys.

- 15.3. Occupancy Sensor:** Provide 'I-see Sensor' occupancy sensor.

- 15.4. Refrigerant Piping:** Coiled line sets and preinsulated line sets are not allowed. See other parts of 15700 for refrigerant piping and insulation requirements. The equipment Manufacturer must size the refrigerant piping for all the units and must furnish all accessories and auxiliaries required for a complete and proper installation for the specific application shown on the drawings and the specified sequence of operation. Refrigerant piping connections must be sweat/brazed connections from

the Manufacturer's factory. Flare connections are not allowed unless **specifically** required by the Manufacturer. Refer to Section Refrigerant Piping and Accessories for additional requirements.

- 15.5. Description:** Capacities and characteristics must be as specified on the drawings. The indoor unit must be factory assembled and wired. The casing must be galvanized sheet metal with insulation. Whenever possible, the unit must fit within a nominal 2'x2' ceiling grid. Coordinate unit type required with previously specified requirements of outside air/supply air duct connections required by the plans. The evaporator fan must be a high performance, fan direct driven by a single motor. The fan must be statically and dynamically balanced and run on permanently lubricated bearings. The indoor unit must have an adjustable air outlet system with 4-way deflection airflow. Return air must be filtered with factory furnished filter. The coil must be of nonferrous construction with smooth plate fins bonded to copper tubing. All tube joints must be brazed with phos-copper or silver alloy and provided with appropriate **piping connections for brazed/sweat connections from the Manufacturer's factory**. Flare connections are not allowed unless **specifically** required by the Manufacturer. The coil must be pressure tested at the factory. A condensate pan and auxiliary drain pan must be provided and extend under the coil and piping.

Unit must be provided with sensor to shutdown unit and sound alarm if condensate line becomes obstructed. If the BAS system is part of the project, provide output contacts to show alarm at BAS system Operator Console. Coordinate with BAS Contractor and provide as required for proper interface.

The control system must consist of low voltage room thermostat to control heating and cooling. Provide clear plastic thermostat guard with lock and key.

- 15.6. Condensate Drainage:** Refer to Part Condensate Drainage Piping of this specification for drainage requirements.
- 15.7. Outdoor Unit:** Must be completely factory assembled, piped and wired. The unit must be furnished with one (1) direct drive, propeller type fan arranged for horizontal or vertical. The motors must have inherent protection, be of the permanently lubricated type, and resiliently mounted for quiet operation. The compressor must be of the high-performance rotary type with crankcase heater, accumulator and internal thermal overloads. The refrigeration system must be equipped with high-pressure switch. Refrigerant flow from the condenser must be controlled by means of a capillary tube. The condenser coil must be of nonferrous construction with smooth plate fins bonded to copper tubing. The coil must be protected with smooth plate fins bonded to copper tubing. The condenser coil must be protected with an integral heavy-duty metal hail guard. The unit must be controlled by the microprocessor located in the indoor matching unit. A built-in, low-ambient controller must allow cooling to 0 degrees F outdoor temperature.
- 15.8. Power Wiring Connection:** Coordinate wiring requirements (separate connection for each indoor and outdoor unit or indoor unit powered by outdoor unit) with electrical plans and provide as required.
- 15.9. Pad Mounted Supports:** Units mounted on finished grade must be provided with concrete pad. Concrete pads are specified under Division 2. Where concrete pads are not specified or shown elsewhere, the Mechanical Contractor must provide a minimum 4" thickness, 5,000-psi concrete pad with rounded edges and corners. Pad must extend a minimum of 12" around three (3) sides of the unit and terminate at the building outside wall. Provide a strip of asphalt expansion joint between the concrete

pad and the building exterior wall. Expansion joint must be 1" thickness, non-absorbing, self-sealing, ASTM D 994 compliant and manufactured by W.R. Meadows Inc or equivalent.

- 15.10. Unit Protection:** All equipment must also be provided with equipment manufacturer factory installed surge protection and phase protection to insure against voltage unbalance, over/under voltage, phase loss, reversal, incorrect sequencing and rapid short cycling. Where manufacturer factory installed devices are not available, protection must be provided for all single phase equipment with horsepower greater than or equal to 1/8 HP utilizing ICM Controls Model ICM 492 or equivalent. Where phase protection device cannot be mounted within the respective equipment, provide a NEMA 4x or NEMA enclosure appropriate for the installation. The Contractor must consult with the Owner's maintenance personnel and set up all programmable options based on the Owner's requirements, within the device's capabilities.

- 15.11. Warranty:** General warranties are specified in Section "General Mechanical Provisions". The Mechanical Contractor and equipment Manufacturer must provide a non-prorated, total of five years replacement warranty for this equipment, to include all parts and components, belts, lubricants, compressors, refrigerant, etc., all labor, and shipping of the items required to return the installation to its original operating condition.

The Mechanical Contractor must be responsible for any parts, labor, etc. as specified above that is not provided by the equipment Manufacturer.

The Contractor and/or the Manufacturer must respond within 24 hours upon notification that there has been a failure under the terms of the specified warranty. "Respond" must mean having a Manufacturer certified technician onsite to evaluate the extent of the needed repairs/replacement and ordering of all items required for repair/replacement.

Shipping of the replacement compressor and any other related unit parts must be via maximum 2-day delivery if the unit is inoperable or cannot maintain a minimum indoor temperature of 78°F to the affected facility.

The warranty period must begin on the date of substantial completion of the installation, as determined by the Architect, and must continue for the full product warranty period specified above. Refer to Part, Air Cooled Condensing Units for condensing unit and compressor warranty.

- 15.12. Manufacturers:** Trane or equivalent by Mitsubishi, Lennox, LG or Carrier. **Trane is the basis of Design.**

PART 16. WALL MOUNTED PACKAGED DEHUMIDIFIER

Dehumidifier must be Ultra Aire MD33, Model 4035900 in wall mounted dehumidifier operating on 120 Volt, single phase power and manufactured by SantaFe or approved equivalent. The unit must be capable of 33 pints/hour moisture removal with 155 CFM blower. The unit must be as required for hardwiring by the Electrical Contractor. Units must be surface mounted for block walls or recessed for stud walls. Coordinate requirement with architectural plans and provide for wall type indicated. For surface mounted installation, mounted and provided with factory surface mount kit or 2x4 wall mount bezel kit and related rear panel kit, washable air filter, copper drain line to hub drain or outside as shown on the plans, internally mounted

dehumidistat and must operate with R134A refrigerant. The unit must have a minimum 4-year warranty.

PART 17. AUTOMATIC CONTROLS

- 17.1. General:** Furnish and install a complete system of automatic temperature controls, as specified herein, as shown on the Drawings and as required for a complete installation. All temperature control equipment must be of electric type. All specified Sequences of Operation are subject to all equipment built-in safety requirements. Equipment and safety requirements must not be overridden.
- 17.2. Submittals:** The temperature control contractor must submit a complete set of temperature control diagrams with written "sequence of operation" and factory-printed specification data sheets covering each control device proposed to be used for Engineer's review prior to installation of any equipment or part of system. Submittal data must include a schedule of all devices to be installed.
- 17.3. Installation:** By trained and experienced mechanics. All work must be done by an approved, independent HVAC Controls Contractor whose primary business is the installation and servicing of HVAC controls systems. The HVAC Controls Sub-Contractor must have an adequate service facility to provide complete service and maintenance of the facility within 100 miles of the installation.
- 17.4. Identification:** Provide permanent nameplates for all control components and for all motor starters. Nameplates must be engraved laminated plastic with sufficiently large letters to be legible under normal operating conditions. Refer to Section 15010, Part Identification for additional requirements, nameplate materials, etc.
- 17.5. Conduit, Controls Wiring and Instrumentation Cable:** The HVAC Controls Contractor must be responsible for the furnishing and installation of a complete and functional system as specified, shown on the plans and as required to accomplish the specified sequences of operation.

All HVAC control cabling and wiring must be in EMT conduit (no "whips") or on J-hooks. Above accessible lay-in ceilings, control wiring must be installed on J-Hook assemblies. Above all hard, inaccessible ceilings, in all mechanical rooms and in areas with exposed structure (no ceilings), controls wiring must be in conduit. Do not attach any wiring, cabling or conduits to refrigerant piping.

Do not route control wiring through sleeves containing piping. Do not route control wiring through sleeves containing piping. **All control wiring penetrating any exterior wall, interior partition, floor, and similar construction must be in EMT conduit. Through base control wiring/conduit is not allowed.** EMT control conduit must be as specified in the Electrical Division of the specifications and/or as shown on electrical drawings. Minimum HVAC Controls conduit size must be 3/4" in size. All control conduit, power, relays, contactors, transformers, wiring, etc., required for a complete functional system as specified, shown on the plans, or as required to accomplish the specified sequences of operation, which is not shown or specified by the Electrical Division, must be furnished and installed by the HVAC Controls Contractor. This must include all power, interlock control wiring between the various components of the heating, ventilating and air conditioning system, lighting interlocks and all smoke detection system electrical wiring.

Instrumentation cable must be minimum AWG as specified or heavier AWG as recommended by the controls system Manufacturer.

All thermostat and humidistat boxes must be mounted 46" A.F.F. to the center of the box (ADA height). Where wall mounted CO₂ Sensors are indicated, they must be mounted 58" A.F.F to the center of the box.

- 17.6. Space Thermostats:** Space thermostats must be 7-day programmable, microprocessor based, low voltage type with "Heating - Cooling" and fan "On-Off-Auto" switches sub-base. Coordinate thermostat requirements and options with Mechanical Contractor and provide as required to accomplish specified sequence of operation. Each thermostat must have building power supply with transformer and battery back-up power.

Provide hinged metal guard with rounded corners, lock and key for each thermostat.

All thermostat boxes must be mounted 46" A.F.F. to the center of the box (ADA height). All thermostat boxes in walls or partitions must be sealed/caulked to prevent the passage of air and smoke through the device.

- 17.7. Carbon Dioxide Sensors:** Must be of the non-dispersive infrared type (NDIR) diffusion sampling, repeatable to +/- 8 PPM with a measurement range 0 – 2000 PPM and be user adjustable. It must have the following accuracy: from 0-1500 PPM +/- 75 PPM; +/- 5% with an operating range of 32 degrees F to 130 degrees F with a response time of less than 90 seconds.

Sensors must be provided with all options, inputs and outputs required to control the motorized return air and outside air dampers to accomplish the specified Sequence of Operation. Duct mounted sensors must be mounted where shown on the plans. Wall mounted sensors must be mounted 58" A.F.F to the center of the box.

Duct mounted sensors must be Veris Industries Series CDE or approved equivalent by Johnson Controls or Honeywell. Wall mounted sensors must be Veris Industries Series CWE or approved equivalent by Johnson Controls or Honeywell.

Provide metal guards as specified for thermostats.

- 17.8. Humidistats:** Heavy-duty industrial type. Provide metal guard as specified for thermostats.

All humidistat boxes must be mounted 46" A.F.F. to the center of the box (ADA height). All humidistat boxes in walls or partitions must be sealed/caulked to prevent the passage of air and smoke through the device. At his option, the unit Manufacturer/Controls Sub-Contractor may provide a combined thermostat/humidistat device. Coordinate requirement with the equipment manufacturer prior to bidding and provide as required.

- 17.9. Smoke Detectors:** Smoke detectors operating on photoelectric principles must be furnished and installed, including all required wiring, by the Mechanical Contractor in the return air duct(s) where shown on the plans.

The Mechanical Contractor must provide an access door/panel, watertight where required, adjacent to each smoke detector to allow for maintenance and visual inspection. Access panels must be as specified hereinbefore.

The Contractor must take all measures required to keep the smoke detectors clean and protected from construction debris.

- 17.10. Condensate Drainage:** Refer to Part Condensate Drainage Piping of this specification for drainage requirements.
- 17.11. Motorized Control Dampers:** Equal to Ruskin Series CD-50, Pottorff CD-52, Greenheck VCD-43, United Enertech CD-110 or Nailor 2020, galvanized steel frame, Class 1A (less than or equal to 3 cfm/sq.ft. at 1" w.g.) leakage, extruded aluminum airfoil, opposed blade dampers, stainless steel or synthetic bearings with heavy-duty Belimo actuator and 24-volt actuators. The dampers must be labeled by an approved agency when tested in accordance with AMCA 500D.

Coordinate power requirements with electrical contractor and provide as required. Damper motors must be located outside of the air stream. Provide weatherproof construction for outdoor installation of dampers and weatherproof enclosure.

- 17.12. Typical Packaged Heat Pump (PHP) Unit or Split System Heat Pump (HP) Unit Systems with Demand Control Ventilation Sequence of Operation:** Units without demand control ventilation are similar. The control circuit for each unit must be energized by its respective 7-day programmable thermostat. Occupied and unoccupied schedules must be programmed by the Controls/Mechanical Contractor as desired by the Owner.

The thermostat must be used to control heating and cooling. Provide for each heat pump unit an adjustable outdoor thermostat and wire to control the second stage of the auxiliary electric resistance heater.

Upon a call for the occupied schedule, the outside air damper must open to its minimum scheduled outside air setpoint, and the respective indoor/outdoor unit must start. Upon shutdown of the indoor/outdoor, the motorized outside air damper must close.

Upon a call for the unoccupied schedule, the outside air damper must remain closed, and the unit must start.

A wall mounted or duct mounted CO₂ sensor, monitoring CO₂ levels in the space or return air duct, must modulate the outside air damper, motorized relief air damper (as applicable) and return air dampers, in sequence, as required to maintain CO₂ levels at a maximum of 700 PPM (adj). Refer to the equipment schedules for the minimum CO₂ scheduled outside air setpoint and the maximum CO₂ scheduled outside air setpoint. Upon satisfaction of the CO₂ sensor, the outside air, relief air and return air dampers must return to their minimum scheduled setpoint and normal sequence of operation. Refer to the plans for location of the CO₂ sensor type required.

Provide a space humidistat to override the cooling thermostat to provide for dehumidification.

During dehumidification, the heat pump unit reversing valve must be locked out to prevent switching to the heating mode and the compressor must be commanded on for cooling. The space thermostat must then modulate the refrigerant hot gas reheat coil valve to maintain the required space temperature.

Provide smoke detectors as specified above and where shown on the plans. Wire the detectors to stop the unit upon smoke detection. Provide all required interlocks, wiring, relays, etc., as required for shutdown of the unit as specified.

- 17.13. Packaged Heat Pump (PHP) Unit Economizer Cycle:** Units are specified with factory mounted enthalpy-based economizer. The sequence of operation is pre-programmed based on ASHRAE requirements. The Controls Sub-Contractor must verify factory plug and play settings for the region of the installation as required. Refer to equipment specifications and coordinate for proper interface as required.
- 17.14. Exhaust Fan (EF) Controls:** Where indicated provide room thermostat or wall switch to control the respective fan and intake damper operation to maintain space temperature. Also, provide interlock wiring from each exhaust fan to the respective motorized damper motor to operate damper anytime fan is started.
- Provide interlocks for certain fans as noted on fan schedule, including lighting interlocks if not shown on electrical.
- Provide hinged metal guard with rounded corners, lock and key for each thermostat.
- 17.15. Time Delay Controls:** Provide time delay control systems as required to stage units starting to prevent more than three units from starting at the same time.
- 17.16. Miscellaneous Controls:** Provide all other miscellaneous controls, wiring, dampers, valves, etc., as required for a complete functional control system.
- 17.17. Service and Guarantee:** After completion of the installation, adjust all control equipment and place the complete system in operation subject to the review of the Engineer. Guarantee the control system to be free of defects and adequate to provide required control functions for a period of one year after acceptance of project. Provide free service and maintenance during the guarantee period.

END OF SECTION

DIVISION 16

ELECTRICAL



Prepared by Kenneth R. Gunn Jr. P.E.

SECTION 16100
ELECTRICAL

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 specified in this section.

1.02. QUALIFICATIONS OF ELECTRICAL CONTRACTORS:

- A. Electrical contractor must be properly established as an electrical contractor by the State of Alabama. Electrical contractor shall have had previous experience in the satisfactory installation of at least three systems of this type and size in the State of Alabama.

1.03. CODES, PERMITS AND INSPECTIONS:

- A. Comply with applicable laws of the community, with latest edition of National Electrical Code (NEC), NFC 70, and the International Building Code (IBCC) or the edition adopted by the local authority having jurisdiction, where not in conflict with those laws, and with the service rules of the local utility company.
- B. Obtain and pay for all permits and deposits and arrange for inspections as required.
- C. After completion of the work, submit certificate of final inspection and approval from the local electrical inspector, certifying that the installation complies with all regulations governing same.

1.04. MATERIALS:

- A. All materials shall be new, and UL approved where a standard has been established.
- B. Manufacturers' names and model numbers shown on the plans and in the specifications are given to indicate the type and general quality of items to be provided. Equal products by other manufacturers will be accepted.
- C. Material substitutions will be considered only when evidence of equality and suitability, satisfactory to the Architect/Engineer has been presented in writing, with samples if requested by the Architect/Engineer. All prior approvals must have the approval of the engineer of record at the offices of Gunn and Associates, P.C. located at 3102 Highway 14, Millbrook, AL 36054, Phone: 334-285-1273
- D. All proposed substitutions shall be approved in writing at least ten (10) days prior to the bid date.
- E. It shall be understood that the Architect/Engineer has the authority to reject any material or equipment used which is not specified or approved, or showing defects of manufacture or workmanship, before or after such material or equipment is installed.

1.05. WORKMANSHIP:

- A. Execute all work so as to present a neat and workmanlike appearance when completed.

1.06. DESCRIPTION OF WORK:

- A. Furnish all labor and materials required to complete the electrical work indicated on the drawings or herein specified. Major work included in Section 16 shall be:
- B. Prior to bid it is the contractor's responsibility to re-affirm with the power company the service requirements to the facility as indicated on the electrical drawings. If any changes or additions to the service lateral installation indicated on the drawings is required by the utility company the contractor shall include the cost of these changes in his/her bid. Additionally, any/all charges

for electrical service to the facility (aid-to-construction) by the utility company shall be included in the contractor's bid price.

- C. Remove or relocate all electrical or electronic services located on or crossing through the project property, either above or below grade, which would obstruct the construction of the project or conflict in any manner with the complete project or any code pertaining thereto.
- D. Furnish and install a complete electrical light and power system including but not limited to the connection of all meters, switchboards, panelboards, circuit breakers, power outlets, convenience outlets, lighting fixtures, switches, and/or other equipment forming part of the electrical system.
- E. Furnish and install a complete system of outlet boxes, face plates, conduit raceways, Category 6 cables, backboards, patch panels, and fiber optic cables and patch panels for the Data System.
- F. Furnish and install outlet boxes, brass f-connector outlets, conduit raceways, RG6 cabling from each outlet to the nearest backboard, backboard, and service entrance conduit for the cable television outlet system.
- G. Connect all electrical equipment whether furnished by this contractor or by others.
- H. Furnish and install all disconnect switches not included as an integral part of equipment.
- I. Furnish complete buss or busway assemblies where indicated.
- J. Furnish and install a complete Lighting Control System.
- K. Furnish and install a complete Fire Alarm System compliant with applicable provisions of the International Building Code (IBC) and the National Fire Protection Association (NFPA) Standard No. 72.
- L. Complete the alterations, additions, and renovations to the electrical system in the existing building as specified herein or as shown on the drawings.
- M. Procure and pay for permits and certifications as required by local and state ordinances and Fire Underwriters certificate of inspection.
- N. Visit the site and determine conditions that affect this contract. Failure to do so will in no way relieve the Contractor of his responsibility under his contract.
- O. Submit to the Architect a certificate of final inspection from local and/or state inspection authorities.
- P. Establish and maintain temporary electrical services for construction purposes.

1.07. DRAWINGS AND SPECIFICATIONS:

- A. This Contractor shall examine drawings and Specifications relating to the work of all trades and become fully informed as to the extent and character of work required and its relation to all other work in the project prior to submission of bid and prior to the start of any construction.
- B. Drawings and Specifications shall be considered 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 the Architect in advance of bidding; otherwise incorporate the more stringent conditions into the bid price.
- C. Omissions from the drawings and specifications or the mis-description of details of work which are evidently necessary to carry out the intent of the drawings and specifications, or which are customarily performed, shall not relieve the Contractor from performing such omissions and details of work; they shall be performed as if fully and correctly set forth and described in the drawings and specifications.
- D. The drawings indicate diagrammatically the extent, general character, and the approximate location of the work to be performed. In the interest of clearness, the work is not always shown to scale or exact location. Check all measurements, locations of conduit, fixtures, outlets, and equipment with the detailed architectural, structural, and mechanical drawings, and lay out

work so as to fit in with ceiling grids, ductwork, sprinkler piping and heads, and other parts. Take finished dimensions at the job site in preference to using scale dimensions.

- E. Where the work is indicated but with minor details omitted, furnish and install the work complete so as to perform its intended functions.
- F. Where doubt arises as to the meaning of the plans and specifications, obtain the Architect's decision before proceeding with parts affected; otherwise assume liability for damage to other work and for making necessary corrections to work in question.
- G. Except as noted above, make no changes in or deviations from the work as shown or specified except on written order of the Architect.

1.08. EXISTING CONDITIONS:

- A. Before submitting a bid, visit the site and ascertain all existing conditions.
- B. Make such adjustments in work as are required by the actual conditions encountered.
- C. No consideration will be given after bid opening for alleged misunderstandings regarding utility connections, integration of work with existing system, or other existing conditions.

1.09. SUBMITTALS:

- A. Follow procedure outlined in Division 1.
- B. Submittals shall be bound together and shall include a coversheet indicating the following:
 - 1. Project name
 - 2. Trade contractor's name
 - 3. Supplier's name
 - 4. Name and phone number of supplier's contact person
 - 5. A list of each item submitted with manufacturers' names and model numbers.
- C. Within 20 days of award of contract and prior to beginning any work on the project submit six (6) copies of manufacturer's drawings/data sheets for the following items to the Engineer for review:
 - 1. Conductors
 - 2. Cable Pulling tensions. Provide cable pull tension calculations (lateral and longitudinal) on all underground cable runs over 150 feet for cables sized #1 and larger. Provide one line diagram indicating pulling tensions on each run and number and size of each pull box along anticipated route. Calculations shall include changes in direction or elevation of feeder runs.
 - 3. Wiring Devices
 - 4. Conduit Wrapping Tape
 - 5. Panelboards
 - 6. Power system breaker coordination. Submit proper breaker settings recommendations with breaker coordination study.
 - 7. Contractor shall coordinate with mechanical/plumbing shop drawings prior to submitting power package to engineer. Adjust overcurrent devices accordingly.
 - 8. Disconnect Switches
 - 9. Fire Stopping
 - 10. Lighting Control System: Include conduit and cable layout, terminal to terminal wiring showing color code and wire numbers, and complete technical data on each system component. Furnish the Owner one set of as built drawings at completion of the project. Coordinate with lighting control riser on drawings for further shop drawings requirements.
 - 11. Lighting Fixtures (include photometric data for each fixture)
 - 12. Fixture Support Equipment
 - 13. Data/Telecommunications System
 - a. Cable
 - b. Equipment
 - c. Installer qualifications

- d. Makes and Model Numbers of Testing Equipment to be used.
- 14. Secondary Surge Arresters
- 15. Transient Voltage Surge Suppressors(Surge Protective Devices)
- 16. **Fire Alarm System: Include conduit and cable layout, battery calculations, terminal to terminal wiring showing color code and wire numbers, and complete technical data on each system component. Additionally, the contractor or his/her fire alarm system vendor shall provide audibility calculations indicating compliance with all applicable provisions of NFPA 72 and the IBC. The contract drawings indicate a minimum design required to comply with applicable codes. However, since devices vary from manufacturer to manufacturer the contractor shall be responsible for furnishing any/all additional devices as required to provide audibility and visibility levels that comply with applicable sections of NFPA 72 and IBC. Furnish the Owner one set of as built drawings at completion of the project. Provide a copy of the fire alarm contractor's State Fire Marshal's Permit with the submittals for approval.**
- 17. **Fire Alarm Submittals: Alabama DCM projects will be required to provide a courtesy set of approved fire alarm submittals to the local fire department for their records. Not for review, but only for their records.**
- 18. J-Hooks
- D. Submit samples upon request.
- E. The Contractor is responsible for verifying all quantities and for verifying and coordinating dimensional data with the available space for items other than the basis of design.
- F. **Provide a 1/2"= 1'- 0" scale drawing of all electrical rooms containing more than a single panelboard section or containing a panelboard and other electrical and/or mechanical equipment. These drawings shall be submitted along with equipment data sheets. Note we will no longer review submittals that does not have this information. Any delay will be the responsibility of the contractor for not submitting these drawings of the electrical rooms. Power submittals will be returned rejected without these drawings.**
- G. The contractor shall review and approve or make appropriate notations on each item prior to submittal to the architect. Submittals without contractor's approval will be rejected.
- H. Submittal reviews will be performed up to two times to review material submitted by contractor. Gunn & Associates will charge a review fee of a \$1,000 to review submittals starting the third time submitted. If contractor needs Gunn & Associates, P.C. to perform another review of material after submittals have been submitted and approved to change manufacturers. A review cost of \$1,000 per review. Payment must be received by Gunn & Associates prior to scheduling any additional reviews.

1.10. COORDINATION OF SERVICE WITH OTHER TRADES:

- A. It shall be the responsibility of the Electrical Contractor to coordinate the electrical service characteristics to each piece of electrically operated equipment with all trades providing electrically operated equipment.
- B. Within ten (10) working days of notification to proceed with construction from the Architect, the Electrical Contractor shall notify, in writing, all trades providing electrically operated equipment the characteristic of the electrical power being supplied to each piece of electrically operated equipment.
- C. A copy of this notification shall be provided to the General Contractor and the Architect.
- D. Be informed as to equipment being furnished by other trades, but not liable for added cost incurred by equipment substitutions made by others which require excess electrical wiring or equipment above that indicated on drawings or specified.
- E. The contractor providing the equipment shall be responsible for the additional costs.

1.11. PROGRESS OF WORK:

- A. Schedule work as necessary to cooperate with other trades, Do not delay other trades. Maintain necessary competent mechanics and supervision to provide an orderly progression of the work.

1.12. PROTECTION OF PERSONS AND PROPERTY DURING CONSTRUCTION:

- A. Take all precautions necessary to provide safety and protection to persons and the protection of materials and property.
- B. Protect items of equipment from stains, corrosion, scratches, and any other damage or dirt, whether in storage, at job site or installed. No damaged or dirty equipment, lenses, or reflectors will be accepted.
- C. Live panelboards, outlets, switches, motor control equipment, junction boxes, etc., shall be protected against contact of live parts and conductors by personnel.

1.13. CLEANING UP:

- A. During the progress of work, keep the Owner's premises in a neat and orderly condition, free from accumulation of debris resulting from this work. At the completion of the work, remove all material, scrap, etc. not a part of this Contract.

1.14. AS-BUILT DRAWINGS, AND OPERATING AND MAINTENANCE INSTRUCTIONS:

- A. Prior to the Final Acceptance Inspection the Contractor shall turn over to the Architect one set of reproducible "as built" drawings, including corrected fire alarm system shop drawings, three (3) sets of all equipment catalogs and maintenance data, manufacturers' warranties, and three (3) sets of shop drawings on all equipment.

1.15. TESTING:

- A. Upon completion of the work, conduct a thorough test in the presence of Architect or his representative, and demonstrate that all systems are in perfect working condition.

1.16. INSPECTIONS:

- A. The contractor shall have all systems ready for operation and an electrician available to remove panel fronts, coverplates, fixture doors, etc., at the final inspection and any other scheduled inspections.
- B. It is the contractor's responsibility to have the job ready for inspections when they are scheduled. We will perform inspections as required by our contract. If project is not ready during inspection and requires a re-inspection by Gunn & Associates, then the contractor shall pay Gunn & Associates, P.C. for the re-inspection. The payment shall be made directly to Gunn & Associates, P.C. in the amount to be determined by engineer. Not to exceed \$1,500 for single re-inspection fee. Payment must be received by Gunn & Associates prior to scheduling re-inspection.
- C. Inspections for Temporary or Permanent Power required by any utility companies are not in our scope of work. If contractor needs Gunn & Associates, P.C. to perform inspections, contractor must include an inspection cost of \$1,000 per inspection in their base bid. Payment must be received by Gunn & Associates prior to scheduling inspection.

1.17. DEMONSTRATION:

- A. By on-off, stop-start operation, demonstrate to the Owner or his representative, the use, working, resetting, and adjusting of each and every system. Submit statement initialed by the Owner that such demonstration has been made.

1.18. WARRANTY:

- A. Warrant the entire electrical system in proper working order. Replace, without additional charge, all work or material that may develop defects (ordinary wear and tear or damage resulting from improper handling excepted) within a period of one year from date of final to general contractor. Provide the owner with two bound copies of all manufacturers' warranties.

- B. Data and Telecommunications system cabling shall be warranted for a minimum of 15 years.

1.19. TEMPORARY SYSTEMS:

- A. The Electrical Contractor shall be responsible for furnishing and installing equipment and materials necessary for providing electrical power and lighting where needed for the construction of the project.
- B. Electrical Contractor will be responsible for paying for and providing temporary construction power and lighting for entire job site. Coordinate with local jurisdictions and utility companies and pay all fees necessary to get temporary power to the job site. General Contractor shall be responsible for all monthly utility cost for duration of project or date of substantial completion.

1.20. SERVICE INTERRUPTION CLEARANCE WITH OWNER:

- A. Before submitting a proposal, check with the Owner concerning interruption of service to the existing electrical systems. No interruption shall be made except at such time and for such duration as approved by the Owner. The Contractor's bid shall include all necessary over-time and weekend work.

1.21. DEFINITIONS:

"AWG" - American Wire Gauge

"ADA" – Americans with Disabilities Act

"As required" - Any and all items required to complete the installation of an item so as to perform its intended function.

"Circuiting" - Conductors, raceways, raceway fittings, and associated hardware.

"EMT" – Electrical Metallic Tubing, "thin wall"

"IBC" – International Building Code

"Install" - furnish, install, and make all necessary connections to and/or for the item(s) indicated or specified.

"NEC" - National Electrical Code, ANSI/NFPA 70, latest edition or the edition adopted by the authority having jurisdiction.

"Necessary" - Any and all items required to complete the installation of an item so as to perform its intended function.

"NEMA" - National Electrical Manufacturers' Association

"NFPA" - National Fire Protection Association

"PVC Conduit" – Rigid Nonmetallic Polyvinyl Chloride conduit

"RGS Conduit" – Rigid galvanized steel conduit

"UL" - Underwriters' Laboratories, Inc.

PART 2 - MATERIALS

2.01. GENERAL:

- A. This section includes all basic materials for raceways, fittings, busways, conductors, panelboards, switchboards, lighting fixtures and accessories, etc., as required for a complete installation.
- B. All materials shall be new and listed by the Underwriters Laboratories. Material substitutions will be considered only when evidence of equality and suitability, satisfactory to the Architect has been presented in writing, with samples if requested by the Architect.
- C. It shall be understood that the Architect/Engineer has the authority to reject any material or equipment used which is not specified or approved, or showing defects of manufacture or workmanship, before or after such material or equipment is installed.

2.02. CONDUITS:

- A. Rigid Metal (Galvanized Steel-RGS) Conduit: Rigid metal conduit shall be mild steel piping, galvanized inside and outside, and conform to ASA Specification 080.1 and Underwriters' Laboratories Specifications. By Sprang, Republic, Wheatland, Triangle or Pittsburgh.
- B. Intermediate Metal Conduit (IMC): IMC shall be hot dipped galvanized inside and outside and manufactured in accordance with U.L. Standard #6 or #1242. By Allied or approved equal.
- C. Electrical Metallic Tubing (EMT): EMT shall be high grade steel electro-galvanized outside and lacquer or enamel coating inside and conform to ASA Specifications 080.1 and Underwriters' Laboratories Specifications. By Sprang, Republic, Wheatland, Triangle or Pittsburgh.
- D. Rigid Nonmetallic Conduit (PVC): PVC conduit where exposed shall be high impact Schedule 80; below ground and below or in slab PVC shall be of high impact Schedule 40 PVC and shall conform to Underwriters' Laboratories Standard UL-651. By Carlon, Kraley Pittsburgh, R.G. Sloan or Southwestern.
- E. Rigid Aluminum: Rigid Aluminum conduit shall be manufactured from 6063, t-1 aluminum alloy and shall meet the requirements of Federal Spec. WW-C-540c and ANSI C80.5 and shall be U.L. listed in accordance with UL-6. Equal to products by V.A.W. of America.

2.03. COUPLINGS, FITTINGS, AND CONNECTORS:

- A. RGS & IMC: By Appleton, Crouse-Hinds, Efcor, O-Z/Gedney, Racor, or Republic.
- B. EMT: EMT fittings shall be all steel type setscrew or insulated throat compression type. Pressure indented or slip fit type will not be accepted. All connectors to be insulated. By Appleton, Efcor, Racor Steel City, or Thomas & Betts.
- C. PVC: PVC fittings shall be of high impact PVC Schedule 40 or Schedule 80 to match the installed conduit. Joints shall be made with PVC solvent cement as recommended by manufacturer. By Pittsburgh, R.G. Sloan or Carlon.
- D. Rigid Aluminum: Fittings used with Rigid Aluminum conduit shall be formed of the same alloy as the conduit or shall be copper free cast aluminum unless specifically indicated otherwise.

2.04. CONDUIT BODIES:

- A. Conduit bodies shall be malleable iron except in kitchen, dishwashing, and waste water treatment areas conduit bodies shall be copper free cast aluminum with stamped aluminum covers.
- B. Covers shall be screw retained with wedge nut or threaded body. Covers on bodies installed outdoors shall be approved and rated for installation outdoors.
- C. Bodies shall comply with NEC 370 and 373.
- D. RGS & IMC: By Appleton, Crouse-Hinds, Efcor, O-Z/Gedney, Racor, or Republic.
- E. Conduit cannot be used as ground. Provide separate insulated green grounding wire.

2.05. BUSHINGS:

- A. Bushings up to and including 1" shall have a tapered throat.
- B. Bushings 1-1/4" and larger shall be the insulating type.
- C. Grounding bushings shall be specification grade insulated grounding type bushings with tin plated copper grounding saddles and shall be equal to O-Z/Gedney Type BLG or HBLG.
- D. Bushings shall be zinc plated malleable iron or copper free cast aluminum.
- E. Bushings for terminating Data, Telecommunications, control, CATV, and similar conduits above ceilings and at backboards may be PVC or Polyethylene insulating bushings equal to those manufactured by Arlington Industries and Bridgeport Fittings.

2.06. EXPANSION FITTINGS:

- A. Conduit Expansion Joints shall be UL Listed.

- B. Expansion joints in rigid metal conduits shall consist of a threaded malleable iron body, pressure bushing, watertight packing, pressure ring, gasket, insulating bushing, and external grounding jumper, and shall be equal to O-Z Gedney Type AX with Type BJ bonding jumper.
- C. Expansion joints for EMT conduit shall be same as above with additional EMT couplings and connectors and shall be equal to O-Z Gedney Type TX with Type BJ bonding jumper.
- D. Expansion joints in PVC conduit shall be equal to Carlon Series E945.
- E. Expansion joints shall provide a minimum of 4" of conduit movement.

2.07. BELOW GRADE THRU WALL WATER SEALS:

- A. Thru wall water seals for conduits penetrating exterior below grade concrete walls shall be seal systems by O-Z/Gedney or The Metraflex Company.
- B. Thru wall water seals for conduits penetrating exterior below grade concrete walls shall be Metraseal thru wall water seals by The Metraflex Company.

2.08. CONDUIT ACCESSORIES:

- A. Conduit clamps and supports for metallic conduit shall be galvanized steel by Efcor, Steel City, or Mineralac. Conduit fittings by Appleton, Crouse-Hinds, O-Z/Gedney, Pyle-National or approved equal.
- B. Conduit clamps and supports for nonmetallic conduit shall be nonmetallic high impact PVC by Carlon, Pittsburg, or Sloan.
- C. Conduit clamps for aluminum conduits shall be stainless steel or cast copper free aluminum with stainless steel fasteners.

2.09. FLEXIBLE CONDUIT:

- A. Liquidtight flexible metal conduit:
 - 1. Neoprene-jacketed liquidtight flexible metal conduit.
 - 2. Equal to Anaconda Sealtite.

2.10. ELECTRICAL TAPES:

- A. General use electrical tape shall be 8 mil (.008") thick, minimum, premium grade, pressure sensitive, flame retardant, vinyl electrical tape meeting UL 510, ASTM-D-3005, and MIL-I-24391C. The tape shall be equal to 3M No. 88 or Plymouth Premium 85 CW.
- B. Rubber tape used as primary tape shall be a 30 mil (.030") thick, minimum self-amalgamating, low voltage rubber tape rated for use through 600 V. Rubber tape shall be equal to 3M No. 2150 or Plymouth 122 Rubber Tape.
- C. Electrical filler tape shall be a 125 mil (.125") thick, minimum, self-amalgamating, low voltage insulating compound rated for use through 5 kV. Filler tape shall be equal to 3M SCOTCHFILL or Plymouth 125 Electrical Filler Tape.

2.11. PIPE WRAPPING TAPE:

- A. Pipe wrapping tape shall be a 10 mil (.010") thick, minimum, pressure sensitive, vinyl tape manufactured for pipe wrapping applications.
- B. The tape shall be UV, bacteria, and fungus resistant.
- C. The manufacturer's name and tape type shall be printed on the back of the tape.
- D. Pipe wrapping tape shall be equal to Plymouth Rubber Co. PLYWRAP 11, or 3M No. 50.

2.12. WIRE NUTS:

- A. Wire nuts for conductor splicing shall be winged type connectors with a square, plated steel spring and flame-retardant thermoplastic shell.
- B. The connector shall be rated for the number and size conductors being connected.
- C. The Wire Nuts shall be rated for 105°C. And UL 486C listed.

- D. Wire nuts shall be equal to connectors by Ideal/Buchanan, 3M/Scotch, or T & B,

2.13. SPLIT BOLT CONNECTORS:

- A. Split bolt connectors for splicing conductors shall be UL 486A listed, shall be tin plated copper, and shall have a hexagonal head and nut.
- B. Split bolt connectors for conductors sized AWG #4 and larger shall have a serrated spacer bar between conductors.
- C. Split bolt connectors for splicing conductors AWG #12 through #6 shall be equal to Ilco Type SEL and Type SK for AWG #4 and larger conductors.

2.14. MULTI-TAP CONNECTORS:

- A. Multi-tap connectors shall be insulated type
- B. Multi-tap connectors shall be rated for the conductor sizes indicated on the drawings.
- C. The connectors shall be provided for the number of conductors indicated, including any future taps shown, plus a minimum of one additional tap.
- D. Multi-tap connectors shall be equal to Ilco Type PCT or Type PED-CP.

2.15. WATERPROOF WIRE JOINTS:

- A. Splices made below grade shall be made connectors, UL listed as waterproof, for below grade applications.
- B. Waterproof Twist On Connectors for Up to #6 W/1#12 tap Conductors: Single piece wire nut pre-filled with silicone sealant. Sealant shall be rated for 45-400 degrees F. Connectors shall have same insulation rating as conductors. Sizes shall be available for connecting up to 2 #6 w/1#12 tap conductors. Connectors shall be UL listed as waterproof for below grade applications and equal to Ideal Buchanan B-Cap Twist and Seal Wire Connectors, King Safety Products, Tyco/Raychem GelCap SL, or equal.
- C. Waterproof Stub Splice Kit for up to #2/0 Conductors: Kit containing connector block, outer waterproof sleeve, and lubricant. Sleeve shall have same insulation rating as conductors. Kit shall be rated for feeder wire sizes #14 through #2/0 and tap wire sizes of #14 through #6. Connectors shall be UL listed as waterproof for below grade applications and equal to Tyco/Raychem GelCap SL.
- D. Waterproof In-line Splice Kit for up to #2/0 Conductors: Kit containing connector block, outer waterproof sleeve, and lubricant. Sleeve shall have same insulation rating as conductors. Kit shall be rated for wire sizes #6 through #350 kcm. Connectors shall be equal to Tyco/Raychem GTAP.
- E. Waterproof Splice Kit for Conductors above #2/0: Kit containing connector block, outer waterproof sleeve, and lubricant. Sleeve shall have same insulation rating as conductors. Kit shall be rated for wire sizes #14 through #2/0. Connectors shall be equal to Tyco/Raychem GHFC.

2.16. PLASTIC MARKING TAPE FOR MARKING UNDERGROUND CABLES AND CONDUITS:

- A. Plastic marking tape shall be acid and alkali-resistant polyethylene film, 6 inches wide with minimum thickness of 0.004 inch.
- B. Tape shall have a minimum strength of 1750 psi lengthwise and 1500 psi crosswise.
- C. The tape shall be manufactured with integral wires, foil backing or other means to enable detection by a metal detector when the tape is buried up to 3 feet deep.
- D. The tape shall be of a type specifically manufactured for marking and locating underground utilities.
- E. The metallic core of the tape shall be encased in a protective jacket or provided with other means to protect it from corrosion.

- F. Tape color shall be as specified in the table below and shall bear a continuous printed inscription describing the specific utility.

Red:	Electric
Orange:	Data, Telephone, Television,

2.17. FIRE STOPPING:

- A. Fire sealant shall be intumescent caulk, putty, sheet and/or wrap/strip as required to attain the proper rating.
- B. Caulk shall be equal to 3M CP25 N/S and/or S/L.
- C. Putty shall be equal to 3M Fire Barrier Moldable Putty.
- D. Sheet equal to 3M CS195.
- E. Wrap/strip equal to 3M FS195.
- F. Equal products by Dow Corning, Hilti, and Metacaulk will be accepted.

2.18. SPACERS FOR CONCRETE ENCASED ELECTRICAL DUCTS:

- A. Spacers shall be interlocking high impact plastic assemblies, which provide horizontal and vertical spacing, and hold the ducts and re-bar, where applicable, in place.
- B. The spacers shall be equal to Carlon Snap-Lok Spacers.

2.19. JUNCTION BOXES (THRU 4-11/16"):

- A. Sheet Metal: To be standard type with knockouts made of hot dipped galvanized steel, By Steel City, Raco, Appleton or approved equal.
- B. Cast: To be type FS, FD, JB, GS or SEH as required for application.

2.20. JUNCTION AND PULL BOXES (LARGER THAN 4-11/16"):

- A. Shall be cast metal for all below grade exterior use and where indicated on plans. All other shall be oil tight, JIC boxes not less than 16 gauge, equal to Hoffman type "CH" boxes.

2.21. PULL BOXES:

- A. Galvanized sheet metal screw-cover type with UL label as produced by Austin, B & C Metal Stamping Company, E-Box, Hoffman, Wiegmann, or approved equal.

2.22. JUNCTION AND TERMINAL BOXES FOR AUXILIARY SYSTEMS:

- A. Junction boxes for auxiliary system circuiting splicing shall be formed of galvanized steel.
- B. Boxes shall have hinged front, locking door(s).
- C. Metal back plates shall be provided for mounting terminal strips or other devices.
- D. Screw terminal strips shall be provided with a minimum of 25 percent spare terminals.
- E. Boxes shall be sized to accommodate the terminal blocks and conductors, providing code required bending space.
- F. Boxes for auxiliary systems shall be manufactured by Austin, E-Box, Hoffman, or Wiegmann.
- G. Provide complete back boxes for all surface mounted devices. Back box shall have knockout on top and bottom as needed. Surface mounted junction boxes with devices mounted to it will not be accepted. Wiremold boxes will be accepted.

2.23. AUXILIARY GUTTERS (WIRING TROUGHS):

- A. Gutters shall be of sizes shown and/or required by the NEC (whichever is larger), constructed of code gauge, galvanized sheet steel, painted ANSI 61 gray.
- B. Gutters shall be UL listed and shall be of NEMA 3R construction in wet or damp locations or shall be as indicated on the drawings.
- C. Gutters shall be as produced by Austin, B & C Metal Stamping Company, E-Box, Hoffman, Wiegmann, or approved equal.

2.24. STRUT SYSTEM FOR SUPPORT OF ELECTRICAL EQUIPMENT:

- A. Strut shall be 1-5/8" except where heavier strut is required to support the load, for rigidity, or where specifically indicated otherwise.
- B. Cold-formed steel, ASTM A 570 or A 446 GR A.
- C. Stainless Steel Strut: Type 304, ASTM A 240.
- D. Hot Dipped Galvanized Steel Strut: Zinc coated after manufacturing operations are complete, ASTM A 123 or A 153
- E. Electro-galvanized Steel Strut: Electrolytically zinc coated, ASTM B 633 Type III SC 1.
- F. Fittings: Same material as strut, ASTM A 575, A 576, A 36, A 635, or A 240.
- G. Zinc Primer: As recommended by strut manufacturer.
- H. Strut Systems shall be as manufactured by B-Line, Erico, Globe, Kindorf, MasterStrut, Power Strut, T&B SuperStrut, or Unistrut.

2.25. OUTLET BOXES:

- A. General: Except as noted, boxes shall be standard hot dipped galvanized steel 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 Appleton, National, Steel City, or approved equal.
- B. Ceiling and Wall Bracket Outlets: 4" octagonal boxes with plaster rings appropriate for finish surface.
- C. Typical boxes (for switches, receptacles and auxiliary systems):
 - 1. All junction boxes shall be recessed within the confines of the walls unless otherwise noted. Junction boxes shall be accessible by means of a coverplate or a standard junction box cover whichever is appropriate for the installation.
 - 2. 4" square boxes ganged as required. Box volume shall be in accordance with NEC Section 370 – provide extensions as required.
 - 3. 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 otherwise appropriate for surface and construction.
 - 4. Use 4-11/16" square, 2-1/8" deep boxes where more than 10 conductors enter the boxes. Provide extensions as required to provide volume per NEC.
 - 5. Where existing walls are furred out with shallow hatch channel and sheet rock then the contractor will be required to use a shallow junction as required.
 - 6. All exposed junction boxes for receptacles, communications devices, switches, and fire alarm devices shall be provided with back boxes. Do not use standard stamped steel junction boxes when exposed. No exposed edges of devices plates will be allowed. No knockouts on the side of the box. Boxes shall be similar to Wiremold 500 & 700 Series or FS boxes. The wall plates will not be allowed to have overlap plates.
- D. Boxes in Exposed (or Thin-Coat 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.
- E. Boxes used with Exposed Conduit: 4" square utility boxes.
- F. Exterior Boxes: Galvanized cast-metal boxes, Crouse-Hinds Type FS or FD as appropriate. Make weatherproof with gasketed covers. Equal products by Appleton, Killark, O-Z/Gedney or approved equal will be accepted.
- G. Exterior Boxes: All receptacle boxes shall be recessed unless specifically called out not to be. This includes exterior receptacles in all masonry type walls including but not limited to Pre-cast, Brick, Block, etc.
- H. Boxes used with Recessed Lighting Fixtures: Provide a 4" square box with blank cover.

- I. 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).
- J. Boxes installed exposed in kitchen and dishwashing areas shall be copper free cast aluminum with gasketed cast coverplates, without lift cover, unless specifically indicated otherwise on the drawings.
- K. All junction boxes shall be mounted in accessible locations. Provide access panels as needed in hard or detention surfaces to access.

2.26. CONDUCTORS AND CABLES:

- A. Power Conductors
 - 1. The ungrounded conductors (phase) and the grounded conductor (neutral) of each voltage system being installed shall be phase identified the full length of the conductor with the color characteristics manufactured in the insulation of cable from the cable manufacturer. Required color cable will then be installed for the specific voltage system as identified in these specifications.
 - 2. All conductors shall be copper with not less than 98% conductivity and with current carrying capacities per N.E.C. for 60°C. for sizes through #1 AWG and 75°C for conductors #1/0 and above.
 - 3. All conductors shall have manufacturer's name, type insulation, and conductor size imprinted on jacket at regular intervals.
 - 4. Conductors of size #10 and smaller shall be solid copper conductors with 600-volt type THHN or THWN insulation.
 - 5. Conductors of size #8 and larger shall be stranded copper conductors with 600-volt type THHN or THWN insulation.
 - 6. All motor branch circuits, HVAC, and plumbing equipment shall be stranded copper conductors with 600-volt type RHH-RHW insulation.
 - 7. All conductors installed in conduit below grade shall be rated for wet location.
 - 8. Manufacturer: Conductors shall be products of GE, Triangle, Phelps- Dodge, Anaconda, Rome, Habirshaw, General Cable, or approved equal.
 - 9. Fixture Wire:
 - a. Conductors feeding into fixtures, other than fluorescent fixtures, of 300 watts or less shall be #14, 200°C., type SF-2, for fixtures of more than 300 watts #12, 200 °C., type SF-2 shall be used.
 - b. Conductors pulled through fluorescent fixtures shall have Type TFN or TFFN fixture wire, rated 90oC.
 - c. Conductors shall be by Dodge, Anaconda, Rome General Cable or Southwire.
- B. Control and Signal Wire: Conductor type TFF, minimum size #16 copper and fully color-coded, shall be used. Conductors shall be by Anaconda, Houston Wire & Cable, General Cable, Phelps Dodge, Rome, or Southwire.

2.27. WIRING DEVICES:

- A. General: Manufacturer's and catalog numbers listed are used to establish style, type and quality. Unless otherwise indicated on drawings, all wiring devices shall be UL listed, side-wired specification grade.
- B. Manufacturers: Equal devices by Hubbell, Leviton, Eaton and P & S will be accepted. All devices shall have plaster ears.
- C. Wall switches: 120/277V, 20A, AC, flush enclosed, quiet type switches with thermoplastic body and polycarbonate toggles. Switches shall meet Federal Specification WS-896. Switches shall be, Hubbell 1200 series, Leviton 1200 series, Eaton AH1200 series or P & S PS20AC series single pole, 2-pole, 3-way, or 4-way as required.

- D. Duplex receptacles (general purpose): 125V/20A flush duplex back and side wired hard use specification grade receptacles, NEMA 5-20R configuration, with nylon face and body, grounding terminal and break-off fins for converting to 2-circuit use. Receptacles shall meet Federal Specification WC-596. Color to match wall switches. Equal to P & S 5362, Hubbell CR20, Eaton 5362 or Leviton 5362.
- E. Tamper Resistant Duplex receptacles, 125V/20A flush duplex, hospital grade, tamper resistant receptacles, NEMA 5-20R configuration, with nylon face and body, grounding terminal. Receptacles shall meet Federal Specification WC-596. Color to match wall switches. Equal to P & S TR62-H, Eaton TR8300 or Hubbell HBL8300SGDuplex combination 125/250-volt receptacles: receptacles shall be 20 amp, combination 125 volt (NEMA 5-20R)/250-volt (NEMA 6-20R) grounding receptacles.
- F. Isolated Ground Receptacles: 125V/20A, NEMA 5-20R configuration, equal to Hubbell #IG5362, Eaton AHIG5362, Leviton #5362-1g, or P & S IG6300. IG receptacles shall be same color as general-purpose receptacles with an orange triangle on the face – fully orange colored receptacles shall not be acceptable.
- G. Ground Fault Circuit Interrupt Receptacles: 125V/20-amp ground fault circuit interrupting receptacle for personnel protection, NEMA 5-20R configuration, Equal to Hubbell #GF5362, Leviton #6599, Eaton SGF20 or P & S 2091. Each GFCI symbol on drawing indicates a GFCI type receptacle. Do not through-wire non-GFCI receptacles from GFCI receptacles where ground fault protection is required. All exterior receptacles shall be ground fault interrupting type with weatherproof coverplates.
- H. Faceless Ground Fault Circuit Interrupter: 125V, 20-amp ground fault circuit interrupter UL listed for personnel protection, equal to Hubbell GFR5350 Series, Leviton 6490, Eaton SGFD20 or Pass & Seymour Series 2081.
- I. Single Receptacles: Flush Bakelite receptacles with side wiring and grounding terminal, voltage, amperage, and configuration as required for circuit indicated.
- J. Each single or multi outlet receptacle, other than straight blade, 15 or 20 amp, 120 volts, NEMA 5-15R or NEMA 5-20R, shall be provided with matching cord plugs.
- K. Multioutlet Assemblies, Strip outlets, 15 amp, 125V, grounded, outlets on 6" centers, equal to Wiremold V20GBx06. Where x = length indicated on the drawings.
- L. Plugs for kitchen equipment to be plugged into wall mounted straight blade receptacles shall be angled type.
- M. Wiring devices shall be of color as directed by Architect. Devices must be available in ivory, brown, black, white, and gray. Devices connected to the emergency generator shall be red in color.
- N. All receptacles shall be tamper-proof type receptacles where required by the National Electrical Code.
- O. Pin and Sleeve Devices:
 - 1. Pin and Sleeve Devices shall be watertight plugs and receptacles of the ratings shown on the legend and/or schedules.
 - 2. Devices shall be listed to UL Standard 498 and UL Classified to IEC Standards 309-1 and 309-2.
 - 3. Devices shall be furnished as matching plugs and receptacles with cast aluminum angled backbox.
 - 4. Devices shall be manufactured by Hubbell, Leviton, Eaton or P&S.

2.28. DEVICE PLATES:

- A. Type appropriate for the associated wiring device, equal to Sierra Stainless Steel Smoothline. Device plates shall be of color as directed by Architect. Devices must be available in ivory,

brown, black, white, and stainless steel. Provide single plate of proper gang where more than one device occurs (do not gang dimmers with rocker switches).

- B. Damp Location: 20 amp, 125 and 250-volt receptacles - Covers shall be weatherproof when plugs are not installed, provide cast aluminum weatherproof coverplates with single lift cover and gasket equal to Hubbell CWP26H.
- C. Wet Locations, 20 amp, 125 and 250-volt receptacles: Covers shall be weatherproof In-Use covers, rated NEMA 3R when in use and shall be constructed of cast aluminum with sealing gasket. Covers shall be equal to products by Hubbell, Leviton, Steel City, T & B, and Taymac.
- D. Coverplates for exposed cast aluminum boxes in kitchen and dishwashing areas shall be cast coverplates, without lift cover, unless specifically indicated otherwise on the drawings.
- E. Color: Wiring device cover plates shall be of color as indicated on drawings or directed by Architect. Devices must be available in ivory, brown, black, white, gray, and stainless steel.
- F. Jumbo and Mini-Jumbo plates will not be accepted.

2.29. OCCUPANCY SENSORS AND ACCESSORIES FOR LIGHTING CONTROL:

- A. Occupancy sensors shall be totally passive in nature, in that the sensors shall not emit or interfere with any other electronic device, or human characteristic. Sensors shall be dual technology, i.e.: Passive Infrared (PIR) and Microphonic.
- B. PIR shall initiate an "on" condition and the PIR or microphones shall maintain the load "on".
- C. Upon detection of human activity by the detector the lights shall come on and a time delay shall be initiated to maintain the lights on for a pre-set time period. The time delay shall be factory set and field adjustable from 30 seconds to 20 minutes.
- D. All devices shall be factory warranted for 5 years.
- E. All sensors shall be low voltage, 12 to 24 volts and shall work in conjunction with remote power packs.
- F. Occupancy sensors shall be as shown on drawings.

2.30. GROUNDING:

- A. Ground Rods shall be 3/4" x 10' copperclad steel.
- B. All grounding conductors shall be copper.

2.31. DATA AND TELECOMMUNICATIONS SYSTEMS:

- A. Qualifications of Data and Telecommunications Systems Installer:
 - 1. The Cable installer sub-contractor shall be properly licensed and established in the business of data and telecommunications systems installation.
 - 2. Data and Telecommunications Cable Installers shall be certified as installers by BiCSi. Proof of Certification shall be provided prior to beginning installation.
 - 3. Cable installers shall be certified by the cable manufacturer and the connectivity hardware manufacturer and the entire structured cabling system covered by a manufacture/installer 15 year, minimum, warranty. Proof of Certification and Warranty agreement shall be provided prior to beginning installation.
- B. Data and Telecommunications Outlets:
 - 1. Data and Telecommunications outlets shall be modular, Category 6 outlets configured for T568B (AT&T) termination. See drawings for model numbers.
 - 2. Modules shall be mounted in brackets that allow use of standard receptacle faceplates. See drawings for model numbers.
 - 3. The face of modules/jacks shall be flush with the face of the coverplate.
 - 4. Each outlet coverplate shall be capable of housing a minimum of four (4) data/telecommunications jacks.
 - 5. Each Phone/Data outlet shall have a minimum of two (2) RJ45 Category 6 jacks installed, one telephone and one data.

6. Wall phone outlets for hanging phones shall have a stainless steel coverplate with integral lugs for modular wall hung phone installation complete with jack. Wall phone outlets shall be equal to Hubbell Series 630 plates.
 7. All unused jack ports shall be equipped with matching blank filler.
 8. Architect to select color of faceplate.
- C. Data System Patch Panel:
1. Patch Panel:
 - a. See drawings for details.
 2. Cable Management Panel:
 - a. See drawings for details.
 3. Rack Mounted Fiber Optic Patch Panel:
 - a. See drawings for details.
- D. Data and Telecommunications Racks:
1. Wall Mounted Equipment Rack:
 - a. Wall mounted equipment racks shall be standard 19" wide X 6" deep X 10.5" high hinged front type.
 - b. Wall mounted racks shall accept standard 19" panels.
 - c. Panel frame shall be aluminum with front swing gate.
 - d. Wall mounted equipment racks shall be standard 20.25" wide X 18" deep X 38" high (18 rack units) aluminum framed structures with black finish equal to Ortronics #OR-604045450.
 - e. Wall mounted equipment racks shall be standard 20.25" wide X 18" deep X 50" high (26 rack units) aluminum framed structures with black finish equal to Ortronics #OR-604045450.
 - f. The frames shall be predrilled and tapped with #12-24 threaded EIA hole pattern.
 2. Fiber Optic Wall Mount Patch Cabinets:
 - a. Fiber Optic Cable Wall Mounted Cabinets shall be fully gasketed, powder coat steel cabinets which accept modular adapter panels for up to 12 multimode terminations.
 - b. Adapters shall be Type SC with metal sleeves.
 - c. Provide 6 or 12 adapter blocks as required.
 - d. Cabinets shall be equal to Ortronics #OR-615SMFC-LX-12P with #OR-615SCDSM3-L adapters.
 3. Equal products by Systimax or Belden shall be acceptable.
- E. Telecommunications and Data Cables:
1. Cables shall be warranted for a period of 15 years by the manufacturer and installing contractor.
 2. Data Cables:
 - a. Data cables shall be as called out on drawings.
 - b. Cable shall be plenum rated where required.
 - c. Cables shall be manufactured by Berk-Tek, Systimax, or Belden.
 3. FiberOptic Cable:
 - a. Fiber Optic Cable shall be as called out on drawings.
 - b. Cables shall be manufactured by Berk-Tek, Systimax, or Belden.
- F. Warranty: The entire Cat 6 and cabling system shall be warranted in writing by the cable manufacturer and certified contractor for a minimum of 15 years.

2.32. LIGHTING FIXTURES

- A. General:
1. All Lighting Fixtures shall be UL labeled.
 2. Fixtures installed in fire rated ceilings or ceiling assemblies shall be rated for installation in fire rated ceilings.
 3. Furnish fixtures complete with lamps, ballasts and internal wiring factory installed.

4. Fixtures shall be furnished as specified herein and as shown on the fixture schedule on the plans. Catalog numbers shown are for basic units; furnish all fixtures complete with flexible connections, trim, plaster frames, and all other appurtenances necessary to the installation.
 5. Substitutions: Reference to a specific manufacturer's product is made to establish a standard of quality and design, and to give a general description of the basic type desired. Equal products by the listed manufacturers will be accepted subject to the Engineer's approval.
 6. It shall be the responsibility of the contractor to verify the exact type ceiling, type fixture mounting and trim, and recessing depth of all recessed fixtures prior to purchasing any fixtures.
 7. Stems on stem mounted fixtures shall be approved ball aligner type, swivel 30 degrees from vertical with swivel below canopy. Paint stems the same color as the fixture trim. Stems in unfinished areas may be unpainted conduit.
 8. High and low bay fixtures shall be equipped with safety chains. Every suspended fixture in Gymnasium shall have safety chains.
 9. Fixtures installed on the exterior of buildings, on poles, or on pedestals shall be rated for wet location installation.
 10. All lighting fixtures installed in gymnasiums, hangars or similar use areas shall be provided with wire guard.
- B. Emergency and Exit lighting Fixtures shall be equipped with a Self-testing module which shall perform the following functions:
1. Continuous monitoring of charger operation and battery voltage with visual indication of normal operation and of malfunction.
 2. Monthly discharge cycling of battery with monitoring of transfer circuit function, battery capacity and emergency lamp operation with visual indication of malfunction. The battery capacity test may be conducted by using a synthetic load.
 3. Manual test switch to simulate a discharge test cycle.
 4. Modules shall have low voltage battery disconnect (LVD) and brownout protection circuit.
 5. All lighting fixtures and exit signs shown as emergency on drawings shall be provided with a minimum 1100 lumen emergency battery ballast capable of 90 minutes of illumination. No exceptions.
- C. Lamps: Type and Lumen Output as scheduled.
1. LED bulb shape shall comply with ANSI C79.1. Lamp base shall comply with ANSI C81.61.
 2. Minimum CRI of LED lamps shall be 80 with a color temperature as shown on drawings.
 3. Rated life of all LED lamping shall be a minimum of 50,000 hours failure to 75% of lamp output.
 4. LED lamping shall be capable of dimming from 100% to 0%.

2.33. PANELBOARDS:

- A. General: All panelboards shall be dead front type manufactured and installed in accordance with UL and NEMA standards and shall carry a UL label. Ampacity, service voltage, and configuration shall be as indicated on drawings. Panelboards shall be clearly marked with ampacity, voltage, and maximum short current ratings.
- B. Manufacturer: Panelboards shall be as manufactured by Cutler-Hammer, Square D, or Siemens.
- C. Enclosure:
1. Panelboard enclosures shall be as indicated on drawings.
 2. Unless otherwise indicated, all boxes shall be constructed of galvanized (or equivalent rust-resistant) sheet steel with hinged front trim.

3. Fronts shall be door in door with two lockable latches to open door, lock, and latch. All panelboard locks shall be keyed alike. Piano hinges with screw latches will not be permitted.
 4. Fronts shall be finished with gray baked enamel over a rust-inhibiting phosphatized coating.
 5. All dual section panels shall be equal in size. Sub-Feed circuit breakers will not be allowed to feed second section.
 6. Sub-Feed circuit breakers feeding additional panels or equipment shall be branch mounted.
 7. Provide permanent numbering of the panelboards. Stickers are not considered permanent.
 8. Any panelboard schedule that indicates more than 42 circuits shall be provided in two equally sized panelboards.
 9. Main circuit breakers shall be centered mounted. Main breaker cannot be mounted on buss bars with other circuit breakers.
- D. Buss Assembly:
1. Bussing shall be copper.
 2. The buss assembly A.I.C. shall be rated as indicated on drawings. Ratings shall be established by heat rise tests, in accordance with UL Standard 67.
 3. All bussing shall accept bolt on circuit breakers.
 4. Current carrying parts of all bussing shall be plated. In lighting and receptacle panels, bussing shall be designed for connection to the branch circuit breakers in the phase sequence format. Distribution panelboards shall be fully bussed.
 5. Ground bars shall be provided in all panelboards.
 6. Neutral bar shall be fully sized with lugs suitable for incoming and outgoing conductors.
 7. Provide insulated ground buss where indicated on the panelboard schedules.
- E. Circuit Breakers:
1. Circuit breakers shall be quick-make, quick-break, thermal magnetic, molded case, bolt on type.
 2. Circuit Breakers shall be numbered and arranged as indicated on the panelboard schedules and/or single line wiring diagrams. Numbers shall be permanently attached to trim.
 3. SWD Circuit Breakers: Single pole circuit breakers rated 15 and 20 amperes and intended to switch 277 volts or less fluorescent lighting loads shall be UL rated for switching duty and shall be marked "SWD".
 4. HACR Circuit Breakers: Circuit breakers 60 amperes or below, 240 volts, 1-, 2-, or 3-pole, intended to protect multi-motor and combination-load installations involved in heating, air conditioning, and refrigerating equipment shall be UL listed as HACR type and shall be marked "Listed HACR Type."
 5. Circuit breakers serving fire alarm systems, dedicated emergency/exit lighting circuits, and area of rescue communications systems shall be equipped with a screw-on, mechanical handle blocking device which locks the circuit breaker in the "ON" position.
 6. Circuit breakers serving circuits in residential bedrooms shall be Arc Fault Interrupting(AFI) type circuit breakers and shall be UL 1699 listed.
- F. Directories:
1. Each panelboard shall be equipped with a metal directory frame with a clear cover welded to the inside of the door.
- G. Equipment Short Circuit Rating: Short Circuit Interrupting Ratings shall be as indicated on the plans and schedules. Unless specifically indicated otherwise all rating are "Fully Rated" capacities. Where no rating is given, the contractor shall verify the available short current with the serving utility and provide equipment rated accordingly.
- H. Lighting panelboard cans shall be a maximum of 20" wide and 5 3/4" deep. Cans of multi-section panelboards shall be the same size.

- I. Provide nameplate as called out on drawings.
- J. All circuit breakers 1200-amp and up shall comply with NEC Article 240.87 Arc Energy Reduction.
- K. All flush mounted panel shall be provided with six (6) $\frac{3}{4}$ " conduit stubbed up above accessible ceiling.

2.34. DISTRIBUTION PANELBOARDS:

- A. Furnish and install distribution and power panelboards as indicated in the panelboard schedule(s) or single line wiring diagrams and where shown on the plans.
- B. Panelboards shall be dead front, safety type equipped with thermal magnetic, molded case circuit breakers with trip ratings as indicated on the schedule(s).
- C. Panelboard bussing shall be copper.
- D. Panelboard buss structure and main lugs or main breaker(s) shall have the fault current ratings as indicated on the drawings. Ratings shall be established by heat rise tests conducted according to UL Standard UL67.
- E. Circuit breakers shall be equipped with individually insulated, braced and protected connectors. The front faces of all circuit breakers shall be flush with each other.
- F. Main circuit breakers shall be centered mounted. Main breaker cannot be mounted on buss bars with other circuit breakers.
- G. An engraved phenolic label shall be permanently attached to the front of the panelboard adjacent to each circuit breaker identifying the load served by the circuit breaker.
- H. Automatic tripping shall be clearly shown by the breaker handle taking a position between ON and OFF when the breaker is automatically tripped.
- I. Provisions for additional breakers shall be such that no additional connectors or hardware will be required to add breakers.
- J. The panelboard assembly shall be enclosed in a steel cabinet. The rigidity and gauge of steel shall be as specified in UL Standards. End walls shall be removable. The size of wiring gutters shall be in accordance with the National Electrical Code, NEMA, and UL Standards for panelboards.
- K. Cabinets shall be equipped with four-piece fronts.
- L. The panelboard interior assembly shall be dead front with panelboard front removed.
- M. Main lugs or main breaker shall be barriered on live sides.
- N. The barrier in front of the main lugs shall be hinged to a fixed part of the interior. The end of the buss structure opposite the mains shall be barriered.
- O. Circuit breakers serving Fire Alarm Systems, Security Systems, and/or Emergency/Exit lights shall be equipped with mechanical, screw-on type, locking devices. These devices shall not be padlock type devices.
- P. Panelboards shall be listed by Underwriters' Laboratories and to bear UL label. Panelboards shall be rated for use as Service Entrance Equipment where required by the National Electrical Code. Panelboards shall be by Cutler-Hammer, Square D, or Siemens.
- Q. Provide nameplate as called out on drawings.
- R. All circuit breakers 1200-amp and up shall comply with NEC Article 240.87 Arc Energy Reduction.
- S. All flush mounted panel shall be provided with six (6) $\frac{3}{4}$ " conduit stubbed up above accessible ceiling.
- T. All service entrance main circuit breakers shall be 100% rated.

2.35. SAFETY SWITCHES:

- A. Furnish and install safety switches as indicated on the drawings.
- B. Switches installed on 277/480 volts systems shall be rated for 600 volts and those installed on 120/208 volt or 120/240-volt systems shall be rated for 240 volts.
- C. Switches shall be NEMA Heavy Duty Type HD and Underwriters' Laboratory listed. Safety switches shall be Cutler Hammer, Siemens, or Square D.
- D. General Duty disconnects will not be accepted.
- E. Enclosures for switches mounted outdoors shall be NEMA 3R or as indicated on the plans.
- F. Enclosures for switches installed in kitchen and dishwashing areas shall be NEMA 4X stainless steel or as indicated on the plans.
- G. All safety switches for equipment with remote controls shall be equipped with a control circuit disconnect interlock.
- H. Switches shall be lockable in the "ON" and in the "OFF" positions.
- I. Provide each disconnect with a nameplate that indicates equipment name, voltage/phase, and feed from location.
- J. Provide keyed brass locks on all disconnects that is located on the exterior of the building or in any area that is accessible to children or the public. All the brass locks shall be keyed the same and turn over 10 sets of keys to the owner at substantial completion.
- K. Disconnect locations shown on drawings is diagrammatically shown. Disconnects shall be coordinated with other trades and placed in the optimal locations to serve equipment and shall be installed in the least obtrusive location. Disconnects will have to be moved at the cost of the contractor when there is conflicts with NEC clearances, access to space, or servicing of equipment. Architect/Engineer will have final judgment of proper location.

2.36. MANUAL MOTOR STARTERS (TUMBLER SWITCH TYPE WITH OVERLOAD PROTECTION):

- A. Starting and thermal overload protection for single phase motors 1/8 Hp to 1 HP shall be provided by manual motor starters with overload units rated as required by the specific motor to be served.
- B. Switches installed for site disconnect switches shall be equipped with padlocking provisions.
- C. Starters shall be by Cutler Hammer, General Electric, or Siemens with NEMA Type 1 enclosure or NEMA Type 3R enclosure where installed outdoors.

2.37. TRANSIENT VOLTAGE SURGE PROTECTORS (SURGE PROTECTIVE DEVICES):

- A. Provide transient voltage surge protectors (Surge Protective Devices) where indicated on the plans. At a minimum provide on all service entrance panelboards/switchboards and any panelboard/switchboards on the secondary side of a dry-type transformer.
- B. Service Entrance Panelboards and at Subpanel Protectors shall be listed and labeled and components recognized in accordance with UL 1283 and UL 1449 Second Edition, including highest fault current of Section 37.3.
- C. All devices shall meet or exceed the following:
 - 1. NEMA LS 1-1992.
 - 2. Minimum surge current capability, single pulse rated, per mode:
 - a. Service Entrance – 100 kA (200 kA per phase)
 - a. Distribution and branch panelboards – 80 kA (160 kA per phase)
 - 3. UL 1449, Second Edition, Listed and Labeled, and Recognized Component Suppressed Voltage Ratings shall not exceed (1.2x50□s, 6kV open circuit and 8x20□s, 500A short circuit test wave forms at end of 6" lead):

Voltage	L-N	L-G	N-G	L-L
208Y/120v	400	400	330	700

4. Testing shall be done at the end of 6" leads with the complete unit including any fuses and all other components making up the unit.
- D. The devices shall have a minimum EMI/RFI filtering of –50dB at 100kHz with an insertion ratio of 50:1 using MIL-STD-220A methodology.
- E. Devices shall utilize MOV's of 25 mm diameter or larger, shall have pilot lights visible on the outside of the enclosure to indicate device operating condition, and shall provide contacts for remote monitoring of device condition.
- F. Devices shall be modular in design with individual module fusing and thermal protection.
- G. Devices shall incorporate visual alarm signals that indicate the failure of a single MOV and total loss of protection.
- H. Wye connected devices shall provide L-L, L-N, L-G, and N-G surge diversion with L-N/L-G bonded at service entrance devices. Delta connected devices shall provide L-L and L-G protection.
- I. Data Line Surge Protectors: Data Line Surge Protectors shall be UL 497B listed and labeled. The units shall be heavy duty devices utilizing a combination of silicone diodes and gas tube technology to provide surge protection.
- J. All devices shall have a minimum warranty period of five years, incorporating unlimited replacement of suppressor parts if they fail during the warranty period.
- K. Transient voltage surge suppressors shall be manufactured by AC Data Systems, Advanced Protection Technologies, Current Technologies, Cutler-Hammer, General Electric, Joslyn, Liebert, or MCG.

2.38. SECONDARY SURGE ARRESTERS:

- A. Secondary surge arresters shall be UL listed under UL Classification (Lightning Protection) Surge Arresters (OWHX).
- B. Surge arresters shall be rated at same voltage and phase configuration as service.
- C. Arresters shall be equal to Cooper Power Systems ASZH Series, Cutler-Hammer, GE Tranquell, Joslyn Electronic Systems, Leviton models as required to match the voltage of the system served.

2.39. FUSES:

- A. General: Fuses shall be UL listed time delay types with a minimum interrupting rating of 100,000 amps symmetrical.
- B. 200 amps and below: Provide Class RK-5 current limiting, time delay, rejection type as manufactured by Busman Manufacturing, Ferraz Shawmut, or Littlefuse.
- C. 201 to 600 amps: Class RK-1, current limiting, time delay, rejection type as manufactured by Bussman, Ferraz Shawmut, or Littlefuse.
- D. Above 600 amps: Class L current limiting, time delay, as manufactured by Busman Manufacturing, Ferraz Shawmut, or Littlefuse.

2.40. LABELING:

- A. Provide laminated plastic nameplates for each panelboard, equipment enclosure, relay, switch, and device.
- B. Each nameplate inscription shall identify the function and, when applicable, the position. Nameplates shall be melamine plastic 0.125-inch thick, white with black center core.
- C. Provide red laminated plastic label with white center core where indicated.
- D. Surface shall be matte finish. Corners shall be square. Accurately align lettering and engrave into the core.
- E. Minimum size of nameplates shall be one by 2.5 inches.

- F. Lettering shall be a minimum of 0.25-inch high normal block style.
- G. See Panelboard details for proper labeling of all panelboards.

2.41. PHOTOCELLS, TIME SWITCHES AND CONTACTORS:

- A. Photocells: Units shall have 1" diameter, hermetically sealed, cadmium sulfide sensing cell with 3-prong NEMA locking plug, rated for wet locations. Units shall have built-in time delay. Units shall be equal to Tork 5231 of correct voltage to match load or use with matching receptacle equal to Tork 2421.
- B. Time switches:
 - 1. Unless otherwise indicated on drawings, time switches shall be 24-hour electromechanical type having synchronous motor drive with two single pole double throw contacts rated 20 amps minimum.
 - 2. Unit shall have spring back up, with automatic rewind, capable of providing 16 hours minimum of reserve power upon electric power failure.
 - 3. Units shall be furnished in an enclosure, NEMA 1 indoor and NEMA 3 outdoors. Enclosures shall be flush mount unless otherwise indicated on drawings.
 - 4. Units shall be Tork 7120L, or equal by Paragon or Sangamo.
 - 5. Time switch(es) shall be digital, seven day format, two channel time switches with 9v lithium battery 30 day back-up and with metal indoor enclosure. The controllers shall be equal to Tork #DW200A-Y.
- C. Contactors: Units shall be electrically held or electrically operated mechanically held, as indicated on drawings, and shall be recommended by manufacturer for type of load served.
- D. Contacts shall double-break type of same ampere rating as line side circuit wiring.
- E. Contacts shall be field-convertible to normally open or normally closed.
- F. Contactor coils shall be encapsulated. Electrically held contactors shall have continuously rated coils. Mechanically held contactors shall be equipped with coil-clearing contacts to energize coils only when switching.
- G. Units shall be furnished in an enclosure, NEMA 1 indoor and NEMA 3 outdoors.
- H. Units shall be equal to GE CR460 series in NEMA 1 or NEMA 3R enclosure as indicated.

2.42. FIRE ALARM SYSTEM (ADDRESSABLE):

- A. General: The contractor shall furnish and install a complete power limited automatic and manual fire alarm system, as specified herein and indicated on the drawings. The system shall include a central control panel, power supply, signal initiating devices, audible and visual alarm devices, provisions for connection of remote monitoring, a wiring system, and all necessary devices required to provide a complete operating system. The system shall comply with the applicable provisions of the National Fire Protection Association Standard Number 72 and meet all requirements of the local authorities having jurisdiction. The Underwriter's Laboratories, Incorporated, or approved by the Factory Mutual Laboratories shall list all equipment and devices. The equipment shall be EST, FCI or Notifier. No deviation will be considered unless submittals are received and approved in writing, not less than ten days prior to bid date.
- B. Fire Alarm Document Box: The contractor shall furnish and install a fire alarm document enclosure as mandated by NFPA 72 Chapter 7.7.2.1. The system records documents box shall be constructed of 18 gauge cold rolled steel. It shall have a red powder coat epoxy finish. The cover shall be permanently screened with 1" high lettering and read "FIRE ALARM DOCUMENTS" with white indelible ink. The access door shall be locked with a 3/4" barrel lock which is keyed the same as the manufacturer's fire alarm panel. The enclosure shall supply 4 mounting holes to securely fasten to the wall. Inside the enclosure will accommodate standard 8.5" x 11" manuals and loose document records that may be placed in a three-ring binder. All documents & software will be protected within the enclosure. A legend sheet will be

permanently attached to the door for system required documentation, key contacts, and system information. The fire alarm document will have securely mounted inside the enclosure a minimum of 4 Gigabyte digital flash memory drive with a standard USB type B connector for uploading and downloading electronic information. The drive shall not be accessible without tools to any person who gains access to the enclosure. The enclosure shall also provide 2 Key ring holders with a location to mount standard business type cards for key contact personnel. The password to the fire alarm programming shall be provided to the owner in the fire alarm document box. The password must be provided, fire alarm contractors that refuse to give password will not be accepted. Contractor will be responsible for replacing the entire fire alarm system at their cost and cost of delaying the project if password is not provided.

- C. Control Panel: The control panel shall be an addressable type panel capable of handling up to 256 devices, with 60-hour minimum standby battery. The panel shall provide for the connection of alarm circuits as indicated and shall include the following features.
1. The fire alarm panel shall detect the operation of any initiating device, indicate by annunciator lamps the area of the alarm condition, and operate all alarm auxiliary devices.
 2. A pilot light shall normally be on, indicating that the system is receiving power from the building service supply. A failure of the building service supply shall cause the lights to go out.
 3. A trouble light and trouble buzzer, operating together, shall signal any trouble condition. Failure of the building service supply, disarrangement in the system wiring, or alarm condition shall cause that trouble light to come on and the trouble buzzer to sound. A self restoring silencing switch shall be provided to silence the trouble buzzer, which shall be arranged so the trouble light will remain on until the system is restored to normal.
 4. All notification signals shall be automatically locked in at the control panel until the operating device is returned to its normal condition, and the panel is manually reset. A switch shall be provided on the control panel for silencing the notification devices. The manual reset switch and the alarm-silencing switch shall be of the self-restoring type, which cannot be left in the abnormal position.
 5. The control panel shall provide relay contacts, of quantity as shown on the drawings, for control of heating, ventilation and air conditioning equipment. Such contacts shall be connected to air conditioning equipment, as indicated on drawings, for shutdown of individual units. Unit shutdown shall be initiated by duct-mounted smoke detectors unless otherwise indicated. Operation of any initiating device shall open all control contacts and release all mechanically held doors.
 6. The control panel shall be equipped with a front mounted Drill switch.
 7. Metal oxide varistors (MOV's) shall be provided on the system power supply and the municipal connection circuit to provide transient suppression protection to the control panel.
 8. Power Supply: The power supply shall be 24 Volt DC, filtered and regulated, and shall provide sufficient power for all system functions. The fire alarm system main power supply shall operate at 120 Volt AC obtained from the building service. The 120-volt AC main power shall be converted to low voltage direct current for system operation. The system shall operate on 24 volts DC with trickle charged batteries provided as an emergency source of supply for operating the system in the event of interruption of main power. A changeover relay in the control panel shall transfer to standby power automatically upon main power failure and automatically reconnect to main power upon restoration.
- D. Manual Stations: Manual Fire alarm stations shall be an addressable double acting, semi-flush mounted type. Stations with two sets of contacts will not be acceptable.
- E. Smoke Detectors: Smoke detectors shall be addressable photoelectric type with base.
- F. Heat Detectors: Addressable 135 degree/rate of rise type with base.
- G. Duct Mounted Smoke Detectors: Duct detectors shall be addressable photoelectric type with sampling tube.

- H. Contractor shall be responsible for coordinating prior to bid with mechanical drawings to confirm all duct mounted smoke detector locations and quantities. Contractor shall include in their base bid price the cost of all additional duct mounted smoke detectors and circuitry needed for locations.
- I. Duct Detector Remote Test Station: Test stations shall be keyed with indicator light.
- J. Audible/Visual Notification Devices: Audible/visual notification devices shall be four wire, horn/strobe units capable of 90 dB audible output, 100 candela-second output, shall be ADA compliant. Devices using incandescent lamps will not be acceptable.
- K. Visual Notification Devices: Visual notification devices shall be strobe units capable of 100 candela-second visual output, shall be ADA compliant. Devices using incandescent lamps will not be acceptable.
- L. Voice Control Panel: The Voice Control Panel shall play a digitally recorded message or microphone input for evacuation instructions. The unit shall be installed next to the FACP, shall be equipped with emergency battery power, and shall provide a minimum of 75 watts of amplification.
- M. Remote Microphone Panel: Remote Microphone Panels shall have a keyswitch control and shall be supervised.
- N. Remote Amplifier: Remote amplifiers shall be 120 watt with battery backup.
- O. Speaker/Visual Notification Devices: Speaker/Visual Notification devices shall be semi-flush, wall mounted, combination strobe/speaker assemblies with a minimum strobe output of 100 candela-second equal to Notifier #E70-24110W-FR for wall installation or Notifier #E70-W for speaker only ceiling installations.
- P. Interface Relay:
 - 1. Provide addressable control modules equal to Notifier #CMX-2 or interface relays equal to Notifier #MR-101/CR as required for interface of the Fire Alarm System with HVAC shut down, door holders, kitchen hood fire suppression system, and fan shut down, and any other locations required for proper interface and operation of systems.
 - 2. A control module or interface relay shall be provided for each duct mounted smoke detector and shall be the point of interface between the Fire Alarm System and the HVAC Control System.
 - 3. Contacts shall be rated for 10 A at 120 V.
- Q. **UL Fire Listed Cellular Communicator: Terminals and other necessary facilities shall be provided in the control panel to permit automatic transmission of trouble and alarm signals over a UL listed cellular communicator to the fire, police, or other continuously manned facility, so designated for response to fire emergency. Provide 3-years of cellular and monitoring for the fire alarm system in the base bid from the date of substantial completion.**
- R. Annunciator Panel: Provide and install an annunciator that provides an audible and visual indication of an alarm or trouble condition for each zone, an alarm silence switch, and a key operated test and reset switch.
- S. Auxiliary Remote Power Supplies/Notification Appliance Circuit Extenders (NAC Panels):
 - 1. Provide auxiliary power supplies and/or NAC Panels where required for notification devices, door holders, annunciators, or for other devices requiring supplemental power.
 - 2. Remote power supplies shall include a filtered and regulated 24 VDC output, provisions for automatic transfer to battery back-up in case of primary power failure, and batteries sized for 60 hours of operation.
- T. Wire Guards: Wire guards shall be made of 3/16" minimum steel wire with a corrosion resistant coating equipped with integral mounting rings. Provide wire guards for all devices located in gymnasium.
- U. All devices installed on the exterior shall be weatherproof.

- V. All A/V devices in gymnasium at bleachers or any other facility with bleachers shall mount the fire alarm devices 80" above top of bleachers.
- W. **Monitoring - Provide 2-years of monitoring for the fire alarm system in the base bid from the date of substantial completion.**

2.43. CONCRETE:

- A. Concrete for electrical requirements shall be:
 - 1. Composed of fine aggregate (sand), coarse aggregate (graded from three-sixteenth (3/16) inch to one (1) inch), Portland cement, and water proportioned and mixed so as to produce a plastic, workable mixture.
 - 2. Aggregates shall be free from detrimental amounts of dirt, vegetable matter, soft fragments, or other foreign substances.
 - 3. Water shall be fresh, clean, and free from salts, alkali, organic matter, and other impurities.
 - 4. Concrete shall have a minimum 3000 psi ultimate twenty-eight day compressive strength and a maximum three (3) inch slump.

PART 3 - EXECUTION

3.01. GENERAL:

- A. This section includes the installation of the complete electrical system.

3.02. ELECTRICAL SYSTEM DEMOLITION:

- A. Before any new work begins the Contractor shall determine and document in writing to the satisfaction of the Engineer the condition of existing electrical work and auxiliary systems that are to remain in service. After the new work begins any existing electrical work or systems that are found to be inoperative or defective and not so documented shall be repaired or replaced by the Contractor at no additional cost to the Owner.
- B. Existing electrical equipment and materials to be reused shall be tested and repaired as required and installed for first class operation.
- C. General: The manner-in-which the remaining portions of the electrical system are terminated, supported and generally maintained for permanent use shall comply with all applicable regulations of the National Electrical Code, applicable NFPA codes and any local codes.
- D. Refer carefully to construction drawings prior to commencing with demolition to determine the intent of demolition. Contact the Engineer if there appears to be any conflict between the demolition and construction drawings.
- E. See "Renovation" Section regarding modification and relocation of circuits.
- F. Phasing: Phasing shall be as coordinated by the General Contractor.
- G. Work in Occupied Areas: Coordinate work carefully with General Contractor to provide minimum disruption to occupied portions of project. Provide minimum of 24 hours advance notice to Owner of demolition activities that will affect Owner's normal operation.
- H. Protections: Take necessary measures as required for protection of the Owner's personnel and the general-public, as well as Owner's property. Provide temporary barricades, partitions, bracing, and weather protection as needed. Remove all temporary protections at completion of work.
- I. Flame Cutting: Do not use cutting torches for removal until work area is cleared of flammable materials. Maintain portable fire suppression equipment during flame-cutting operations.
- J. System Protection: Protect and maintain all portions of existing system not indicated for demolition, including but not limited to light fixtures, panelboards and circuits.

- K. Fire Protection: Coordinate with general contractor to ensure that all penetrations of fire-rated decks and partitions are properly sealed.
- L. Removal of Circuits: All circuits indicated for removal shall be entirely removed, including raceway, back to take-off point or as far as possible without chasing (unless chasing is indicated). Where it is not possible to remove conduit, all conductors shall be removed and the conduit shall be permanently capped. Floor outlets indicated for removal shall be entirely removed, including outlet box, and capped below floor level (minimum 4" below floor level if in slab).
- M. Where floor slab is damaged in the course of demolition, it shall be permanently repaired as soon as practicable.
- N. Leave existing branch circuits and feeders which run through reworked areas and serve existing equipment to remain in service, continuous and uninterrupted.
- O. Where service interruptions are required, obtain approval for interruptions in writing from Architect 14 days prior to interruption. Submit schedule of work to be performed and the time required to accomplish work with request for interruption.
- P. Disposition of Material: Where electrical equipment is indicated for removal and not indicated for re-use, the owner shall have the option of taking possession of the equipment, the Contractor shall deliver any such material to a local site designated by the owner. The Contractor shall be responsible for disposing of all other materials in accordance with applicable codes and laws.

3.03. ELECTRICAL SYSTEM RENOVATION:

- A. General: Provide renovations as indicated on drawings and specified herein as required for a complete, operational system, even though every item is not indicated.
 - 1. This Section is intended to serve as a supplement to the applicable sections within this Division, and in no way relieves the contractor from the requirements of any other Section.
 - 2. All renovations shall comply with all applicable regulations of the National Electric Code, applicable NFPA codes and any local codes
- B. Materials and workmanship: Execute all work presenting a neat and workmanlike appearance when completed. Except where otherwise indicated, all materials shall be new, UL approved where a standard has been established. Where specific means and methods for affecting renovations are not covered in drawings and specifications, the contractor shall exercise prudent judgment in following accepted practices.
- C. Modifications: All major deviations from the drawings and specifications shall be approved in writing by the Engineer.
- D. Inspection:
 - 1. Inspect all existing electrical system components which are accessible, including fixtures, wiring devices, raceway and panelboards.
 - 2. Perform minor repairs to loose or damaged connections, damaged or missing supports, replacement of broken devices, replacement of missing plates and junction box covers and other visible damage or disrepair.
 - 3. Report major damage to Engineer.
- E. Renovation Services: In addition to the scope of work indicated on the drawings and specified herein, it shall be the responsibility of this Division to provide minor modification and repair services made necessary to electrical system components through the normal course of renovation. Such services shall include but not be limited to minor repair or relocation of branch circuits necessitated by the work of other trades, as coordinated by the General Contractor.
- F. Penetrations: Coordinate penetrations of existing walls, decks, and roofs required for electrical system with General Contractor. Do not cut structural members without the prior consent of Structural Engineer.

- G. Raceway.
 - a. Unless specifically indicated otherwise, existing raceway may not be used.
 - b. Where existing raceway is indicated for possible re-use, it shall be the responsibility of this Division to verify that the condition and configuration of the raceway is in compliance with the NEC.
- H. Panelboards: Where new circuits are run to an existing panelboard, thoroughly inspect the panelboard for any indications of arcing, overheating, or other damage. Report damage to the Engineer. Unless specifically allowed, tandem circuit breakers shall not be utilized.
- I. Clearing of Neutral Faults: Any and all neutral faults to ground on existing system shall be corrected.
- J. Service Ground: Visually inspect existing service ground electrode system for damage and code compliance. Check continuity from panel to each electrode with a meter. Make repairs as required.
- K. Lighting Fixtures: Where existing lighting fixtures are indicated for re-use, they shall be thoroughly cleaned and re-lamped, no exceptions. Where existing lighting fixtures are indicated for replacement, it shall be the responsibility of this Division to verify the compatibility of new fixtures with existing ceiling type, existing penetrations, available support, and other existing conditions prior to submittal of fixtures. Any variances or required modifications shall be clearly indicated on the fixture submittal.
- L. Backfilling, Grading, and Sodding:
 - 1. Restore surface features, including vegetation, at areas disturbed by Work of this Section.
 - 2. Reestablish original grades, unless otherwise indicated.
 - 3. If sod has been removed, replace it as soon as possible after backfilling is completed.
 - 4. Restore areas disturbed by trenching, storing of dirt, cable laying, and other activities to their original condition.
 - 5. Include application of topsoil, fertilizer, lime, seed, sod, sprig, and mulch. Comply with Division 2 Section "Landscaping." Maintain restored surfaces.
 - 6. Restore disturbed paving as indicated.

3.04. ELECTRICAL SERVICE:

- A. General: Arrange with local electric Utility Company for service to be brought to the building, and for installation of meter. Provide all material and labor not supplied by Utility Company so as to produce a complete installation meeting the Utility regulations.
- B. Service requirements: It is the responsibility of this Section, prior to bid, to reaffirm with the Utility Companies involved, that locations, arrangement, Power Company voltage, phase, metering required, and connections to utility service are in accordance with their regulations and requirements. If their requirements are at variance with these drawings and specifications, contract price shall include an additional cost necessary to meet those regulations without extra cost to Owner after bids are accepted.
- C. Notify Architect of any changes required before proceeding with work.
- D. Fees and deposits:
 - 1. The Electrical Contractor shall be responsible for verification and payment of all utility fees associated with installation of the electrical service.
 - 2. The Owner shall pay the cost of establishing an electrical service account and permanent meter deposit.
- E. Metering: Obtain metering equipment from Utility Company and install in compliance with the Utility Company's requirements. The Electrical Contractor shall provide and install all necessary metering raceways, fittings, supports, connectors and ground conductor necessary for a complete installation. Provide 100# pull wire in all metering conduits.
- F. Main Service Equipment: Provide UL approved service entrance components as indicated on drawings or specified herein.

- G. Provide a full-size copy of the AS-BUILT Power Riser Diagram framed behind plexiglass screwed to the wall near service entrance in main electrical room.
- H. Service lateral or feeder: Extend lateral or feeder of the size shown on drawings from service equipment to the point of service as indicated (verify exact location with Utility Company).
 - 1. For Overhead Service, provide and install service entrance fitting on conduit and leave sufficient slack conductor for connection to utility feeder 10' above finish grade, 12' above drive and 18' above street.
 - 2. For Underground Service, provide and install underground conduit to utility riser, as directed by Utility Company. Conduit shall be of size and quantity as indicated on drawings. Provide 480# polypropylene pull line in each empty conduit.
 - 3. For Underground Service, provide and install transformer pad, primary underground conduit to utility riser as directed by Utility Company, underground secondary conduit, and secondary conductors. Conduit shall be of size and quantity as indicated on drawings. Provide spare 4" conduit in transformer pad extending 2' beyond edge of pad with PVC cap. Provide 480# polypropylene pull line in each empty conduit.
 - 4. On service transformers with multiple taps, it shall be the responsibility of this section to coordinate tap selection with the electric utility to insure the proper nominal voltage.

3.05. GROUNDING:

- A. Bond the neutral conductor and various conductive materials in the building per NEC Article 250.
- B. Grounding Electrode System: A bare copper grounding conductor shall be bonded to grounding electrodes as specified below. This conductor shall serve as ground for system neutral and for building equipment bonding. Where conductor is #6, or smaller, or is subject to injury, it shall be run in conduit, Schedule 80 PVC or Rigid Galvanized to which the conductor shall be bonded at both ends.
 - 1. Grounding electrodes shall be as follows:
 - a. Cold water piping, if metal and in direct contact with the earth for 10 feet or more, at the point of entry into the building. Attach ground conductor to cold water piping with UL approved bronze clamp.
 - b. Building structural steel, if present and accessible.
 - c. Grounding electrode shall be attached with exothermic weld connection or irreversible crimp type connector similar to Burndy YGHR connectors. Crimps must be made with Burndy tool approved by the manufacturer for setting irreversible crimp connections.
 - d. Foundation reinforcing bar system. Coordinate with General Contractor to provide turned up re-bar (sleeved) near service point for attachment of grounding electrode above grade. Grounding electrode shall be attached with UL approved exothermic weld connector.
 - e. Driven ground rod(s).
 - 1) Three 3/4" x 10' copper weld rods shall be driven into the ground at the lowest point adjacent to the building, spaced a minimum of 10' apart.
 - 2) Ground rods shall be driven to 12" below grade.
 - f. Grounding electrode shall be attached with exothermic weld connection or irreversible crimp type connector similar to Burndy YGHR connectors. Crimps must be made with Burndy tool approved by the manufacturer for setting irreversible crimp connections.
 - g. Existing grounding electrode system. If an existing electrical service is in place, it must be bonded to the new grounding electrode system.
- C. Connections to grounding rods, building structure, counterpoise, and conductor junctions shall be made by exothermic weld unless specifically noted otherwise.
- D. 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. Each branch circuit or multi-outlet branch circuit shall be provided with a dedicated neutral conductor.

- E. Equipment grounding conductors:
 - 1. An equipment grounding conductor (copper with green insulation except where bare copper is used) shall be provided in all wiring raceways.
 - 2. Sizes shall be in accordance with NEC 250.
 - 3. The equipment grounding conductor shall originate in the same panelboard, panelboard section, as the circuit conductors.
 - 4. The equipment grounding conductor bonding the sections of multi-section panelboards shall be sized per NEC 250.
 - 5. The equipment grounding conductor is not included in number of branch circuit conductors indicated on the drawings.
- F. Telephone service ground: provide a minimum #6 bare, solid copper grounding conductor from the electrical service grounding connection to the TBB. Leave six (6) feet minimum of free conductor. Install the conductor in PVC conduit where inside the building.
- G. Computer backboard ground: provide a minimum #6 bare, solid copper grounding conductor from the electrical service grounding connection to the CBB. Leave six (6) feet minimum of free conductor. Install the conductor in PVC conduit where inside the building.
- H. Grounding electrode resistance shall be less than 15 ohms. The resistance of the grounding electrode shall be tested by the Fall of Potential Method.
- I. Lighting Standards (Poles): Install 10' driven ground rod at each pole. On non-metallic poles, ground metallic components of lighting unit and foundations. Connect fixtures to grounding system with No. 6 AWG conductor.
- J. Each grounding conductors at the service entrance ground bus bar shall be provided with a brass round identifying tag. Tag shall indicate where ground wire is terminated.

3.06. EXCAVATION, CUTTING AND BACKFILLING:

- A. Provide cutting and patching, under the supervision of the General Contractor, as required for the work in Section 16.
- B. Locate all existing below grade and/or below floor utilities prior to beginning any site excavation or cutting of existing floor slabs. The Contractor shall repair any damage to existing utilities or systems.
- C. Saw cut existing concrete slabs and asphalt paving.
- D. Trenching:
 - 1. Dig trenches true to line, with a flat, even bottom.
 - 2. Width of the trench shall provide not less than 3 inches clearance from the conduit to each side of the trench.
 - 3. Ensure that foundation walls and footings and adjacent load bearing soils are not disturbed in any way.
 - 4. Conduits shall be installed below footings where possible. Where a line passes under a footing, make crossing with the smallest possible trench to accommodate the conduits/sleeves.
 - 5. Where a line must pass adjacent to and below the bottom of a column footing, or the corner of a continuous footing, backfill the trench with concrete up to the level of the footing bottom, for a distance away from the footing equal to the depth of the fill.
 - 6. Keep excavation free from water, by pumping if necessary.
 - 7. Where rock, soft spots, or sharp-edged materials are encountered, excavate the bottom for an additional 3 inches, fill and tamp level to proper elevation with sand or earth free from particles that would be retained on a ¼-inch sieve.
 - 8. Remove and relocate existing obstructions as directed.

9. The Contractor shall be responsible for the repair and/or replacement of any damage to existing utilities, structure, or finishes.
 10. Coordinate work with other trades as work progresses so cutting and patching will be minimal.
 11. Refer to Section "Earthwork" for shoring, sub-soil assumptions and data, work around trees, surplus earth, etc.
- E. See Section 16100, "Conduit Installation, Below grade and below slab conduit installation", for installation of conduits in trenches.
- F. Backfilling:
1. Immediately after inspection, cover conduits with 3" of compacted sand or earth free from particles that would be retained on a 1/4inch sieve. Do not to disturb the alignment or joints of the conduits.
 2. Carefully backfill with 4" of earth free from clods, brick, etc., firmly puddling and tamping.
 3. Thereafter, puddle and tamp every vertical 4" for hand tamping or 8" for heavy duty mechanical tamping.
 4. Backfill shall meet the compaction requirements set forth in Division 2.
 5. Backfilling Beneath Slabs and Pavement: Trenches beneath future slabs or pavement, including but not limited to buildings, drives, parking areas, sidewalks, playground surfaces, and equipment pads, shall be backfilled, from 3" above top of conduits to final grade, with crushed aggregate, AHD 825, type B, compacted in 4" layers to 100% ASTM 698.
 6. Install marking tape above conduits at 12 inches below grade.

3.07. SLEEVES, INSERTS, AND SUPPORTS:

- A. Provide and install No. 16 gauge galvanized steel or iron sleeves in all walls, floors, ceilings, and partitions. Sleeves shall have no more than 1/2" clearance around pipes and insulation.
- B. The contractor shall furnish to other responsible trades all sleeves, inserts, anchors and other required items which are to be built in by other trades for securing of all hangers or other supports by the Contractor.
- C. The contractor shall assume all responsibility for the placing and sizing of all sleeves, inserts, etc., and shall either directly supervise or give explicit instructions to other trades for their installation.
- D. The contractor shall seal all conduits through floors, smoke partitions, and floor partitions, with a sealant approved for the application.
- E. All sleeves through sound barrier walls and partitions shall be sealed with mineral wool.
- F. Through the floor conduit penetrations shall be sealed watertight.
- G. Furnish and install steel angles and channels as required for mounting and bracing heavy equipment and conduits. Steel shall be securely bolted or welded to structure and equipment bolted to the steel framework. Obtain the approval of the Architect prior to welding.

3.08. BELOW GRADE THRU WALL WATER SEALS:

- A. Each conduit penetrating exterior, below grade, cast concrete walls shall have the annular space around the conduit sealed with an approved Thru Wall Water Seal System.
- B. Where the system includes water seal thru wall sleeves, the Electrical shall provide properly sized sleeves to the contractor responsible for constructing the walls and shall be responsible for the proper location of each sleeve.
- C. Where openings are to be core drilled, the Electrical Contractor shall be responsible for the core drilling and for coordinating proper sizing and location of each opening.

3.09. FIRE STOPPING:

- A. The Electrical Contractor shall be responsible for firestopping of all penetrations of fire rated partitions made by any and all lighting, power, and auxiliary circuiting, sleeves and/or equipment.
- B. The Electrical Contractor shall submit manufacturers' UL System drawings for the systems to be utilized. The systems shall be compatible with the partition ratings as indicated on the Architectural drawings and in accordance with details on the Electrical drawings.
- C. Penetrations of fire rated partitions shall be sealed with an approved fire sealant resulting in the completed penetration having the same fire rating as the partition.
- D. The installation shall be in accordance with the manufacturer's UL system detail and installation instructions to attain the required fire partition rating.
- E. Empty sleeves through 1 and 2 hour rated partitions shall be plugged with mineral wool.
- F. Sleeves through 4 hour rated partitions shall be plugged with mineral wool and fire stopping material.

3.10. ROOF PENETRATIONS:

- A. Furnish roof flashing for all equipment, installed under Section 16, which penetrates through the roof. Flashing shall be approved by the Architect prior to installation.

3.11. CONDUIT INSTALLATION:

- A. Conduits shall be as follows:
 - 1. Overhead Service Entrance - Rigid Galvanized Steel (RGS) Conduit or IMC.
 - 2. Underground Service Laterals: Schedule 40 rigid PVC in horizontal runs with rigid galvanized steel elbows turning up to vertical RGS.
 - 3. Where subject to moisture or mechanical injury - RGS conduit.
 - 4. ALL conduits exposed to moisture or subject to mechanical damage shall be RGS. Where conduit exits building, the changeover from EMT to rigid shall be inside exterior wall.
 - 5. In open shop and industrial installations RGS shall be run to 10' A.F.F.
 - 6. All conduit exposed on the outside of the building envelope shall be Rigid Galvanized Steel (RGS) conduit. This includes all conduits on and/or under canopies or awnings.
 - 7. In concrete or solid masonry – RGS conduit
 - 8. Above furred spaces or in cells of hollow masonry - EMT
 - 9. Concealed inside drywall construction walls and above lay-in ceilings – EMT.
 - 10. Exposed conduits:
 - a. Conduits installed exposed in shop, warehouse, and manufacturing areas shall be RGS up to 12' A.F.F. Conduits in such spaces above 12' A.F.F. may be EMT unless indicated otherwise on the drawings.
 - b. Exposed indoors in non-hazardous unfinished areas not subject to physical damage - EMT
 - c. Exposed in kitchen and dishwashing areas: Rigid aluminum.
 - 11. Branch circuits in slab (3/4" and larger) - PVC. Turn up through slab with RGS ells - no exceptions. Extend rigid turn-ups 2" minimum above finish floor level.
 - 12. Circuits beneath building vapor barrier - PVC. Turn up through slab with RGS ells - no exceptions. All elbows 45° and greater shall be RGS. Extend RGS turn-ups 2" minimum above finish floor level.
 - 13. Below Grade – PVC with RGS, or rigid aluminum where applicable, elbows turning up to vertical. All below grade elbows 45° and greater shall be RGS.
 - 14. Motor, HVAC equipment, and vibrating equipment connections - flexible metal conduit, liquid tight flexible metal conduit outdoors, in kitchen and dishwashing area, or in other wet areas. Liquidtight flexible nonmetallic conduit shall be used only where specifically indicated.
 - 15. IMC may be used where RGS is indicated.
- B. Conduit sizes:

1. Unless specifically indicated otherwise herein or on the drawings, the minimum conduit size shall be 3/4".
 - a. All conduits installed below grade or below slab shall be 3/4" minimum.
 - b. The minimum size for flexible lighting fixture "whips" shall be 3/8" and the maximum length shall be 6 feet. Lighting fixture "whips" shall be defined as flexible conduits with conductors feeding one or more recessed lighting fixtures installed in suspended, lay-in, acoustical ceiling systems from a single junction box.
 - c. 1/2" conduit may be for final connections to equipment or fixtures where conduit is less than three (3) feet in length and is extended from a junction box or from a 3/4" conduit stub up.
2. Conduits shall be sized in accordance with the National Electrical Code as adopted by the local authority having jurisdiction or as amended to date, except where a larger size is indicated on the drawings or specified herein.

C. Layout:

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 factors. Offsets are not indicated and must be furnished as required.
2. Install all conduits concealed except in equipment rooms and where exposed runs are specifically indicated.
3. Install conduit runs to avoid proximity to steam or hot water pipes. In no place shall a conduit be run within 6" of such pipes except where crossings are unavoidable, then conduit shall be kept at least 1" from the covering of the pipe crossed.
4. Eliminate trapped runs insofar as possible.
5. Do not chase new work, but instead build in conduit as work progresses.
6. Do not run conduit in cavity of exterior walls.
7. Run concealed conduits in direct line with long sweep bends and offsets where practicable.
8. 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.
9. Where conduits are indicated exposed overhead, runs down to wall outlets shall be concealed in wall.

D. Conduit Installation:

1. 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.
2. All conduits shall have bushings with smooth beveled throats installed at both ends prior to installing conductors. Split bushings around conductors shall be taken to indicate that the conductors were pulled into conduit without the proper bushings installed and a basis for requiring the replacing of the conductors.
3. Conduits entering service enclosures (panelboards, disconnect switches, switchboards, motor control centers, etc. used as service entrance equipment) shall be provided with specification grade, insulating, grounding type bushings. Grounding bushing shall be bonded together and bonded to the service grounding buss.
4. Support:
 - a. Raceways shall be securely and rigidly supported to the building structure in a neat and workmanlike manner, and wherever possible, parallel runs or horizontal conduit shall be grouped together on adjustable trapeze hangers.
 - b. Support shall be provided at appropriate intervals not exceeding eight (8) feet with straps, hangers, and brackets specifically designed for the application.
 - c. Channels shall be 1 inch for 18-inch wide trapeze, 1-3/8 inch for 24 to 30 inch, and 1-5/8 inch for over 30-inch wide trapeze.
 - d. Perforated steel straphangers, "butterfly clips", or tie-wire supports are not acceptable.

- e. Conduits shall not be supported from ceiling support wires.
 - f. Conduit shall not be supported from mechanical system ducts or piping.
 - g. Conduits installed along wall surfaces shall be supported with galvanized steel brackets specifically designed for conduits and sized for the conduit used.
 - h. PVC conduits shall be supported per the NEC with PVC or stainless clamps and stainless-steel hardware.
 - h. Attach to supporting devices with screws, bolts, expansion sleeves or other workmanlike means appropriate to the surface.
 - i. In stud walls, anchors shall be completely rattle proof.
 - j. For conduits in damp and wet locations, use stainless steel clamps and stand-offs, or galvanized malleable or cast-iron clamps and spacers.
 - k. All mounting hardware for aluminum conduit shall be stainless steel.
 - l. Surface mounted conduits installed in kitchen and dishwashing areas shall be supported off walls approximately 3/16".
5. Thread rigid conduits so that the ends meet in couplings; cut ends square, ream smooth and draw up tight.
 6. All field cut threads shall be cleaned with a solvent such as mineral spirits and painted with two coats of galvanize primer.
 7. Cap conduit ends to keep out water and trash during construction.
 8. Field made bends:
 - a. Avoid field-made bends where possible, but where necessary, use a proper hickey or conduit-bending machine.
 - b. Field made bends in PVC conduit shall be made with a heated PVC conduit bender.
 - c. Make no bends with radius less than six times the conduit diameter, nor more than 90 degrees.
 9. Make changes in direction with pull boxes, symmetrical bends and/or cast-metal fittings.
 10. Total bends in any conduit run shall not exceed the equivalent of four, quarter (90°) bends for a total of 360°, per NEC, between pull boxes.
 11. Replace any crushed or deformed conduits.
 12. Conduits passing through roofs shall be in place before roof is installed.
 13. Conduits installed in concrete/grout filled CMU walls shall be Rigid steel or IMC conduits installed field wrapped with 0.010 inch-thick pipe-wrapping plastic tape applied with a 50 percent overlay. Painted on coating shall not be acceptable.
 14. Where conduits pass through or across building expansion joints, provide hot-dipped galvanized expansion fittings with bonding jumpers.
 15. Ensure that all penetrations of firewalls are sealed per NEC and IBCC.
 16. Right and left couplings shall not be used; conduit couplings of the Erikson type shall be used at location requiring such joints.
 17. Paint all conduits exposed in finished spaces. Paint shall consist of one coat of zinc rich primer plus two top-coats of water-based latex paint, color to match adjacent finishes. Verify colors and paint system with Architect.
 18. All conduit runs entering the building from outdoors shall be sealed against moisture migration and condensation by filling with insulating type foam.
 19. All conduits passing through walls of coolers or freezers shall have seal fitting installed on the outside of the cooler/freezer wall and within 3" of the wall. Fitting shall be sealed per manufacturer's recommendations.
 20. All conduits exposed to water shall have flexible conduits with a drip curve in conduit to keep from allowing water run into enclosure and provide a Myers hub connector to the enclosure.
 21. Install telephone, data, intercom, and signal system raceways, 2-inch trade size and smaller, in maximum lengths of 150 feet and with a maximum of two 90-degree bends or equivalent. Separate lengths with pull or junction boxes where necessary to comply with these requirements, in addition to requirements above.

- E. Below grade and below slab conduit installation:
1. See Section 16100, "Excavation, Cutting, and Backfilling" for trenching and backfilling requirements.
 2. Rigid steel or IMC conduits installed below slab-on-grade or in the earth shall be field wrapped with 0.010 inch thick pipe-wrapping plastic tape applied with a 50 percent overlay, or shall have a factory-applied polyvinyl chloride, plastic resin, or epoxy coating system. Painted on coatings shall not be acceptable. Wrap shall extend a minimum of 1" above slabs or 3" above finished grade where there is no slab. Alternate methods must be approved by Engineer prior to bids.
 3. Top of the conduit shall be not less than 30 inches below grade.
 4. Run conduit in straight lines except where a change of direction is necessary.
 5. Conduits stubbed up from below grade or slab into exterior walls shall be turned toward the interior of the building below slab fill perpendicular to the wall. Conduits shall not be turned out toward the exterior unless specifically indicated to do so.
 6. Placing of conduits below slab on grade:
 - a. Conduits 1-1/4" and larger shall be installed a minimum of 12" below the bottom of slab in the clay/sand fill below any gravel fill material.
 - b. Conduits 1" and smaller may be installed in the porous/gravel fill below the vapor barrier.
 7. Multiple Conduits:
 - a. Separate multiple conduits by a minimum distance of 2-1/2 inches horizontally and 3 inches vertically, except that light and power conduits shall be separated from control, signal, and telephone conduits by a minimum distance of 3 inches horizontally and vertically.
 - b. Where multiple layers of conduits are to be placed in a trench, each layer shall be placed in the trench, straight and parallel, clear fill material (see Excavation, Cutting, and Backfilling) placed and tamped in place to provide the specified spacing, and each subsequent layer placed in the same manner.
 - c. Stagger the joints of the conduits by rows and layers to strengthen the conduit assembly.
 - d. Conduits shall not be placed haphazardly in the trench.
 8. Where conduits pass through footings or foundation walls:
 - a. Conduits roughed in beneath slab shall exit the foundation perpendicular to the building spaced approximately 3" apart. Conduits shall be arranged in a single horizontal row where practical.
 - b. Secure approval from the Architect and Structural Engineer prior to penetrating any footing or foundation wall.
 - c. Schedule 40 PVC sleeves shall be cast in the footings or foundation wall for the conduits to pass through.
 - d. Multiple sleeves shall have 3" clearance, vertically and horizontally, between the sleeves unless directed otherwise by the Architect and/or Structural Engineer.
 9. Where PVC conduit is installed below grade a PVC to rigid metallic conduit coupling shall be installed in the horizontal run and a rigid galvanized steel conduit elbow installed to turn up to above grade. Where above grade conduits are indicated to be rigid aluminum the elbow turning up to vertical shall be rigid aluminum.
 10. Rigid aluminum conduit shall be wrapped same as RGS through concrete from 2" each side of the concrete.
 11. Rigid galvanized conduit shall extend a minimum of 6" above the finished floor level.
 12. In hazardous areas the coupling shall be below grade and a single section of conduit installed up to 18" A.F.F. to accept the required seal fitting.
 13. Wiring shall be extended in rigid threaded conduit to equipment, except that where required, flexible conduit may be used from 6 inches above the floor to the served equipment.

14. Conduits shall exit concrete slabs vertically.
 - a. Where adequate support cannot be obtained by wiring to reinforcing steel, obtain support with solid iron stakes (which may be driven through membrane) cut off flush with slab after pouring.
 - b. At turn-ups of adjacent runs of exposed conduit, obtain alignment by wiring members to a temporary horizontal member.
 15. Empty or spare conduit stub-ups shall be capped with a threaded cap.
 16. Encasement Under Roads, Structures, and at other locations indicated on the drawings:
 - a. Under roads, paved areas, railroad tracks, and other locations indicated on the plans install conduits in concrete encasement of rectangular cross-section providing a minimum of 3-inch concrete cover around ducts.
 - c. Provide plastic duct spacers that interlock vertically and horizontally. Spacer assemblies shall consist of base spacers, intermediate spacers, and top spacers to provide a completely enclosed and locked-in conduit assembly.
 - d. Install #4 rebar at each corner of the encasement and at not more than 18" on center vertically and horizontally on the sides of the encasement. #4 rebar hoops shall be installed at not more than 18" on center along the length of the encasement.
 - e. Concrete encasement shall extend at least 5 feet beyond the edges of paved areas and roads, and 12 feet beyond the rails on each side of railroad tracks.
 17. Conduits to be installed under existing paved areas, which are not to be disturbed, and under roads and railroad tracks, shall be installed through a zinc coated, rigid steel, sleeve, jacked into place.
 18. Conduits installed between handholes, manholes or other accessible areas shall have a minimum slope of 3 inches in each 100 feet away from buildings and toward manholes and other necessary drainage points.
 19. The contractor shall provide properly rated and sized junction and pull boxes as required on all underground conduit runs 150 feet and greater so as to minimize pulling tensions on cables to be installed in conduits. In no case shall pull or junction boxes be further than 300 feet apart. Provide pulling tension calculations on all underground runs over 200 feet as required in Paragraph 1.09 Submittals.
- F. Conduit Installation in concrete slabs:
1. Conduit installed in concrete slabs shall be rigid steel or IMC. Rigid steel or IMC conduits installed in slabs-on-grade shall be field wrapped with 0.010 inch-thick pipe-wrapping plastic tape applied with a 50 percent overlay, or shall have a factory-applied polyvinyl chloride, plastic resin, or epoxy coating system. Painted on coatings shall not be acceptable.
 2. At slabs on grade, conduit, 3/4" maximum, may be run in the slab; larger conduit shall be run below slab.
 3. Where adequate support cannot be obtained by wiring to reinforcing steel, obtain support with solid iron stakes (which may be driven through membrane) cut off flush with slab after pouring.
 4. At turn-ups of adjacent runs of exposed conduit, obtain alignment by wiring members to a temporary horizontal member.
- G. Flexible conduit:
1. At motor or equipment connections:
 - b. The maximum length allowable for flexible conduit shall be 36 inches except at lighting fixtures.
 - c. Flexible conduit installed outdoors shall be installed so as to provide an 8 inch minimum drip loop as measured from the lowest end of the conduit.
 2. At lighting fixture connections provide flexible steel conduit by one of the manufacturers named for rigid.
 - a. Maximum length allowable shall be 72 inches.

- b. Support flexible conduit such that it does not contact the ceiling system, ductwork, or other equipment above the ceiling. The conduit shall not be attached to a ceiling or ceiling support system.
 - c. All fixture whips shall be supported within 12" of outlet/junction boxes with single hole clamps.
- H. Empty conduit:
 - 1. Install a #14 galvanized fish wire or polypropylene pull cord with 14-inch free ends in all empty power and/or auxiliary conduits.
 - 2. All conduits indicated to be terminated above the ceiling shall have an elbow turned out above the ceiling and shall be terminated with an insulating bushing.
 - 3. Empty conduits stubbed out of buildings below grade:
 - a. Empty conduits stubbed out of buildings below grade shall extend 5 feet outside of the building foundation.
 - b. Install a 12"x 12"x 6" concrete marker at grade, above the end of the conduits, with "ELEC" inscribed on top.
 - f. Note on as-built drawings the exact location where empty conduit(s) are stubbed out below grade to the building exterior. Indicate conduit sizes and number of each size.
 - g. The contractor shall provide properly rated and sized junction and pull boxes as required on all underground conduit runs 150 feet and greater. In no case shall pull or junction boxes be further than 200 feet apart.
- I. Conduit entries into enclosures, panelboards, and wiring troughs:
 - 1. Layout conduit entries carefully to allow clearances for the number and sizes of conduits, electrical equipment, and future expansion.
 - 2. In sheet metal equipment use Greenlee Knock-Out punch, or equal, to cut holes for conduit installation. Do not drill holes or cut holes out with snips or torch.
 - 3. In cast enclosures and boxes drill conduit openings with correct size drill for tight fit.
- J. **All junction box covers above the ceiling shall be labeled to which circuits or systems they contain.**

3.12. CONDUIT BODIES:

- A. Conduit bodies shall be sized in accordance with NEC 370, and 373.
 - 1. Conduit bodies for conductor sizes AWG #4 and larger shall be mogul type bodies sized in accordance with NEC 370-28.
 - 2. Conduit bodies for conductor sizes AWG #6 and smaller shall be sized in accordance with NEC 370-16(c).

3.13. JUNCTION AND PULL BOXES:

- A. Junction and pull boxes shall be sized per NEC to accommodate the installed number and size of conductors and conduits.
- B. Boxes shall be securely fastened in place.
- C. Boxes serving lighting fixtures installed in accessible, suspended ceilings:
 - 1. Provide number of boxes as required to maintain fixture whips within the 6' maximum length.
 - 2. Generally, attach to underside of structure above, in accessible location, to accommodate a maximum 6' flexible conduit connection to each fixture or fixture run.
 - 3. Where the structure above is more than 18" above the ceiling the boxes shall be supported within 18 inches of the ceiling with all thread rod and/or strut.
- D. Install galvanized steel utility box plates, by box manufacturer, at exposed conduit fittings or boxes.
- E. **All junction box covers above the ceiling shall be labeled to which circuits or systems they contain.**

3.14. WIRE AND CABLE INSTALLATION:

- A. No conductor shall be smaller than #12 except where so designated on the drawings or specified elsewhere.
- B. Multiwire lighting branch circuits shall be used where indicated.
- C. Wiring devices shall be connected such that each device can be removed without interrupting the neutral or equipment grounding conductors serving other outlets on the same circuit(s).
- D. Joints and splices in wire shall be made with solderless connectors and covered so that insulation is equal to conductor insulation. Wire nuts shall not be used for conductor #8 and larger.
- E. No splices shall be pulled into conduit.
- F. Both conductors and conduit shall be continuous from outlet to outlet.
- G. No conductor shall be pulled into the conduit until the conduit is cleaned of all foreign matter.
- H. When installing parallel conductors, it is mandatory that all conductors making up the feeder be exactly the same length, the same size, and type of conductor with the same insulation. Each group of conductors making up a phase or neutral must be bonded together at both ends in an approved manner.
- I. MC cable or Romex cable will not be accepted unless specifically called for on drawings.
- J. Wiring thru light fixtures and receptacles will not be accepted.

3.15. AUXILIARY GUTTERS (WIRING TROUGHS):

- A. Auxiliary Gutters shall be sized per NEC to accommodate the installed number, size, and orientation of conductors and conduits.
- B. Conductors serving a gutter shall be extended without reduction in size, for the entire length of the gutter.
- C. All taps and splices shall be made with insulated multi-tap connectors.

3.16. CIRCUITS AND BRANCH CIRCUITS:

- A. Outlets shall be connected to branch circuits as indicated on the drawings by circuit number adjacent to outlet symbols, and no more outlets than are indicated shall be connected to a circuit.

3.17. WIRE JOINTS:

- A. Except for motor circuits, wire joints for #8 and smaller wire shall be made with twist on connectors.
- B. Wire joints and splices for motor circuits, for conductors #6 and larger, and for smaller conductors where other connectors are not rated for the number of conductors involved shall be made with split bolt connectors rated for the applicable conductor size, number of conductors, and conductor material.
 - 1. Properly tape and insulate all joints to attain the same insulation rating as the cable insulation.
 - 2. Splices for #6 through #1 shall have a minimum of two (2) layers of rubber tape covered by a minimum of three (3) layers of electrical tape.
 - 3. Splices for #1/0 and larger conductors shall have a minimum of two (2) layers of electrical filler tape covered by a minimum of three (3) layers of electrical tape.
- C. Splices in control conductors shall be avoided as much as possible. Stranded control conductor up to #12 may be connected or spliced with hand crimped type compression connectors. The connectors shall be of the proper size for the conductors being connected.
- D. Splices and joints made with mechanical/hydraulic type compression connectors:
 - 1. Connections and splices shall be made with connectors rated for the applicable conductor size and conductor material.

2. Dies used shall leave the die number embossed in the connector. The Contractor shall provide the Engineer with the Manufacturer's connector and die chart prior to final inspection.
- E. Taps and splices in auxiliary gutters/troughs shall be made with insulated multi-tap connectors.
- F. Wire joints and splices made below grade shall be made with UL listed waterproof connectors, wire nuts, or splice kits.
- G. All joints and splices shall be made in junction boxes, wiring troughs, or conduit bodies sized per NEC.
- H. All connections to switchboards, panelboards, transformers, generators, ATS, or any other type electrical distribution type equipment shall be compression type fittings. Mechanical fittings will not be accepted in these applications.

3.18. STRUT SYSTEM FOR SUPPORT OF ELECTRICAL EQUIPMENT:

- A. Strut Systems: Strut shall be utilized to rack exposed piping vertically or horizontally on walls and across slabs (where applicable). Strut may be utilized to support piping above ceilings, for support of equipment, and elsewhere as deemed appropriate.
 1. Strut in conditioned spaces and above accessible ceilings shall be electro-galvanized.
 2. Strut installed outdoors, in mechanical rooms, and in other unconditioned spaces shall be hot-dipped galvanized.
 3. Strut installed in waste-water treatment facilities, kitchens, dishwashing spaces, and labs shall be stainless steel.
 4. Strut fittings and hardware, including anchors, shall be same material as strut.
 5. Saw cut strut square, 6" minimum lengths. Strut on continuous runs of pipe shall be same length. File or grind burrs from saw cuts.
 6. After installation, electro-galvanized and hot-dipped galvanized strut shall be painted with two coats of zinc primer.

3.19. OUTLET BOX INSTALLATION:

- A. General: 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.
- B. Outlet boxes shall be sized per NEC to accommodate the installed number and size of conductors, wiring devices, and conduits.
- C. Ceiling and Wall Bracket Outlets: 4" octagonal boxes with plaster rings appropriate for finish surface.
- D. Typical boxes (for switches, receptacles and 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 otherwise appropriate for surface and construction.
- E. Boxes in Exposed (or Thin-Coat 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. .
- F. Multiple Outlet Floor Boxes:
 1. Verify the exact location of the floor boxes with the Architect prior to rough-in.
 2. Set the boxes in accordance with the manufacturer's instructions.
 3. Boxes shall be set so that the box is flush with the finished floor; the boxes shall not cause a rise or fall in the floor.
 4. The power outlets shall be connected to the circuits indicated by the numbers next to the symbol.
 5. For Data outlets, install a 1" C. to above the nearest corridor ceiling.
- G. Boxes used with Exposed Conduit: 4" square utility boxes.

- H. Exterior Boxes: Cast-metal boxes, Crouse-Hinds Type FS or FD as appropriate. Make weatherproof with gasketed covers. Equal products by Appleton, Killark, O-Z/Gedney, or approved equal will be accepted.
- I. Boxes used with Recessed Lighting Fixtures in suspended acoustical tile ceilings:
 - 1. Provide a 4" square box with blank cover adjacent to each fixture or fixture group.
 - 2. Install a flexible metal conduit fixture-"whip" from the box to the fixtures. The "whip" shall not be longer than 72".
 - 3. Attach the box to the underside of the structure above, in an accessible location, not more than 18" above the lay-in ceiling.
 - 4. Where structure is more than 18" above the ceiling, the boxes shall be supported from all-thread rods, strut, or a combination of rod and strut.
- J. Boxes in Dry Wall Construction:
 - 1. Outlet boxes shall be securely fastened in place.
 - 2. Outlet boxes installed in metal stud construction shall be supported by brackets screwed to studs. Clip on brackets shall not be accepted.
 - a. Where a single outlet box is installed adjacent to a stud, brackets may attach to a single stud with a brace against the back of the opposite wall. Use a bracket equal to Caddy Fasteners "H" Series.
 - b. Where outlets do not fall next to a stud or where more than one outlet is installed between studs use a metal bracket attached to both studs. Brackets shall be equal to Caddy Fasteners "SGB", "TSGB", or "RBS" series brackets.
 - c. Outlet boxes three gangs and wider shall be supported with support member screwed to the two adjacent studs. Brackets equal to Caddy Fasteners SGB or TSGB brackets may be used.
- K. 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).
- L. Outlets in unfinished masonry walls may be slightly adjusted upward or downward to suit masonry courses, provided outlets are mounted at uniform heights throughout the installation.
- M. Coordinate installation of outlet boxes in masonry walls with the masonry contractor to insure that boxes are flush with face of wall and grouted smooth around boxes such that covers, fixtures or devices install flush on face of wall.
- N. Where outlets at different levels are shown adjacent, install in one vertical line where possible. Avoid conflict with wainscot caps, splash backs and upper cabinets by adjusting height slightly up or down as directed.
- O. Back to back boxes shall be staggered with at least 3 inches between boxes.
- P. Back to back boxes in fire rated partitions shall have a minimum of 24" horizontal and/or vertical separation between them.
- Q. Backs of boxes three gang and larger installed in fire rated partitions shall be wrapped with self adhesive fire stopping tape.
- R. Locate switch outlets on the lock side of doors and so that the first switch in a single or gang installation is approximately 6" to 10" from the doorjamb. Verify door swings on Architectural Drawings.
- S. Dimmers shall be ganged together in accordance with the manufacturer's instructions where appropriate but shall not be ganged with toggle switches.
- T. Coordinate carefully with appropriate trades the size and orientation (vertical, horizontal) of outlet boxes for thermostats, data outlets, fire alarm equipment, security equipment, and other control and communications outlets.
- U. Mounting Heights:

Confirm all mounting height with local codes and authorities prior to bid and adjust as required:

Switches, generally	48" A.F.F. to top of outlet
Safety switches	Center of Switch 48" A.F.F. or as required.
Receptacles, generally	16" A.F.F. to bottom of outlet
Receptacles over counters	Bottom of outlet 6" above countertops or 2" above backsplashes
Comm Outlets	16" A.F.F. to bottom of outlet
Wall mounted exit and emergency lights	Bottom of fixture 7'- 6" A.F.F. or 12" below Ceiling whichever is lower
Thermostat	Top of outlet 48" A.F.F. or as noted by mechanical drawings.
Clocks & clock outlets	Top of outlet 12" below ceiling, 8' maximum.
Electric Water Coolers	Coordinate location with plumbing contractor to locate the receptacle(s) concealed within the EWC enclosure per manufacturer's installation instructions.

- V. Install blank coverplates on all unused power and auxiliary outlet boxes. Blank coverplates shall match other cover plates installed in the facility.
- W. Furnish blank plates, matching those on the other outlets in the same area, on TV outlets and other outlets installed for future use.

3.20. WIRING DEVICES:

- A. Install wall devices vertically' unless otherwise noted, so that all devices of any given height will align exactly.
- B. Where boxes are not flush or square with the finished wall surface install wiring devices utilizing a leveler and retainer equal to Caddy #RLC or Steel City #SSF-SR.
- C. Plates shall be plumb and true with all four edges contacting wall surface.
- D. Mount receptacles with grounding terminals down.
- E. Do not install devices until plastering or other type wall covering has been completed; install ahead of painting work but protect from paint spatter.
- F. Use screw terminal connections only.
- G. Do not gang dimmer switches with toggle switches.
- H. Each single or multi outlet receptacle, other than straight blade, 15 or 20 amp, 120 volts, NEMA 5-15R or NEMA 5-20R, shall be provided with matching cord plugs and a minimum of 8 feet of Type SOW cable matching the receptacle size and configuration.
- I. Pin and sleeve plugs for food service equipment shall be provided with a Type SOW cable connected to the equipment and plug of sufficient length to reach from the equipment to the plug with a minimum of 18" slack cord. Minimum length shall be 6 feet from equipment to plug.
- J. Provide "Kellums" type grips at the plug, cord connector, and for overhead support on all overhead cord connector drops.

3.21. TELE-POWER POLES:

- A. Tele-Power poles shall be attached to the floor and rigidly supported from the structure above such that there is no lateral movement of the pole.
- B. Where direct attachment to the structure is not possible, install cross bracing constructed of strut members.

3.22. OCCUPANCY SENSORS AND ASSOCIATED DEVICES FOR LIGHTING CONTROL:

- A. Occupancy sensors and associated devices and circuiting shall be installed in strict accordance with the manufacturer's instructions.

- B. Wall, corner mounted sensors shall be mounted as close to the ceiling as possible on the manufacturer" corner mounting bracket.
- C. Power packs shall be mounted above the ceiling. Power packs shall be installed utilizing two(2) 4" x 4" x 2-1/8" deep boxes joined together using the nipple on the powerpack in accordance with the manufacturer's instructions. One of the boxes shall contain the power pack and control wiring and the other shall contain the power wiring.
- D. All control and power circuiting shall be in EMT conduit. Where the devices are not equipped with conduit connections the conduit shall be brought up as close as possible to the device and terminated with insulating bushings.

3.23. ELECTRICALLY POWERED EQUIPMENT AND CONTROLS:

- A. Provide and install power circuits for all electrically powered equipment and controls.
- B. Heating, Ventilating, and Air Conditioning Control Wiring and Conduit:
 - 1. The electrical contractor shall be responsible for installing outlet boxes for flush mounted HVAC system thermostats in dry wall or masonry wall construction and, where called for on the plans, for surface mounted metallic raceway in finished areas. Extend 3/4" conduit from the outlet to above nearest accessible ceiling and terminate horizontally. Refer to the Mechanical/HVAC plans for thermostat locations and coordinate exact type outlet required and orientation with the Mechanical/HVAC contractor.
 - 2. The Mechanical Contractor shall be responsible for the installation of all outlets and conduit for surface mounted devices in unfinished areas such as shops, warehouses, industrial facilities, etc.
 - 3. The mechanical contractor shall furnish and install all low and line voltage control wiring required for the temperature control and/or ventilation systems.
- C. Where Fire Alarm system duct mounted smoke detectors and HVAC shut down interface relays are provided, the Electrical contractor shall provide wiring from the smoke detectors to the HVAC shut down interface relay. All circuiting from the shut down relay to the HVAC controls and/or starters shall be provided and installed by the Mechanical/Controls contractor.
- D. The mechanical contractor shall furnish all motor starters for the temperature control and/or ventilation equipment unless otherwise indicated on the electrical plans or elsewhere in these electrical specifications. The electrical contractor shall install all motor starters, except for equipment with factory installed starters, for the temperature control and/or ventilation equipment.
- E. Where exhaust fans are supplied with field installed speed controllers, the Electrical Contractor shall provide all necessary circuiting to the fan/speed controller and between the fan and the speed controller.

3.24. DISCONNECTING MEANS:

- A. Where required by the National Electrical Code and/or other applicable codes or authorities, or where indicated on the electrical plans, the electrical contractor shall furnish and install an approved disconnecting means for all electrically powered equipment and/or controllers for such equipment whether the disconnecting means is or is not shown on the electrical plans.
 - 1. The location, rating, and enclosure for the disconnecting means shall be as required by the National Electrical Code and/or other applicable codes or authorities.
 - 2. Manual motor starters with thermal overload protection may be used in lieu of safety switches for individual motors under 1 horsepower.
 - 3. Motor rated switches may be used for the disconnecting means when supplied of correct voltage, phase, amperage rating, and enclosure type.
 - 4. The disconnecting means shall be as manufactured by General Electric, Cutler Hammer, or Siemens. Square D will not be accepted.
- B. Where the disconnecting means shown on the electrical plans has a rating greater than the required code rating, the greater rating device shall be installed.

- C. An approved horsepower rated fusible safety switch shall be installed where the circuit overcurrent protection does not provide overload protection for the equipment served and where required to meet the equipment's listing requirements.
- D. Motor rated switches may be used as service disconnect switches when supplied with a pad-lockable, handle locking guard.
- E. Install an engraved phenolic nameplate on the front of each switch enclosure identifying the equipment served by the safety switch and source of power (i.e., panel name and circuit number). Plates shall be white with black lettering. The plates shall be permanently installed with stainless steel screws or stainless-steel rivets.
- F. All disconnects installed in public areas or in areas readily accessible to the public shall be lockable and shall be furnished with a brass lock. Provide 10 keys for each lock. All disconnect locks furnished on the project shall be keyed alike.

3.25. DATA AND TELECOMMUNICATIONS SYSTEMS:

- A. The Data/Telecommunications Contractor shall have a BiCSI certified technician on the job at all times that system installation and/or testing is taking place.
- B. All cables shall be installed by the Data/Telecommunications Contractor under the direct supervision of a BiCSI certified technician.
- C. Install a 1" conduit from each Data and Communications outlet box to above the nearest corridor ceiling and terminate with an insulating bushing. The conduit shall be run without pull boxes, junction boxes, or conduit bodies and no more than the equivalent of three (3) 90-degree bends.
- D. Each Data/Tele-Communications outlet shall have a Category 6 cable installed from each jack to the patch panel serving the area. Coordinate with drawings.
- E. Make all terminations at jacks and patch panel in accordance with industry standards.
- F. Cable installation:
 - 1. The rated cable pulling tension shall not be exceeded. Cable shall not be stressed such that twisting, stretching or kinking occurs. Cable shall not be spliced.
 - 2. Cable shall not be run through structural members or in contact with pipes, ducts, or other potentially damaging items.
 - 3. Placement of cable parallel to power conductors shall be avoided, if possible; a minimum separation of 12" shall be maintained when such placement cannot be avoided.
 - 4. All cables shall be terminated at both ends; no cable shall contain unterminated elements.
 - 5. Cable ties shall not be excessively tightened such that the transmission characteristics of the cable are altered.
 - 6. Cable bending radius shall be 1" minimum. Minimum bending radius shall not be exceeded during installation or once installed.
 - 7. Cables shall not come-in-contact with conduits, ceilings, lighting fixtures, ductwork, or water, sewer, or steam piping.
 - 8. Cables routed above suspended ceilings shall be neatly bundled and supported with J-Hook Hangars attached to the building structure a maximum of 4 feet on center at not more than 24" above the suspended ceiling or in cable tray.
 - a. Cables shall be bundled together with nylon cable ties at 3' on-centers. Cable ties shall not be excessively tightened such that the transmission characteristics of the cable are altered.
 - b. Hangars shall be configured as required to attach to the structure, wall mounted, ceiling mounted, suspended from all thread rod, or supported on strut attached to the structure. Anchors attached to sheetrock shall not be acceptable.
 - c. Hangars shall be single or multiple tiered as required for the number of cables being supported.

- d. At Corridor crossings or other locations where wall mounting is impractical hangers shall be double sided, single tier J-Hooks suspended on all-thread rods supported from the building structure or beam clamps at a maximum of 48" on centers.
 - e. No more than 32 Cat 6 cables shall be installed in 2" J-hooks.
 - 9. Cables shall not be installed such that J-hooks are deflected, or such that cables are pulled tight against conduit walls where they exit the conduit.
 - 10. Cat 6 cables shall not be bundled with, installed in j-hooks with, or installed in conduit with power circuiting, bell system circuiting, intercom system circuiting, or other auxiliary systems circuiting.
 - 11. Cables routed through finished spaces which do not have suspended ceilings shall be installed in conduit. Routing of any exposed conduit shall be coordinated with the architect.
 - 12. Above inaccessible ceilings, cables shall be installed in EMT conduits. Conduits shall be terminated at each end with insulating bushings. Each end of conduit shall be easily accessible.
 - 13. Maximum number of Cat 6 cables in an EMT conduit shall comply with NEC.
 - 14. On backboards cables shall be supported on "D" Rings at not more than 10" on centers. Cables shall be attached to the "D" rings in vertical runs with nylon tie wraps.
- G. Category 6 Cable Testing:
- 1. All category 6 circuits shall be tested using a test set that meets the Class II accuracy requirements of TIA/EIA TSB 67 standard, including the additional tests and test set accuracy requirements of ANSI/TIA/EIA-568-A-5.
 - 2. Testing shall use the Basic Link Test procedure of TIA/EIA TSB 67, as supplemented by ANSI/TIA/EIA-568-A-5.
 - 3. All metallic cable pairs shall be tested for proper identification and continuity.
 - 4. All opens, shorts, crosses, grounds, and reversals shall be corrected. Correct color coding and termination of each pair shall be verified in the communications closet and at the outlet.
 - 5. Horizontal wiring shall be tested from and including the termination device in the communications closet to and including the modular jack in each room.
 - 6. Makes and model numbers of testing equipment shall be provided to the Engineer for approval prior to beginning installation.
 - 7. Each Category 6 cable shall be tested in accordance with ANSI/TIA/EIA TSB-67 for Link Performance Verification.
 - 8. Phone outlets with RJ11 terminations shall have a Cat 5e connector installed for testing. After testing and certification of the cable the cable shall be terminated on the telephone jack.
 - 9. Each Pair of conductors in each cable shall be tested for the following:
 - a. Wire Map
 - b. Length
 - c. Attenuation
 - d. Near End Crosstalk Loss (NEXT): Tested from both ends of cables.
 - 10. Any cable(s) not meeting the minimum standards of ANSI/TIA/EIA TSB-67 shall be removed and replaced.
 - 11. Results of the tests for each cable shall be printed out with the name of cable as affixed to the cable and terminals on site.
 - 12. A bound copy of all test results shall be provided to the Engineer and Owner prior to final inspection. The results shall be bound in protective sleeves in a three-ring binder.
- H. Optical Fiber Cables:
- 1. All optical fiber cable shall be installed in 1" EMT conduit. After installation, conduits shall be permanently labeled as containing fiber optic cable.
 - 2. Innerduct may be installed from the horizontal runs of EMT down to the Data Racks.

3. Optical fiber cables shall not be spliced. Each cable shall be continuous from Patch Cabinet to Patch Cabinet
4. All Optical Fiber Cable shall be pulled with hand power only. Pulling tension shall not exceed the cable manufacturer's rating. Torsion shall be avoided by-the-use of a swivel at the cable end. While under tension, a minimum bend radius of 20 times the outside cable diameter will be maintained through-the-use of pulleys and sheaves where required. After pulling, no bend may have a radius, at rest, of less than 10 times the outside cable diameter.
5. Provide cable lubricant compatible with the cable sheathing material when pulling cable. Attach pulling fixtures to the cable strength members. When indirect attachments are used, match the grip diameter and length to the cable diameter and characteristics. When indirect attachment is used on cables having only central strength members, reduce pulling forces to ensure that fibers are not damaged from forces being transmitted to the strength member. During pulling of the cable, continuously monitor pull line tension and shall not exceed maximum tension given by the cable manufacturer. Mechanical stress placed upon the cable during installation shall be such that cable is not twisted or stretched. Provide cable feeder guide between cable reel and face of duct or conduit to protect and guide cable into the duct or conduit as it played off the reel. As the cable is played off the reel, carefully inspect for jacket defects. Take precautions during the installation to prevent the cable from being kinked or crushed and to ensure that minimum bend radius is not exceeded at any time. When practicable, use the center pulling technique to lower pulling tension. Pull cable from center point of cable run towards the end termination points. Method may require cable to be pulled in successive pulls. When cable is pulled out of a manhole or handhole, protect cable from dirt and moisture by laying cable on a ground covering.
6. Each cable and conduit or inner duct is to be permanently labeled at each end with a unique cable number. In addition, labels shall be affixed to the cable and conduit/inner duct at every transition of a vault, hand hole, riser closet, or major pull box. For example, from Server Room to each building wing should be labeled as "FIBER-1, FIBER-2, FIBER-3 & FIBER-4 or some unique numbering scheme to identify each cable run.
7. Termination Standards
 - a. The terminal ends of all fiber cable strands shall be field connectorized. The connectors shall be mounted on backboards and installed in enclosures called Fiber Integration Centers (FIC). Terminate both ends of all fibers within a fiber cable with SC style connectors.
 - b. Fiber Organizers: Fiber cables are to be terminated in fiber optic cable patch panels installed where indicated on the drawings.
 - c. Each enclosure shall be labeled with a machine-made label with permanent black ink on a white background. Labels shall be in the format to identify each cable run as well as the fiber pairs of each run. Labeled shall be on the faceplate with the identifiers of the cables it contains.
 - d. Each fiber optic strand shall be labeled with a unique identifier at the SC coupler in the FIC. Connectors shall be labeled on the identifying sheets on the front of the FIC.
 - e. Connectors and Splices: Fibers ends are to be terminated in SC-type connectors with composite ferrules. They must be of the "polish and adhesive" type. All runs are to be solid length point to point with no breaks to the termination points.
 - f. At each end of the cable, sufficient slack (10-15 ') shall be left to facilitate reasonable future relocation of the FIC. Slack shall be mounted on walls or ladder racks according to direction.
8. Testing
 - a. Before installing each individual fiber in each cable shall be tested with an adjustable OTDR for length and transmission anomalies while on the reel before installation.

- b. Perform test on 100 percent of the fibers of each circuit and repeat from the opposite end of each circuit. Field tests shall include as a minimum:
 - 1) Optical time domain reflectometer (OTDR) test at 850 nanometers, of the FO cable on the reel prior to installation. Calibrate OTDR to show anomalies of 0.2 dB as a minimum. Submit photographs traces to the Engineer.
 - 2) Scale of the OTDR trace shall be such that the entire circuit appears over a minimum of 80 percent of the X-axis.
 - 3) After installation, repeat the OTDR test in item 1) above. Replace cables that failed the test. Test new segment of cable to demonstrate acceptability. Submit photographs traces for each circuit to the Contracting Officer.
 - c. After Installation
 - 4) High-resolution optical time domain reflectometer (OTDR) tests shall be performed from one end of each fiber.
 - 5) All single mode and multi mode fiber strands shall be tested end-to-end for bi-directional attenuation at 850 nm and 1300 nm.
 - 6) Tests should be conducted in compliance with EIA/TIA-526-14, Method B, according to the manufacturer's instructions for the test set being utilized.
 - 7) Tests must ensure that the measured link loss for each strand does not exceed the "worst case" allowable loss defined as the sum of the connector loss, (based on the number of mated connector pairs at the EIA/TIA-568 maximum allowable loss of 1.0 dB per mated pair), and the optical loss (based on the EIA/TIA-568 maximum allowable loss of 3.75 dB at 850 nm and 1.5 dB at 1300 nm).
 - 8) Before termination, each fiber shall be tested with an adjustable ODTR for length, transmission anomalies, and end-to-end attenuation. Results are to be recorded and supplied to Engineer in the form of hard-copy printouts or photographs of screen traces.
 - 9) After termination connectors shall be visually inspected for scratches, pits or chips and shall be re-terminated if any of these conditions exist.
 - 10) Each terminated fiber is to be tested for end-to-end loss. As above, results are to be recorded and supplied to the Engineer.
 - 11) The maximum allowable attenuation for any splice or termination is 0.5 dB.
 - d. Any fiber optic cable not meeting the minimum standards shall be removed and replaced or if it is determined that splices or terminations are at fault the splice or termination at fault shall be replaced.
- I. Labeling:
1. Fiber Optic Cables:
 - a. Each Fiber Optic cable shall be labeled with an alpha/numeric identifier.
 - b. Each fiber in a fiber optic cable shall be labeled with an alpha/numeric identifier corresponding to the cable number, the patch panel number, and fiber identifier (typically A through F for a six-fiber cable).
 - c. Labels shall be installed at each end of cables where terminated and on each fiber of each cable at the point of termination.
 - d. A floor plan of the facility shall be provided showing all patch panels with the corresponding identifiers, and cable identifiers for each cable at each patch panel.
 2. Cat 6 Cables:
 - a. Each jack, Cat 6 cable, and fiber optic cable shall be labeled with an alpha/numeric identifier with a corresponding identifier on the punch down block and/or patch panel.
 - b. The number shall include the alpha/numeric patch panel name and the alpha/numeric patch panel port name where the cable is terminated.
 - c. Labels shall be installed at each end of Cat 6 cables where terminated.
 - d. A floor plan of the facility shall be provided showing outlet locations and cable identifiers for each cable and the location of all patch panels with the corresponding identifiers.

3.26. LIGHTING FIXTURES:

- A. The installation and support of all lighting fixtures shall be the responsibility of the Electrical Contractor.
- B. Lay out work as shown, and to provide attractive and efficient arrangement.
- C. Install fixtures level, plumb, and true with ceiling and walls, and in alignment with adjacent lighting fixtures.
- D. Provide adequate and substantial supports for fixtures in accordance with manufacturers' directions and as specified herein.
- E. A Re-lock system will not be accepted for installing lights.
- F. Wire grid mounted luminaries individually to junction boxes with flexible conduit not more than 6 feet in length. Individual flexible connections shall be 2 #14 and 1 #14 ground THHN in 3/8" flexible conduit. Ground wire shall be bonded at each end.
- G. Light fixtures with center baskets shall have all fixtures in a room installed with the center baskets oriented in the same direction.
- H. Fixtures mounted in inverted "T" grids:
 - 1. For round fixtures or fixtures smaller in size than the ceiling grid, provide a minimum of two wires per fixture located within 4 inches of each corner of the ceiling grid in which the fixture is located. Do not support fixtures by ceiling acoustical panels. Fixtures shall be supported independent of the ceiling system or shall be supported by at least two metal channels spanning the grid system, and secured to, the ceiling tees. One support wire shall be attached to the center of the fixture or to each of the metal channels.
 - 2. Surface mounted fixtures:
 - a. Surface mounted fixtures installed on lay-in ceiling systems shall be supported independent of the ceiling system from the building structure with a minimum of two (2) 3/8", minimum, all-thread rods.
 - b. Install nuts and washers on inside and outside of the fixture housing to provide a rigid installation.
 - c. Provide cross bracing as required such that fixtures have no lateral movement.
- I. All stems on lighting fixtures shall be installed as follows: (except fixtures with slide grip hangers) first and last stem in row in first knockout from end of fixture. One stem shall be installed between each two fixtures, stem shall center joint, where fixtures join, and attach by use of "jointing plates". Nipples with lock nuts and bushings shall connect all fixtures in continuous rows other than recessed grid type.
- J. All suspended lighting fixtures shall be provided with chain or cable sway bracing to keep fixtures from swinging.
- K. Fixtures installed in fire rated assemblies shall be tented in accordance with the specified assembly.
- L. Means shall be provided to keep insulation 4" minimum away from fixtures not rated for direct contact with insulation.
- M. Prior to final inspection clean fixtures and lamps with a soft cloth or sponge and detergent (not soap) solution.
- N. All lighting fixtures installed in gymnasiums, hangars, high bay or similar use areas shall be equipped with wire guards.
- O. All emergency and exit lights designated on drawings shall be provided with an 1100-lumen battery ballast.
- P. All light fixtures shall be supported to the structure independent of the ceiling system on two opposite sides. Support wires shall be different color from ceiling support wires. Engage all

ceiling mounting clips. If light fixture is not provided with grid support clips, then the contractor will be responsible to support the fixture on all four sides with support wires. See "Typical Lay-In Luminaire Detail" on drawings for further requirements.

3.27. PANELBOARDS:

- A. Panelboards shall be installed where shown on the drawings.
- B. Ratings and configurations shall be as scheduled and/or indicated on the drawings.
- C. The Electrical Contractor shall coordinate installation of equipment in Electrical and Electrical/Mechanical spaces with other trades such that Code required clearances and working space around the electrical equipment is maintained.
- D. Conduit termination:
 - 1. In general use panelboards with blank ends, without knockouts.
 - 2. Layout conduit entries carefully to allow clearances for drywall or CMU wall thickness, and to accommodate the number and sizes of home run conduits and specified spare conduits.
 - 3. Use Greenlee Knock-Out punch, or equal, to cut holes in panelboard ends and/or sides for conduit installation. Do not drill holes or cut holes out with snips or torch.
- E. Phase arrangement in panelboards shall be per the NEC, phase A, B, C from front to back, top to bottom, or left to right as viewed from the front.
- F. In Delta connected systems the "high" leg shall be the B phase and shall be clearly marked with an orange outer finish.
- G. Multi-Section Panelboards:
 - 1. Sub-feed conductors shall be the same size as the conductors feeding the main section.
 - 2. Circuiting originating in one section shall not pass through another section.
 - 3. Circuit conductors and grounding conductors shall originate in the same panelboard section.
 - 4. A separate isolated grounding conductor shall be installed from the main section to the sub-feed section(s).
 - 5. Where the panelboard is rated for service entrance equipment the sub-feed section shall have a separate isolated ground buss fed from the main section ground buss.
- H. Labeling:
 - 1. Each panelboard shall have an engraved phenolic plate permanently installed on the front of the panel with the panel name, current rating, and voltage rating.
 - 2. Where there is more than one nominal voltage system the panel shall also have an engraved phenolic plate describing the means of identification used to identify the phase and system of each ungrounded conductor of the system served by the panel.
 - 3. Plates shall be white with black lettering.
 - 4. Panelboard circuit numbers shall be as indicated on the panelboard schedules.

3.28. PHOTOELECTRIC CELLS, TIMERS, AND CONTACTORS FOR LIGHTING CONTROL:

- A. Install time clocks where accessible.
- B. Install photoelectric cells so that lighting fixtures do not affect the cell.
- C. Adjust time clock(s) and photoelectric cells as required for proper operation.

3.29. IDENTIFICATION AND LABELING:

- A. Feeder Designation:
 - 1. Non-ferrous identifying tags or pressure sensitive labels shall be securely fastened to all cables, feeders, and power circuits in vaults, pull boxes, manholes, switch gear and at termination of cables. Tags or labels shall be stamped or printed to correspond with markings on drawings so that feeder or cable number and phase can be readily identified.

2. Where there is more than one nominal voltage system, each ungrounded system conductor shall be identified by phase and system wherever accessible per NEC. The means of identification shall be permanently posted at each branch-circuit panelboard.
- B. Color Coding of Conductors:
3. The ungrounded (phase) conductors and the grounded (neutral) conductors of each voltage system shall be identified by the following color coding method:
 - a. 120/240 Volts, Single Phase, 3 Wire:
 - 1) Grounded (Neutral) Conductor --- White
 - 2) Ungrounded (Phase) Conductors --- Red, Black
 - b. 120/240 Volts, Three Phase, 4 wire:
 - 1) Grounded (Neutral) Conductor --- White
 - 2) Ungrounded (Phase) Conductors --- Red, Orange, Black
 - c. 120/208 Volts, 3 Phase, 4 Wire:
 - 1) Grounded (neutral) Conductor --- White
 - 2) Ungrounded (phase) Conductors --- Black, Blue, Red
 - d. 277/480 Volts, 3 Phase, 4 Wire:
 - 1) Grounded (neutral) Conductor --- Gray
 - 2) Ungrounded (phase) Conductors --- Brown, Orange, Yellow
 4. Green shall be used for equipment grounding conductors only.
 5. The insulation color shall be visible for the entire length of wire.
- C. Panelboard:
1. Each Lighting and Power Panelboard shall contain a typed circuit directory listing all circuit breakers and the load served by each.
 2. Panelboard directories shall be typewritten and shall include adequate descriptions for proper identification of individual circuits. Do not write in or on panelboards.
 3. On Distribution panelboards, provide and install an engraved laminated label for each circuit, indicating circuit's number and load served.
 4. Each panelboard shall have an engraved phenolic plate permanently installed on the front of the panel with the panel name, current rating, and voltage rating.
 5. Where there is more than one nominal voltage system each panelboard shall have an engraved phenolic plate describing the means of identification used to identify each phase, neutral, and grounding conductors of the system served by the panelboard per NEC.
 6. Plates shall be white with black lettering.
- D. Wall Switches: Where three or more switches are ganged, and elsewhere as indicated, identify each switch with approved legend engraved on the wall plate.
- E. Receptacles: Install a label on the face of the coverplate and tags or wire markers inside the outlet box identifying the panelboard and circuit number from which the outlet is served. Use machine-printed, pressure-sensitive, abrasion-resistant label tape on face of coverplate- black print on clear tape on light colored or stainless-steel plates and white print on clear tape on dark colored plates. Embossed tape labels will not be accepted. Use durable wire markers or tags within outlet boxes.
- G. Disconnect Switches:
1. Install an engraved phenolic nameplate on the front of each switch enclosure identifying the equipment served by the safety switch and source of power (i.e., panel name and circuit number).
 2. Plates shall be white with black lettering.
 3. The plates shall be permanently installed with stainless steel screws or stainless-steel rivets. Plates installed with glue or other adhesives will not be accepted.
 4. Where motor rated switches are used as service disconnect switches, labeling shall be as described for receptacles.

- H. Junction boxes: Identify circuits enclosed in concealed junction boxes on the cover with permanent marking pen.
 - 1. For power and lighting circuits indicate panelboard of origin and panelboard circuit number(s).
 - 2. For auxiliary systems circuiting indicate the system and zone served.
- I. Service disconnects:
 - 1. An additional engraved sign shall be permanently attached next to panelboard circuit breakers, on enclosed circuit breaker enclosures, and/or on disconnect switches used as service disconnects to identify each main service disconnect.
 - 2. The sign shall be red with white lettering a minimum of ½" high.
 - 3. Where multiple main disconnects are utilized the labels shall identify each as one of a group, i.e., "Service Disconnect 1 of 3", etc. where there are three service disconnects.

3.30. FIRE ALARM SYSTEM:

- A. The installation shall be by a Certified Fire Alarm Contractor who has qualified and received a permit from the State Fire Marshal, with an NICET Level III on staff.
- B. All wiring shall be in accordance with the National Electric Code and the local code having jurisdiction.
- C. Unless otherwise specified, minimum wire size shall be 14 gauge for AC and power supply connections, 14 gauge for audible alarm and auxiliary circuits, and 18 gauge for signal initiating circuits. Diagrams shall be provided for device and power wiring. Color coding and permanent numbering shall be used as recommended by the equipment supplier.
- D. All system wiring shall be installed in metal raceway in accordance with Section "Raceways".
- E. Junction boxes shall have covers painted red with the letters "FA" stenciled on the cover in 2" high white letters.
- F. Auxiliary Remote Power Supplies/Notification Appliance Circuit Extender (NAC panel):
 - 1. Power supplies shall be sized at 133% of proposed load. Fire Alarm submittals shall include power supply capacity and loading data.
 - 2. Remote power supplies shall be supervised by the FACP.
 - 3. The power supplies shall be installed, accessible, below ceiling, in electrical rooms or where indicated on the drawings.
- G. Where air handler shut down is controlled from the fire alarm system, the fire alarm system installer shall provide circuiting as required between the Duct Mounted Smoke Detectors and the HVAC interface/shut down relays. Circuiting connecting the relay output contacts to the HVAC control system shall be provided and installed by the Mechanical/Controls contractor.
- H. Each air handling unit shall be a separate fire alarm initiating zone.
- I. Install wire guards on all smoke detectors and notification devices installed in gymnasiums or similar use areas.
- J. **Install UL fire listed cellular communicator for monitoring of the fire alarm system. Provide all material and labor as needed for complete functioning system at the completion of construction.**
- K. Final connections to the Fire Alarm Control Panel **and Voice Panel** shall be made by a factory certified, NICET Level III, technician.
- L. A factory-trained representative of the manufacturer shall supervise connections and final testing of this system and shall complete a Certificate of Completion per NFPA 72. The Certificate of Completion shall be completely filled out and copies delivered to the Owner, Architect, and Engineer prior to the final inspection.
- M. On completion of the acceptance tests, the Owner or his representative shall be instructed in the operation and testing of the system.

- N. **At the acceptance tests, contractor shall provide engineer with smoke detector diagnostic reports for all smoke detectors. All smoke detectors more than 10% dirty shall be either cleaned or replaced until test show value less than 10%.**
- O. The fire alarm system shall be warranted free from defects in workmanship and materials, under normal use and service, for a period of one year from the date of acceptance or beneficial occupancy, whichever is earlier. Any equipment shown to be defective in workmanship or material shall be repaired, replaced, or adjusted free of charge.
- P. Identification and labeling:
 - 1. Provide a framed building drawing identifying each zone and/or building area.
 - 2. Each building zone on the Fire Alarm Control panel shall relate to the building drawing in a manner that will direct the fire department to the area of a fire.
 - 3. On addressable systems each addressable device shall be given a name displayed on the control panel readout that will direct the fire department to the area of the fire, i.e. – South End of Zone(Building) 5; AHU-1 – Mechanical Room 201 – Building 2. Any room number reference shall be to final room numbers assigned to rooms on completion of construction.
 - 4. Building drawing, schedule of zones, and device identification schedule shall be submitted to the Engineer for approval prior to final inspection and acceptance.
 - 5. On addressable systems the contractor shall label each device with an alpha-numeric identifier that is unique to that device. This identifier shall correspond to the identifier programmed in the fire alarm control panel such that maintenance personnel may quickly and readily identify the device.

3.31. SECONDARY SURGE ARRESTERS:

- A. Secondary surge arresters shall be installed in strict accordance with the manufacturer's recommendations.
- B. Arrester may be mounted to the side of a surface mounted panelboard or trough. If such a surface is not available, the arrester shall be mounted on a bracket in its own flush mount enclosure located immediately adjacent to the service panel. Ensure that all leads are attached per manufacturer's recommendations. Excess lead length shall be cut off prior to making connections.

3.32. CONCRETE:

- A. The Electrical Contractor shall be responsible for placing concrete for electrical equipment pads, lighting standard bases, electrical equipment supports, and at other locations as indicated on the electrical drawings and/or specified herein.
- B. This Contractor shall be responsible for size, location, and orientation of the pads, bases, etc. Any required additions or modifications to concrete due to incorrect size, location, or orientation shall be the responsibility of this contractor.
- C. Concrete shall be cured for a period of not less than seven (7) days prior to setting poles, transformers, switchgear, motor control centers, or other pad mounted equipment.
- D. Forms shall be completely removed after concrete has cured and prior to setting equipment.
- E. A smooth wood float finish shall be given to exposed, unformed concrete.
- F. Honeycombed, or otherwise defective areas of concrete shall be repaired by patching with cement mortar.

3.33. SPARE MATERIAL:

- A. Provide two combo/exit signs and 50 feet of circuiting in conduit for each device complete with all labor and material for installation in a location as directed by the engineer or architect.
- B. Provide two emergency wall packs and 50 feet of circuiting in conduit for each device complete with all labor and material for installation in a location as directed by the engineer or architect.

- C. Provide four type NEMA 5-20R receptacles complete with 75 feet of circuiting in conduit . For each device provide complete with all additional labor and materials for installation in a location as directed by the architect or engineer.
- D. Provide four duplex communications outlets complete with all labor, material, cabling and conduit necessary to install outlet 300 feet from the nearest communications IDF closet and terminate outlet cables on patch panels in rack. Outlets to be installed in a location as directed by architect or engineer.
- E. Provide two occupancy sensor wall switches and their installation.
- F. Provide two marked time wall switches and their installation.
- G. Provide two of each type of fire alarm notification devices (speaker/strobe units, strobe only units) and 75 feet of circuiting in conduit for each device complete with all labor, programming, and material for installation in a location as directed by the engineer or architect.
- H. Provide two of each type of CO detector and 150 feet of circuiting in conduit for each device complete with all labor and material for installation in a location as directed by the engineer or architect.
- I. Provide two of each type of fire alarm heat detector devices and 75 feet of circuiting in conduit for each device complete with all labor, programming, and material for installation in a location as directed by the engineer or architect.
- J. Provide two of each type of initiating device (pull station, zone module, duct detector, smoke detector) and 75 feet of circuiting in conduit for each device complete with all labor and material for installation in a location as directed by the engineer or architect.
- K. Provide one spare set of fuses for each size and type fuse used.

3.34. EQUIPMENT TOUCHUP AND PAINTING:

- A. Clean damaged and disturbed areas on all painted surfaces of enclosures, cabinets, and equipment, sand smooth, and apply primer, intermediate, and finish coats of paint to suit the degree of damage at each location. Paint shall be the manufacturer's supplied touch up paint or a matching paint. Prep all surfaces to be painted by removing all rust, dirt, oil, and any other material that might inhibit good paint adhesion by mechanical means and/or with solvents.
- B. Follow paint manufacturer's written instructions for surface preparation and for timing and application of successive coats.
- C. Repair damage to galvanized finishes with two coats of zinc-rich paint recommended by manufacturer.
 - 1. Paint cut ends.
 - 2. Paint all drilled and punched holes.
 - 3. Paint all knicks and scratches.
 - 4. Paint all field cut conduit threads.
- D. Repair damage to PVC or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION

SECTION 16571
THEATRICAL LIGHTING SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. This Section includes microprocessor-based central dimming controls with the following components:
 - 1. Master-control stations.
 - 2. Control Network
 - 3. Wall stations.
 - 4. Dimmer cabinets.
 - 5. Manual switches and plates for controlling dimmers.

1.3 DEFINITIONS

- A. Fade Override: The ability to temporarily set fade times to zero for all lighting scenes.
- B. Fade Rate: The time it takes each zone to arrive at the next scene, dependent on the degree of change in lighting level.
- C. Fade Time: The time it takes all zones to fade from one lighting scene to another, with all zones arriving at the next scene at the same time.
- D. Low Voltage: As defined in NFPA 70, term for circuits and equipment operating at less than 50 V or for remote-control, signaling, and power-limited circuits.
- E. Scene: The lighting effect created by adjusting several zones of lighting to the desired intensity.
- F. SCR: Silicon-controlled rectifier.
- G. Zone: A fixture or group of fixtures controlled simultaneously as a single entity. Also known as a "channel."

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.

1. For central dimming controls; include elevation, features, characteristics, and labels.
 2. For dimmer panels; include dimensions, features, dimmer characteristics, ratings, and directories.
 3. Device plates, plate color, and material.
 4. Ballasts and lamp combinations compatible with dimmer controls.
 5. Sound data including results of operational tests of central dimming controls.
 6. Operational documentation for software and firmware.
- B. Shop Drawings: Detail assemblies of standard components, custom assembled for specific application on Project. Indicate dimensions, weights, arrangement of components, and clearance and access requirements.
1. Include elevation views of front panels of control and indicating devices and control stations.
 2. Wiring Diagrams: Power, signal, and control wiring.
- C. Samples for Initial Selection: For master-control stations, partitioned-space master-control stations, wall stations, dimmer cabinets, and faceplates with factory-applied color finishes and technical features.
- D. Samples for Verification: For master-control stations, partitioned-space master-control stations, wall stations, dimmer cabinets, and faceplates with factory-applied color finishes and technical features.
- E. Operation and Maintenance Data: For central dimming controls with remote-mounting dimmers to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 1 Section "Operation and Maintenance Data," include the following:
1. Software manuals.
 2. Adjustments of scene preset controls, adjustable fade rates, and fade overrides.
 3. Operation of adjustable zone controls.
 4. Testing and adjusting of panic and emergency power features.
- F. Warranty: Special warranty specified in this Section.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain central dimming controls from a single source with total responsibility for compatibility of lighting control system components specified in this Section, in Division 13 Section "Lighting Controls," and in Division 16 Section "Lighting Control Devices."
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with 47 CFR 15, Subparts A and B, for Class A digital devices.
- D. Comply with NFPA 70.

1.6 **COORDINATION**

- A. Coordinate features of devices specified in this Section with systems and components specified in other Sections to form an integrated system of compatible components. Match components and interconnections for optimum performance of specified functions.

1.7 **WARRANTY**

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of central dimming controls that fail in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, the following:
 - a. Damage from transient voltage surges.
 - 2. Warranty Period: Cost to repair or replace any parts for two years from date of Substantial Completion.
 - 3. Extended Warranty Period: Cost of replacement parts (materials only, f.o.b. the nearest shipping point to Project site), for eight years, that failed in service due to transient voltage surges.

1.8 **SOFTWARE SERVICE AGREEMENT**

- A. Technical Support: Beginning with Substantial Completion, provide software support for two years.
- B. Upgrade Service: Update software to latest version at Project completion. Install and program software upgrades that become available within two years from date of Substantial Completion. Upgrading software shall include operating system. Upgrade shall include new or revised licenses for use of software.
 - 1. Provide 30 days' notice to Owner to allow scheduling and access to system and to allow Owner to upgrade computer equipment if necessary.

1.9 **EXTRA MATERIALS**

- A. Furnish extra materials described below, before installation begins, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Dimmers: Full-size units equal to 10 percent of amount installed for each size indicated, but no fewer than 3 units.
 - 2. Fuses: Equal to 10 percent of amount installed for each size installed, but no fewer than three.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Strand Lighting, Inc. is the basis of design for the dimming system

Alternate manufacturers shall submit for prior approval 10-days prior to bids.

2.2 CONTACT LIGHTING CONTROL PANEL

A. Overview.

1. The lighting control panel shall be fully digital, designed specifically for architectural and entertainment lighting control applications, and shall consist of 12, 24, 36 or 48 relays per panel. A secondary "slave" panel in each size will be available. Contact Lighting Control Panel systems shall be ETL and cETL listed.

2. Panel setup and preset data shall, as standard, be fully user programmable on a per panel or system wide basis.

3. Panels shall be available that support individual power feeds from standard circuit breaker panels or with integral breakers and 3 phase main lug only inputs.

B. Mechanical.

1. The relay panel shall be a wall-mount, dead-front switchboard, substantially framed and enclosed with 16-gauge, formed steel panels. All panel components shall be properly treated, primed and finished in fine texture, scratch resistant, silver powder coat paint.

2. The dimensions of the relay panels shall be as follows:

- a. 12 Relay panel: 4 inches deep, 21 inches high and 15.8 inches wide.
- b. 24 Relay panel: 4 inches deep, 21.9 inches high and 23.5 inches wide.
- c. 36 Relay panel: 4 inches deep, 34.8 inches high and 23.5 inches wide.
- d. 48 Relay panel: 4 inches deep, 34.8 inches high and 23.5 inches wide.
- e. Slave panels shall be the same size as panels with processors.

3. Contact Relay panels shall be available to ship as a complete assembly or in two parts consisting of a wall mount enclosure and a relay panel insert with all electrical and electronic components preassembled.

C. Installation.

1. A wall mount enclosure shall be available to ship separately to permit wall mounting and conduit stub in. The relay sub panel shall be factory pre-wired and dressed. The contractor shall provide and terminate all feed, load and control wiring on screw terminals fitted within the panel.
2. Cable entry for all panels shall be on the top of the panel. Knockouts shall also be available on the sides of the panel to simplify wiring.
3. All terminations and internal wiring shall be accessible via a removable front cover panel. The Processor Module shall be accessible for programming at all times.

D. Electrical.

1. The power efficiency of the relay panel shall be greater than 95% at full load.
2. The panels shall be suitable for 50/60hz supplies and will accept power feeds from 120, 230 and 277 volt power supplies with the installation of a panel barrier included with each panel. A 347 volt power supply shall be available for Canada.
3. The relay panel shall have an internal power supply to support up to (16) 24vdc architectural control stations. A supplementary Power Supply shall also be available.
4. A "Panic" facility shall close selected relays if the Processor Module is removed or fails. Relays are selected from the panel processor. It shall also be possible to select "Panic" as follows:
 - a. The panel processor on the front of the panel selects "Panic" and "Normal" operation.
 - b. Remote maintained contact closure for Fire Alarm interface.
 - c. Two remote momentary contact closures for "Panic" and "Normal" respectively.
5. The system ground shall be made at a grounding lug in the panel.
6. The panel shall have a 14,000 AIC fault current rating at 277 volts.
7. The panel shall be a NEMA 1 enclosure and shall be ETL and cETL listed.
8. The panel shall be suitable for surface or recess mounting.
9. As an option the panel may be equipped for UL 924 emergency lighting applications.

E. Panel Electronics, Physical.

1. The main panel control electronics shall be housed in one Panel Processor Module (RPM). The panel control electronics shall be completely digital without employing any digital to analog demultiplexing schemes.
2. All panel setup and preset data shall be stored in a non-volatile manner and may be transferred to a replacement Panel Processor Module without losing data.
3. Each Panel Processor Module shall have a back-lit LCD display with a keypad for panel setup, preset control, testing, panel status, error and diagnostics.

4. LEDs shall indicate "DMX512 Port A", "DMX512 Port B" (ShowNet), Vision.net control and Power.

5. The Panel Processor Module shall be permanently mounted inside the panel. The RPM shall provide all necessary low voltage signal connections. The RPM shall provide the only point for contractor connection of signal cables and PANIC activation. The contractor connections shall be made with two-part plug in screw terminals (dedicated connector per input) for ease of installation.

6. All DMX512 & RS485 communication ports and remote contact input connections shall be optically isolated from all processor electronics by a minimum of 2,500V RMS isolation.

7. The Panel Processor shall have the provision to select any of the relay or outputs to be activated by the PANIC function. The PANIC function shall be activated or de-activated by one or more local or remote contact closures.

F. Panel Electronics, Control And Communications.

1. The control electronics shall provide the following control and communication inputs as standard:

a. One optically isolated DMX512 control input.

b. An RS485 control input for Vision.net architectural control. Vision.net is a control system comprised of architectural style panels for recording and playback of presets in individual assigned "rooms".

c. There shall be two programmable panic inputs.

d. One RS232 Serial programming port for remote programming using PC based configuration software.

2. The system shall support an optional ShowNet Ethernet input to provide an additional input plus processor status monitoring and configuration.

G. Panel Electronics, Features.

1. The panel electronics shall provide two levels of operator interface:

a. A local standard interface that includes 6 menu keys and a bitmapped backlit LCD display to access standard system menus.

b. Remote configuration via personal computer using RS232 or ShowNet Ethernet data links.

2. The processor control electronics shall have an update rate better than 16 ms (60 Hz) or 20 ms (50 Hz).

3. The panel processor shall include a programmable astronomical time clock to permit programmed relay closures with a schedule of 128 events that may be programmed for days of the week, specific dates and offsets from sunrise or sunset. The system shall also support daylight savings time adjustments for all countries.

4. The RPM shall also have the capability to support single and double pole relays that may be mixed throughout the panel.

5. As a standard, Contact panel status reporting shall report the following conditions/data:

- a. Processor active.
- b. DMX512 Port A input fail.

6. The control electronics shall provide the following setup functions that shall be user programmable on a per panel or system wide basis:

- a. DMX512 Port A patch.
- b. ShowNet DMX512 patch.
- c. Architectural patch for Vision.net control systems.
- d. Record Vision.net presets for load pattern switching.
- e. Occupancy sensor and photocell control inputs.
- f. Clock events.
- g. Set control input priority logic.

7. The DMX512 Port A and ShowNet patching shall support a panel start address and individual relay patch. The architectural patch shall define the panel circuit/room/room channel relationship for Vision.net control systems.

8. The control electronics shall provide a facility to disable the output of any individual relay by switching the relay off.

9. The processor shall provide an architectural Vision.net control system preset capability of 8 presets for each of up to 256 separate rooms.

10. It shall be possible to load new panel operating software via the Ethernet connection to the relay panel. There shall be no requirement to turn power to the panel off during the loading of panel software. It shall be possible to load new panel operating software into the processor, regardless of the state of the program storage.

H.) Mechanical.

- 1. Relays shall be snap in factory wired units in single or double pole configurations.
- 2. All relays shall be designed for repeat operation with mechanically operated contacts.
- 3. Relays may be operated locally with a manual over-ride.

I.) Electrical.

1. Power connections shall be made on compression screw terminals. Control signal connections shall be made via plug-in connectors at each module chassis.
2. Load connections shall be via compression screw terminals on a terminal block.
3. Relays shall be rated for 120/230/277/347 volts.
 - a. All relays shall be capable of continuous operation at full rated load. They shall be rated for tungsten, LED, cold cathode and HID loads.
 - b. Each assigned relay shall have a programmable switching threshold between 1 and 99%.
 - c. All relays shall have a local control switch to turn the relay on for testing and diagnostic purposes.
4. Relays shall be UL, ETL and cUL, cETL recognized.

J.) Accessories.

1. To supplement the internal Power Supply, a supplemental Power Supply shall be available to support up to 20 additional architectural control stations, and shall be supplied complete with an enclosure for wall mounting in the dimmer/distribution room. It shall be suitable for 90 - 277 volts ac 60 or 50 Hz supplies. A 347 volt supply shall also be available.

K.) Documentation.

1. System riser and connection drawings shall be supplied as specified.
2. Installation Instructions and a Programming Guide shall be supplied with each Contact Lighting Control Panel.

L.) Standards.

1. The relay panel assembly shall be ETL and cETL listed.

M.) Environmental Specification.

1. Ambient temperature extremes: 15 - 140 degrees Fahrenheit (-10 - 60 degrees Celsius).
2. Recommended ambient temperature: 64 - 77 degrees Fahrenheit (18 - 25 degrees Celsius).
3. Relative humidity: 10 - 90% non-condensing.
4. General conditions: Office level cleanliness. Interior use only.

2.3 NEO MEMORY CONSOLE

A. General Description.

- 1.) The lighting control console shall be microprocessor based and specifically designed to provide complete control of stage, studio and entertainment lighting systems. An open architecture system using non-proprietary interfaces to permit upgradeability shall be used. The lighting control console shall be the NEO Lighting Control Console manufactured by Philips Strand Lighting or equal.
- 2.) The system shall provide control of up 100 Universes of DMX (51,200 output parameters) over 32,000 control channels. Output shall be distributed over a 10/100/1024 MB Ethernet network using Philips Strand Lighting ShowNet, E1.31 (sACN), Pathport, KiNet 1 & 2, ArtNet, simultaneously as well as E1.11 -2008 USITT DMX 512/1990-A outputs over four (4) DMX 5pin XLR outputs.
- 3.) The system shall support full bi-directional RDM communication with compatible RDM Network devices via the four (4) DMX connections on the Neo control console. RDM communication shall adhere to ANSI standard E1.20-2006 Entertainment Technology – RDM – Remote Device Management over DMX512 Networks.
Supported RDM features shall include:
 - a. Discovery and Identification of RDM capable devices
 - b. Setting of start addresses, operating modes and additional settings as exposed by connected devices and controllable via RDM
 - c. Remote viewing of data as provided by connected devices
 - d. Error reporting as provided by connected devices
- 4.) An infinite number of cues, cue lists, groups, presets, palettes, macros, effects, snapshots may be contained in non-volatile electronic memory and stored to an onboard solid-state hard drive and to any USB storage devices.
- 5.) Recorded cue lists (Unlimited) may be played back simultaneously on up to 95 faders (including future optional wing faders). Channels shall, by default, respond to cue information by last instruction, with timing control provided for all cues.
- 6.) The Neo control console may be programmed in Tracking, Hybrid Tracking or Cue Only mode by the user as a system default and overridden on individual record actions as required.
- 7.) A Master A/B motorized fader set shall be provided. The 60mm motorized fader set can execute move fades. Five (5) Additional 60mm motorized playback faders are also provided for multiple cue playback options over an unlimited number of fader pages.
- 8.) Ten (10) 60mm motorized multifunction faders are also provided in addition to the above. These multifunction faders give the end user additional playback faders, additive, inhibitive or effect submasters. Two (2) dedicated, addressable motorized grand masters and one rate master are provided as well.
- 9.) A rate master shall be provided. The 60mm motorized fader can be set to execute all master timing across the console functionality allowing for “on the fly” busking timing.
- 10.) A set of four (4) push button soft touch encoders and companion LCD play back screens shall be included for control of multichannel luminaires. Each LCD playback screen will give the user feed back on the rotary encoders state, value, and graphic. Encoders may be operated in coarse or fine mode. Tactile feedback for full frame operations shall be provided. .

- 11.) A high-resolution level wheel shall be provided to control intensity for selected channels and scrolling/zoom for some displays.
- 12.) An integrated track ball and alpha-numeric keyboard shall be included for screen navigation, software interaction, cue labeling, patch labeling, or non -numeric command line functions using the Alpha numeric text call up function feature.
- 13.) Each Control Console shall support up to three (3) HD multi-touch monitors (sold separately) and support HDMI, DVI, and Display port device outputs. Each display is user definable.
- 14.) Control surface buttons shall be backlit. The backlighting shall provide indication of functional states through both color change and intensity. Back lit buttons shall also indicate "follow me" programming which will allow the novice user to follow the next key press sequences needed when command line programming.
- 15.) Control and programming features for intelligent lighting fixtures shall also include: a standard library of fixture profiles, the ability to copy and edit existing profiles and create new profiles and patch displays.
- 16.) User-definable, interactive displays may be created – magic sheet view. These displays, which can be used in live and blind operating modes, allow graphical layout of channels and system shortcuts such as Palettes and Groups.
- 17.) Software upgrades shall be made by the user via USB flash drive; changing internal components shall not be required.
- 18.) Show data may be created and modified on a personal computer, using either Windows 7, or Windows 8 operating systems, with a free offline editing application. The program shall also allow output to visualization software supporting the same protocols as the lighting system.
- 19.) FTB (full tracking back up) Synchronized backup shall be provided via another full console on the network or by use of a remote processor unit. The backup console or Rack mount controller shall maintain synchronized playback with the master and shall take over control of the lighting system upon loss of communication with the master, either automatically or upon user confirmation.
- 20.) Multiple users may access show data from the main control console. Each user shall have an individual workspace. User identification may be assigned to more than one control device, allowing users to work in tandem, or allowing a remote access user to mirror the current display format and mode.
- 21.) Show files are simultaneously saved across the system to each mapped integral hard drive, flash drives and external network drives.
- 22.) The control console shall provide a pull out drawer housing an external alpha-numeric keypad and USB Charging and Data Port .
- 23.) The lighting control console shall feature a flexible hardware and software design. Control channel counts, automated lighting support, help files, and additional control hardware shall be easily upgradeable.

- 24.) Minor revisions of operating software and an off-line editor shall be available to the user via download from the manufacturer's web site at no additional cost. Console software shall be upgradeable in the field via Internet download.
- 25.) The lighting control console software shall feature a familiar and easy-to use Windows graphical user interface (GUI) based on the Windows operating system. Software features shall include Off-line Editor, Remote Video, Media Player, Web Browser, and PDF Reader.
- 26.) The dedicated Windows processor architecture shall deny access to operating system, but shall allow access to an open hard drive for show files. Processor back up shall be supported by the use of any Windows 7, or later, computer running the PC version of the lighting control console software.

B. Capacities

- 1) The Neo control console shall provide direct control (4 output ports and one input port of DMX 5 Pin XLR) of up to 2048 DMX/RDM512 devices (51,200 via network, 100 universes) via the DMX network output capacity of the console. This output capacity of the console can be upgraded at any time and purchased in single DMX universe packets
- 2.) A show file may contain virtually unlimited cues, groups, submasters, submaster pages, effects, macros and one fully proportional patch that can be stored on an internal solid state hard drive and archived to standard USB memory key drives.
- 3.) Multiple show files and backups shall be stored on the system hard drive and shall have the ability to backup to multiple read/write storage devices simultaneously.
- 4.) The control console shall utilize a mission critical Firebird SQL sequel server data base for secure show file storage. Users do not need to ever "save" their show. The Neo Control console is always backing up and saving show file key presses to ensure that a key stroke, key press is never lost. Any system not utilizing this technology will not be accepted.
- 5.) Boot time shall be reduced to a maximum of 30 seconds from a cold boot to system up and outputting DMX/Network.
- 6.) The control console shall host two (2) individually isolated 1 Gigabit network ports located on the back of the console. Each LAN can be individually addressed via network settings to allow for both outside Web access to the console as well as networked Lighting system control.
- 7.) Philips Advantage DMX, shall allow use of "unregistered outputs" when Philips Selecon, Philips Varilite, Philips Showline, or Philips Color Kinetics luminaries are patched to the unregistered universes of the console. Advantage DMX will allow for use of any Philips Entertainment Luminaires in the Patch without encumbering any of the registered universe channels. Manufacturers that charge for registered outputs to run their manufactured multichannel luminaries shall not be acceptable.

A. Control

Control Interface.

- 1.) The programming keyboard shall be grouped by function. Major groupings shall be record target functions, numeric keys, level assignment functions, display navigation functions

and controls, as well as non-intensity parameter controls. The key board shall be grouped in six (6) distinct areas and grouped as:

- a. Playback
- b. Action
- c. Command
- d. Selection/Attributes
- e. Shortcuts
- f. Advanced
- g. Effects
- h. Display

2.) Playback Section:

- a. The playback faders shall consist of a motorized 60mm Master Fader pair with associated Select, Go and Stop/Back buttons.
- b. Five (5) Additional 60mm motorized playback faders are also provided for multiple cue playback options with associated Select, Go, and Stop/Back Buttons, over an unlimited number of fader pages.
- c. It shall be possible to instantaneously halt an active cue, back to the previous cue, manually override the intensity fade or manually override the entire fade.

3.) Submasters:

- a. Ten (10) proportional fully overlapping additive, effect or inhibitive submasters may be defined over infinite pages. Submaster's bump buttons shall have multi-colored LEDs to indicate submaster status. Each submaster may have fade up, dwell and down fade times. Each has a bump and assert/channel select button.
- b. Submasters may be set to independent.
- c. Submasters may be set to HTP or LTP intensity.
- d. Exclusive mode for a submaster shall prohibit the live contribution of that submaster from storing to cues or other submasters.
- e. Motorized faders shall set submasters to required positions as fader pages are changed.
- f. It shall be possible to set submaster values directly from the command line.

4.) Grand Master Faders- Two (2)

- a. The grand master shall have associated blackout and blackout enable buttons.
- b. Blackout shall send all associated intensity outputs to zero. Non-intensity outputs shall not be affected.
- c. Motorized faders shall set grand masters to required positions as fader pages are changed.

5.) Track Ball – Pointing Device. Shall be integrated into the control console infrastructure and shall work in and outside of the console operating software.

6.) Encoders- Neo shall include four (4) independent rotary encoders including an integrated push button as well as four (4) LCD feed back screens for encoder assignments and positioning. Encoder Screens shall display but not be limited to:

- a. Position in Degrees
- b. Color Mix in Percentage
- c. Gobo Position
- d. Gobo Image
- e. Gobo Rotation
- f. FX control Parameters
- g. Lens Percentage

B. Physical

Console Physical & Electrical.

- 1.) The console controls and electronics shall be a desktop configuration and shall use a high density multicore Intel microprocessor.
- 2.) The console shall be constructed of steel with an aluminum face panel. All internal control components shall be fully modular to permit simple removal and exchange. The top panel shall be easily removed via thumb screws to allow for easy access to the internal components of the console.
- 3.) The central processor shall be fully integrated into the main console in a separate removable enclosure for rapid removal and exchange. The processor shall include a 120GB solid state hard drive (minimum), standard computer I/O and an integrated USB hub for connection of all console control electronics to the system processor.
- 4.) The Control Console shall be universal in power requirements and shall support from 90-240 volt 50-60Hz power systems. The integrated power supply shall also support the power requirements of additional future accessories.
- 5.) The Measure of the control console shall not exceed 20" (508 mm) x 31" (787.4mm) x 5" (127mm)

C. Environmental

Operational Environment.

- 1.) The acceptable ambient operating temperature shall be 0 degrees to 50 degrees Celsius (32 degrees to 122 degrees Fahrenheit) and the ambient storage temperature shall be -40 degrees to 70 degrees Celsius (-40 degrees to 158 degrees Fahrenheit).
- 2.) The acceptable operation location shall be the equivalent of a good office environment, without excessive dust.
- 3.) Acceptable humidity levels for operation shall be 5% - 95%, non-condensing.

Standards Compliance.

- 1.) The console shall be CE marked and ETL, cETL, and cTick listed.

D. NEO Operating Software

Channel Control.

- 1.) Selection: Channel control lists shall be composed of any combination of control channels, cues, looks or groups using the +, -, Thru & Thru-on syntax. Any one selection shall be capable of being manipulated for level, intelligent light control without the need to re-select. Mouse and touch screen selection via the Graphical User Interface shall be available on all supported touch screen monitors.
- 2.) Intensity Control: Intensity levels shall be set using the '@' key and inputting a numerical level or adjusted using the level wheel. Context sensitive soft keys with labels available on the system monitor or hard keys shall be provided for Full, DMX512 level, +%, -%, Off, Copy and Move. Level change shall also be available via the main level wheel when the fixture is selected.
- 3.) An "On" key with user definable levels shall be provided.
- 4.) Commands: Command entry shall be user selectable between command line (RECORD CUE 1 [enter]) and direct entry (CUE 1 RECORD). Additional Record Dialogue boxes shall be user accessible when Holding Record and Cue simultaneously. Consoles that do not provide both methods shall not be acceptable.

Cues.

- 1.) The console shall set to tracking cue recording, hybrid tracking cue recording, or cue only recording based on operational preference. This shall be set during the initial configuration of the system when the system is started for the first time and can be changed at any time.
- 2.) Each cue may have split fade & delay times, a follow time, link & loop parameters, calls for macros & effects, a text label and may be assigned to any cue or cue list.
- 3.) Cue zero shall always be a blackout cue by default.
- 4.) Unlimited cue lists can be created to split up a show into manageable units. Each cue list supports up to millions cues with 3 decimal places of point cues. (Cues 0.000 through to 9999999.999)
 - a) Each cue:
 - a. can contain an unlimited number of channels
 - b. can contain an unlimited number of effects, groups and shortcuts
 - c. can be Full tracking or hybrid tracking modes
 - d. can be Auto follow and part cues.
 - e. can wait for user interaction or continue automatically.

- f. can be completely flexible, run order allows cues to be rearranged into any order.
 - g. can have its own delayed start, fade in, dwell, fade out, and effects delay start.
 - h. Each channel within a cue can be assigned a delayed start and override fade time
 - i. can have a different attribute fade time for complex timing.
 - j. With an effect can be assigned a delayed start, override length and whether the effect will loop until the cue ends.
 - k. has "Auto Mark" functionality and can be used to automatically setup intelligent fixtures.
 - l. List can include Scene breaks with text editing.
- 5.) Cues, groups, submasters, palettes, macros, & effects shall be recorded or updated from the keypad.

Playbacks.

- 1.) Playbacks shall be provided (one (1) main dual, five (5) individual playback and unlimited virtual playbacks), each with a Go button, dedicated stop/back, and select keys. Interaction between each playback shall be user programmable as highest level or latest action takes precedence operating from separate cue list. Each playback shall operate in automatic, manual fade or manual time modes executing fades while following links, loops and macros.
- 2.) The playback faders shall be motorized and provide rate override of fades.
- 3.) Cue Only, Hybrid Tracking, and Tracking modes of operation shall be supported.

Effects.

- 1.) Dynamic, fading and tracking FX parameters shall be supported.
- 2.) Chase and build effect types shall be supported as shall forward, reverse, bounce and random directions.
- 3.) Levels and attributes shall be recorded or shall be randomly generated or inverted or alternatively normal and inverted every cycle.
- 4.) Modifications to running effects may be returned back to the effects memory for re-recording.

Cue, Submaster and Effect Previews & Cross Reference Screen.

- 1.) Cue and submaster preview modes shall be supported to permit blind changes to be made to these entities using channel control syntax.

- 2.) A Cross Reference screen shall provide an alternative view of cues by showing levels recorded in a range of cues.
- 3.) Changes may be tracked or restricted to one cue using the Cue Only option.

Submasters.

- 1.) Unlimited pages of fully overlapping submasters shall each be provided each with a fader, virtual fader, bump button and status LED's.
- 2.) Each submaster shall be individually programmable as normal, last takes precedence, inhibitive or exclusive, recordable per page.
- 3.) Bump buttons may be individually enabled, disabled, latching or trigger macros.
- 4.) Submasters shall be loadable with the contents of cues, groups, other submasters or channel lists.

Groups.

- 1.) Groups may be recorded for fast recall of commonly used stage looks. Groups can be independently recorded or directly recorded from the stage output. Cues recorded using preset focus groups may be easily edited and changed by simply updating the focus groups.
- 1.) Each group may be assigned a text label.

Display Formats.

- 1.) User programmable channel display formats shall be provided to show channel levels, colors, and attribute information. User programmable channel formats shall be provided to show channels in show, defined channels or active channels. Screens shall be fully adjustable using the systems fully graphical user interface.
- 2.) On screen controls shall be provided for programming moving light attributes using the supplied system input device.

Patch.

- 1.) A proportional soft patch shall be provided.
- 2.) Dimmers may be profiled, set with a non-dim trigger value, or un-patched at a level.
- 3.) A library of luminaires to simplify patching shall be provided.
- 4.) Patch displays shall be ordered by channel or by output.

Profiles.

- 1.) Profiles may be applied to dimmers or up/down fades in cues or parts.

Set-up.

- 1.) Simple to use set-up screens shall be provided to configure external communications and operation of the console,

Macros.

- 1.) Macros may be activated by, submaster's bump button, from a cue, external switch contact, remote control, console power-up or at pre-programmed times.

Archive.

- 1.) Automated Show archive shall be supported to the systems internal solid state hard drive, a USB key drive, or optional file server.
- 2.) The File control drop down menu shall provide a means to select the current show from the system disk or file server and to copy a show (or any part of a show) to or from a USB key drive, or the file server.
- 3.) Shows shall have text labels and a time and date stamp.
- 4.) The system software shall support the loading and saving of database files formatted in the Strand NEO FireBird database Format (*.FDB), data structure.

Printing.

- 1.) The system shall support Portable Document Format (*.PDF) printing.
- 2.) The following printouts may be requested: Patch, Cues, Groups, Subs, Profiles, Macros, Fixtures, Channels in Use, and Channels Not In Use.

E. System Control Software

Channel Capacity Software Upgrades.

- 1.) Channel and attribute capacity shall be upgradeable via software to the maximum capacity of the console in DMX universe increments (up to 100 total per console).

Automated Luminaire Control.

- 1.) The system shall provide intelligent control of any DMX512 automated luminaire. The console shall display automated luminaire attributes as true attribute definitions not as channels or DMX512 values. An automated luminaire shall be addressed to a single fixture control channel not a series of consecutive control channels. Consoles that use consecutive control channels or DMX512 percentage values to operate automated fixtures shall not be acceptable.
- 2.) The Fixture Attributes display shall show fixture number, model, mode, and attribute settings displayed in values of colors, degrees, percentages, hertz, and RPMs, not in DMX512 percentages or channel levels.
- 3.) All attributes of an automated luminaire (intensity, color, gobo, focus, X-Y position, effects, CMY, RGB, etc.) shall be accessed by typing one channel number.

- 4.) The system shall use an integrated fixture library for patching and control of automated luminaires.
- 5.) Neo control allows for all parameters to be controlled in a user-friendly format. Pan and Tilt shall be adjusted in degrees. Color shall be adjusted using Color Space Control. Gobo parameters like rotation shall be adjusted in RPM speed. Zoom shall be adjusted in degrees. Other parameters shall have similar and consistent parameter control. Console software not using this format shall not be acceptable.
- 6.) Color Frame Control: Full color frames shall be selected using palettes. Part frames may be adjusted using the rotary control wheels. Preset focus groups shall be available to permit the recall of specific colors from scrollers.
- 7.) Color Space Control: For control of color mixing units, it shall be possible to use CMY, RGB, HSL or HSV color mixing methods to select colors. An on screen, user selectable, color picker shall be provided. Consoles that do not provide CMY, RGB, HSL and HSV color mixing shall not be acceptable.
- 8.) Individual attributes shall also be selected from soft keys and the scrolling wheel in conjunction with on screen controls showing attribute names as well as full touch screen support and selection of the individual attributes.
- 9.) Displays shall be provided which show all attributes of a fixture.
- 10.) Attributes shall be excluded from inappropriate masters and normally operate in latest action takes precedence fashion within submasters, playbacks and effects.
- 11.) When attributes and levels are recorded in a submaster the levels shall be mastered by the fader but the attributes shall go to their recorded value in a latest takes precedence basis to ensure that scenes played back on submasters can be faded in and out with recorded colors and positions. Attributes shall have the option of moving when the fader is moved off of zero, when the fader reaches full or manually.
- 12.) Cue tracking shall be supported for attribute channels.
- 13.) A channel and attribute cross-reference screen shall be provided for blind viewing.
- 14.) Auto Mark shall provide an optional automatic means of moving fixtures to the next required position (pan, tilt, color, gobo, etc.) after the previous fade has completed and when the fixture intensity is zero without the need to record extra cues.
- 15.) A library of over 8,000 intelligent and automated luminaires with text labels shall be provided to facilitate fast patching. An off line and built in profile builder is included for easy set up of new luminaires or attribute editing.
- 16.) Unlimited preset focus groups shall be provided to simplify the programming of automated luminaires.

Remote Communication.

The console software shall also support communication with other computer programs running on other computer systems including WYSIWYG, Capture Polar and many other visualization programs.

Ethernet Network Operation.

- 1.) The system shall support full Ethernet connectivity to system dimmer racks and remote peripherals using the built in Ethernet port on the console. Protocols that shall be available are ShowNet, CKNet, Artnet, Pathport and ANSI E1.31. This is in addition to direct DMX512 connectivity.
- 2.) The system shall support industry standard 10/100/1000Base-T cables, Ethernet hubs and switches.

Wireless Remotes.

- 1.) Multiple wireless handheld devices may be connected to the system using a Wireless access point.
- 2.) Multiple access points may be provided to supply adequate coverage throughout a facility.

Tracking Backup.

- 1.) Two consoles may be configured and operated as main and tracking backup.

Remote Console.

- 1.) Additional consoles or PCs running Windows 7, or later, shall be able to connect to the Main console as a Remote Console over an Ethernet network.

Off-Line Editor Software.

- 1.) A Windows hosted off-line editor shall be available which shall enable show files to be edited and simulated in real time on any Windows 7 or later PC.
- 2.) All facilities of the console, including patching, channel control, playbacks, submasters, effects & set-up shall be supported on the off-line editor.

Showfile Compatibility.

The control console shall utilize a mission critical firebird SQL sequel server data base for secure show file storage. Users do not need to ever "save" their show. The Neo Control console is always backing up and saving show file key presses to ensure that a key stroke, key press is never lost. Any system not utilizing this technology will not be accepted.

Provide 91001 Neo Control Console

- 91002 One Universe of DMX (up to 100 may be ordered per console)
- 91021 21" HD Multi-touch Monitor
- 91022 23" HD Multi-touch Monitor
- 91001-DC – Neo control console replacement dust cover

2.4 VISION.NET CONTROL SYSTEM

System shall be a fully integrated digital lighting control system, utilizing digital communications between stations, and the control devices (dimmers, relays, and DMX-512 controlled equipment) in the system as required.

A.) Capacities.

- 1.) The lighting system shall be fully scalable to meet the needs of complexes of any size. Each complex can consist of up to 1000 areas.
- 2.) Each area shall support up to 255 rooms with a maximum of 127 control channels per room, which can be connected to an unlimited number of dimmers, relays, or DMX512 controlled equipment. The control connection between stations and to C21, A21 and R21 dimming systems shall be via standard Cat 5e cable using the Vision.net control protocol. For DMX512 applications an optional Vision.net to DMX512 module shall be available.
- 3.) Star wiring shall be supported using any number of available 4 port Vision.net data hubs.
- 4.) Large-scale systems consisting of multiple Vision.net networks may be linked using a Strand Lighting ShowNet Ethernet network.
- 5.) No central processor shall be required. Systems requiring a separate processor shall not be acceptable.
- 6.) Connections to BMS systems shall be supported through the use of
 - a. Simple contact closures from the BMS system to a standard Vision.net AV interface card. Any number of cards may be used with 8 contact closure inputs per card. Each closure may be defined as a system room preset command, toggle command or Smart button command.
 - b. RS 232 serial interface modules shall also be available permitting simple ASCII text commands and acknowledgements between the BMS system and the Vision.net lighting control system. Commands may access any room or preset or through the use of Smart button commands multiple rooms and presets system wide.

B.) Interconnection.

- 1.) Each station shall be connected as an RS485 serial "daisy chain" using Belden 1583A Cat 5e cable.
- 2.) It shall be possible to change standard control stations at any location on the data network without requiring additional wiring or alterations to the wiring specification. Touchscreen stations shall require a separate power feed to operate the station electronics.

C.) Vision.net 4 Configuration Interface.

- 1.) The system shall support a digital communications link for station configuration and set up.
- 2.) An RS232 programming station shall be used for connecting a Windows PC operating Vision.net 4 Designer software to the Vision.net data network.

3.) A Windows PC can communicate either via an RS232 port or via the available network interface card.

VISION.NET 4 DESIGNER CONFIGURATION SOFTWARE

A.) General.

1.) Vision.net 4 Designer software shall be a graphical set up and configuration programmed designed to operate under Windows XP (or later) operating systems.

2.) An astronomical clock shall be available on any system touchscreen capable of being programmed to any geographical location in the world. The clock shall be able to execute any number of daily, weekly or date specific events at fixed times, or offset relative to sunset and sunrise.

3.) Each system area shall support 127 control channels per room with up to 255 rooms per system. Any number of dimmers may be assigned to a room.

4.) Each room shall be capable of having any combination or quantity of control stations.

5.) It shall be possible to change stations at any location by replacing it with a different station type, and modifying the systems configuration file accordingly.

6.) Each room shall have 32 presets available, regardless of the number of rooms or number of channels within each room. Presets shall be selected from control stations, or shall be "played back" automatically by time clock events. Each preset shall have its own programmable fade, delay and hold time and may be linked for sequential playback in a single sequence, or using system macros if a continuous loop is required.

7.) Programmable delay, fade and hold times shall be available in the following increments; instant, 1 sec., 2 sec., 3 sec., 5 sec., 7 sec., 10 sec., 15 sec., 30 sec., 1 min., 5 min., 15 min., 60 min.

8.) It shall be possible to allocate a name or label to every room, panel, station, preset and group in the system.

9.) It shall be possible during system configuration to create macros using a "Smart" button. Smart buttons shall carry out a sequence of standard system commands. It shall be possible to program Smart buttons from any control station pushbutton, remote input or, automatically using the astronomical time clock. It shall be possible to assign any of the system commands to any station pushbutton, external device input, time clock event, or Macro step.

10.) In cases where an area is to be divisible for separate or combined control, it shall be possible to combine the constituent rooms either manually or with automatic partition switches. Rooms are combined using a "Room Link" touchscreen button. Rooms that are not linked shall maintain their own presets, levels and channels. "Room Link" coordinates the selection of presets within the combined rooms from any control station within those rooms.

11.) The following commands shall be programmable to any system button:

a.) Preset.

b.) Preset/Off.

- c.) Toggle.
- d.) Smart.
- e.) Raise.
- f.) Lower.
- g.) State / Mode.
- h.) Room Link.
- i.) Console button.
- j.) Share Button.
- k.) CK Show.
- l.) Set Clock.
- m.) Suspend Clock.
- n.) Toggle Master.
- o.) Screen Saver.

12.) The system shall include an output simulation mode allowing the system designer to test all configurations prior to system installation.

13.) Touchscreen configuration shall be supported with simple drag and drop tab, button, slider, sliders, and text entities.

14.) Tabbed touchscreen pages may be created for:

- a.) Buttons and Sliders.
- b.) PaletteOS Monitor.
- c.) Web Browser.
- d.) Real Time Clock.

15.) Touchscreens may optionally be connected to a Strand Lighting ShowNet Ethernet network to connect to PaletteOS series control consoles or Network control devices. In this mode of operation, it shall be possible to view console pages that display information on Cues, Submasters, Macros, Lamp Check and Channels.

VISION.NET TOUCHSCREEN STATIONS

A.) Specific Features.

1.) All Vision.net touchscreens shall be full color displays. Systems that do not support color displays shall not be acceptable.

2.) Users may choose from a variety of touchscreen sizes.

3.) Each display shall support multiple tabs to allow users to organize their displays to meet a wide range of applications. Tabs shall support the following applications:

a.) Programmable Sliders that can be scaled and programmed as both channel controls and submasters. Flexible fader sizes are available allowing system programmers to optimize the number of faders displayed on screen for maximum flexibility. Users may also select from a range of fader styles to suit their application.

b.) Touchscreen buttons shall be available in a variety of sizes and shapes permitting system designers the flexibility to allow buttons to define their function through size, shape and color.

c.) Buttons shall support both text labeling and icons. A broad character set shall be supported including Chinese and Arabic characters.

d.) All displays, faders, buttons and tabs shall have text labels in a choice of fonts, sizes and colors.

e.) Real Time clock display with full system programming.

4.) Systems with network connections shall also support tabs with:

a.) Web Browser capability allowing access to Strand ShowNet network devices.

b.) Remote control and monitoring access to Strand Lighting PaletteOS control consoles.

c.) Any screen can have a color graphic background to permit a wide range of custom graphic options for system designers. Backgrounds may be any bit-mapped image. Alternately backgrounds may be assigned a wide range of colors. A standard set of graphical backgrounds shall be available.

d.) Any screen with an internet connection can support access to any webpage.

VISION.NET CONTROL STATIONS

A.) Mechanical.

1.) The control station faceplates shall be free of visible fasteners and shall be of a pleasing aesthetic appearance.

2.) Control stations shall be supplied standard with a white finish, optional custom colors shall be available on request.

3.) On control stations with sliders, the sliders shall have 1.75" (45mm) travel with matching slider knobs.

4.) Control station push buttons shall have matching button caps with long life programmable LED backlighting. The backlight intensity shall be fully adjustable to allow for ambient lighting condi-

tions. Backlighting shall be user definable with a choice of Blue, Amber or White. Different backlighting colors may be programmed to indicate the state of each button.

5.) Key caps shall be available with optional custom engraving.

6.) Each station shall inputs for up to 8 photo cells or occupancy sensors or any combination of these devices. The function of the sensors shall be programmable using the system design software and may be updated at any time.

B.) Operation.

1.) All control stations shall have a unique address between 1 and 255 configured at the initial system start up.

2.) A Vision.net control station may consist of sliders and button keypads with a maximum of 5 gangs per station.

C.) Installation.

1.) 2 gang and larger control stations require flush mounted masonry ("ears-in") back boxes, with a minimum depth of 3.5" (90mm). Back boxes must be grounded / earthed in accordance with local wiring practices to provide a discharge path to ground for static electricity.

2.) Control stations shall be supplied complete with a sub-plate, which is screwed to the flush mounting back box with the screws provided. The sub-plate allows the control station to be hinged into position and secured with hexagonal setscrews on the bottom edge of the trim ring.

3.) Touchscreen stations shall be available with surface and flush mount enclosures designed to simplify station mounting.

4.) Vision.net data line terminations shall be via a screw-terminal plug and socket to facilitate removing a control station while maintaining the continuity of the data network.

VISION.NET SLIDER WITH PUSHBUTTON STATIONS

A.) Specific Features.

1.) Each station shall have a MANUAL (Take Control) button, which shall give control to the manually operated channel sliders.

2.) Stations shall be available with 3, 6, or 9 sliders plus a proportional master. It shall be possible to allocate several channels within a room to a single slider. Expansion stations shall be available to accommodate rooms requiring more sliders.

3.) Channels not allocated to a slider shall either go out or remain at the previously selected pre-set level when MANUAL is selected according to the configuration software.

4.) Sliders may also be configured in submaster mode allowing them to operate as group masters.

5.) All buttons may be programmed to overwrite their default settings. Each button may be assigned any of the following functions:

- a.) Preset.
- b.) Preset/Off.
- c.) Toggle.
- d.) Smart.
- e.) Raise.
- f.) Lower.
- g.) State / Mode.
- h.) Room Link.
- i.) Console button.
- j.) Share Button.
- k.) CK Show.
- l.) Set Clock.
- m.) Suspend Clock.
- n.) Toggle Master.
- o.) Screen Saver.

6.) Smart button commands including room combine, cross room commands and commands to Strand Lighting PaletteOS controller consoles.

7.) If enabled pressing and holding any preset button shall enable recording, which will allow the current slider settings to be recorded into one of the presets available from the local pushbuttons. Fade times for these presets will remain unchanged by this record action.

8.) Within each room, MANUAL buttons can be configured to operate on a "last action takes precedence basis" where recalling a preset or pressing another MANUAL or TAKE CONTROL button will cancel the current selection. During the configuration procedure it shall be possible to select "Override" mode for each room. In this mode an active MANUAL button can be canceled by toggle action. It shall be possible to define whether channels fade to the OFF preset or return to the previously selected preset when TAKE CONTROL is canceled.

VISION.NET PUSHBUTTON STATIONS

A.) Specific Features.

- 1.) All button stations shall be fully configurable.
- 2.) Each button may be assigned any of the following functions:
 - a.) Preset.

- b.) Preset/Off.
- c.) Toggle.
- d.) Smart.
- e.) Raise.
- f.) Lower.
- g.) State / Mode.
- h.) Room Link.
- i.) Console button.
- j.) Share Button.
- k.) CK Show.
- l.) Set Clock.
- m.) Suspend Clock.
- n.) Toggle Master.
- o.) Screen Saver.

3.) Smart button commands including room combine, cross room commands and commands to Strand Lighting PaletteOS controller consoles.

4.) Each station shall store all active control information at all times. No central processor shall be required.

AV INPUT / OCCUPANCY SENSOR INTERFACE

A.) Specific Features.

- 1.) Each Interface shall accept up to 8 momentary or maintained contact closures at their inputs.
- 2.) The Interface shall simultaneously support the Vision.net family of occupancy sensors, photo-cell sensors, contact closures and 0-10v analog configurations.
- 3.) In addition to Vision.net data input, the Interfaces shall require an additional 24-volt dc power supply.

AV INPUT / OCCUPANCY SENSOR INTERFACE WITH CONTACT CLOSURE OUTPUTS

A.) Specific Features.

- 1.) Each Interface shall accept up to 8 momentary or maintained contact closures at their inputs and either 4 or 8 contact closer outputs (depending on model).

2.) The Interface shall simultaneously support the Vision.net family of occupancy and photocell sensors.

3.) In addition to Vision.net data input, the Interfaces shall require an additional 24-volt dc power supply.

WALL POWER AND DATA PORTS

A.) Specific Features.

- 1.) Wall Jacks featuring both power and data are available for portable station connectivity in two modes.
 - a. Dumb Jack – the data port provides access to the Vision.net system and allows all configuration programming to reside in the portable station.
 - b. Smart Jack – the data port provides access to the Vision.net system and stores all configuration programming within the jack allowing the connected portable station to access and control the data ports programmed data.

RS232 SERIAL INTERFACE PORT

A.) Specific Features.

- 1.) The RS232 Serial Interface port allows a programming PC to connect to the Vision.net system for system configuration and operation.

PORTABLE ENCLOSURE KITS

A.) Specific Features.

- 2.) Portable Enclosure Kits shall enable standard stations to be converted to portable units. Kits shall be supplied complete with 25ft (8m) cable and mating connectors.
- 3.) Portable Enclosure kits are available as either smart stations (where the programming resides in the station) or as dumb stations (where the programming resides in the Smart Jack).

DATA CABLE SPECIFICATION

A.) Specific Features.

- 1.) Vision.net stations Belden 1583A Cat 5 cable.
- 2.) DMX512 Belden 9829.

DOCUMENTATION

A.) Specific Features.

- 1.) An Operations Manual and Installation Instructions are supplied with each system. Project installation & connection drawings shall be supplied as specified.

ENVIRONMENTAL

A.) Specific Features.

1.) For all control stations and associated equipment, the following recommendations shall apply:

- a.) Ambient temperature extremes: 32° - 104° F (0° - 40° C).
- b.) Recommended ambient temperature: 64° - 77° F (18° - 25° C).
- c.) Relative humidity: 10% - 90% non-condensing.
- d.) General conditions: Office level cleanliness - Interior use only.

2.5 WALL BOXES

- A. This assembly shall consist of a 16 gauge, galvanized housing designed for recessed mounting in the wall. The unit shall be provided with a 16 gauge steel wall plate with hinged door.
- B. The box may have up to six flush receptacles mounted on a 16 gauge galvanized steel angled receptacle plate.
- C. The box shall be completely pre-wired at the factory, with ground lugs installed.
- A. The entire assembly shall be listed and labeled by Underwriters Laboratories.

2.6 CABLE MANAGEMENT SYSTEM

- A. The CMS Pantograph assembly shall consist of an extruded aluminum wireway.
 - 1. CMS-I 6.605" wide by 1.450 " high in cross section containing five cable compartments.
 - 2. CMS-II 2.882" wide by 1.450" high in cross section containing two cable compartments.
- B. The length of each section to be specified based on the distance between rigging pick up cables and maximum actual travel.
- C. The CMS shall raise and lower the enclosed electrical cable as it travels with the battens.
- D. The CMS shall provide a permanent electrical connection for the lighting system circuits.
- E. The CMS shall be installed between rigging lift lines and in such as a way as to prevent electrical cables from fouling with other hoisting components or mechanism.
- F. The CMS unit housing shall have an electrostatic paint finish in black.

- G. CMS aluminum wireway shall have a uniform minimum wall thickness of .094.
- H. CMS housing shall be inherently rustproof.
- I. Festoon cable shall be 12 or 10 AWG annealed stranded bare copper insulated with flame-retardant Polyvinyl Chloride (PVC) and provided in the specified number of conductors.
- J. CMS units shall contain electrically insulated, adjustable pressure pad strain relief devices to hold all cable securely in place.
- K. CMS unit shall be provided with two (2) PMB1 pipe clamp mounting devices for attachment to 1-1/2" pipe (2"O.D.)
- L. Each CMS hinge section to be provided with a pair of 7 gauge hinge arms and grade 8 attachment hardware.
- M. Unistrut P1001 horizontal stabilization track to be supplied in the specified length.
- N. One (1) P2950 trolley and PTB1 mounting bracket shall be provided with unit to attach extruded aluminum wireway to P1001.
- O. One (1) P2949 trolley and PCB1 bracket shall be provided with unit to manage excess cable.
- P. Two (2) P1001 end stop plates to be provided to prevent the P2950 trolley from exiting the P1001 track.

2.7 CONNECTOR STRIPS

- A. This assembly shall consist of an extruded aluminum wireway, 3.375" x 4.75" in cross section, and in the lengths specified containing terminal strips for feed conduit and wire extending to outlets (flush mount or pigtail), as specified.
- B. Connector strip housing shall be fabricated of black extruded aluminum wireway with interlocking cover sections to exceed UL 1573 standards. Housing shall be inherently rustproof.
- C. Connector strip shall have an electrostatic paint finish in black, with outlets identified by 2" high die-cut circuit identification numbers on the vertical surface of the strip.
- D. The strip shall contain 125°C XLP wiring of the proper sizes and quantities to connect the individual outlets to the terminal blocks in circuits of capacity as specified.
- E. The terminal blocks shall be molded barrier type with screw lugs suitable for

connecting multiconductor feed cable or incoming wire. These shall be located in an extended terminal box of appropriate length when the strip contains more than twenty-20 AMP circuits. Terminal blocks can accept up to #8 gauge wire.

- F. Units available with 20, 30, 50, 60 and 100 Amp devices in either flush mount or pigtail.
- G. Connector strips shall be supplied with .125" thick by 1.5" steel C-channel mounting brackets. Brackets shall be suitable for single or double pipe battens, as specified, and shall extend above and below the strip. Brackets shall be 60" on centers. U-bolts shall be supplied to grip up to 2" O.D. standard steel pipe.
- H. The entire assembly shall be listed and labeled by UL.

2.8 EMERGENCY TRANSFER CABINET

- A. The Emergency Lighting Transfer Cabinet shall provide automatic transfer of the line and neutral conductors of each branch circuit from normal to emergency power when normal power fails. The cabinet shall automatically reconnect circuits to normal power when normal power has been restored.
- B. The transfer cabinet contacts shall be electrically operated and mechanically held. The entire assembly shall be UL1008 listed and labeled. This equipment must comply with the regulations in NFPA 110 for Emergency and Standby Power Systems.
- C. The Emergency Lighting Transfer Cabinet must also satisfy the requirements of NFPA 70 (National Electrical Code).
 - Article 701-Legally Required Standby Systems
 - Article 700-Emergency Systems
 - Article 540-11c-Motion Picture Houses
 - Article 520-7-Theatres and Similar Locations
 - Article 518-3c-Places of Public Assembly
- D. The Emergency Lighting Transfer Cabinet shall be a wall-mounted, NEMA 4 enclosure constructed of 14-gauge steel finished in matte black powder coat paint. All terminations and wiring shall be accessible via a hinged lockable door. The cabinet shall be pre-wired and tested at the factory with clearly marked terminals for contractor wiring of normal feed, emergency feed, lighting loads and sensing feeds.
- E. Standard transfer relays shall be available at 20A and 50A current ratings.
- F. The Emergency Lighting Transfer Cabinet shall accommodate circuits of two wire, dimmed incandescent or fluorescent lighting as well as three wire, dimmed, fluorescent lighting.
- G. Emergency Lighting Transfer Cabinets with Type 1 emergency power feeds shall accept one, two-wire, emergency power feed for each emergency power circuit.

- H. The front panel of the Emergency Lighting Transfer Cabinet shall contain a key-switch to simulate power failure for testing purposes as well as indicator lights to visually signal the presence of normal or emergency power.
- I. Voltage sensing of the Normal source shall cause automatic transfer when the voltage of one or more phases drops below 55% of 120VAC.
- J. Factory default settings for time delay of transfer are as follows: Normal to Emergency-0 Seconds, Emergency back to Normal-3 Seconds. These settings shall be field adjustable.
- K. Provisions for optional remote signal, fire alarm and other input signals shall be incorporated into the control circuit.
- L. Provide Emergency Lighting Transfer Cabinets as manufactured by Stagecraft Industries, Inc. or approved equal.

PART 3 - EXECUTION

3.1 WIRING INSTALLATION

- A. Comply with NECA 1.
- B. Wiring Method:
 - 1. Comply with requirements in Division 16 Section "Conductors and Cables."
 - 2. Install unshielded, twisted-pair cable for control and signal transmission conductors, complying with Division 16 Section "Voice and Data Communication Cabling."
 - 3. Minimum conduit size shall be **1/2 inch (13 mm)**.
- C. Wiring within Enclosures: Bundle, lace, and train conductors to terminal points. Separate power-limited and nonpower-limited conductors according to conductor manufacturer's written instructions.
- D. Size conductors according to lighting control device manufacturer's written instructions unless otherwise indicated.
- E. Splices, Taps, and Terminations: Make connections only on numbered terminal strips in junction, pull, and outlet boxes; terminal cabinets; and equipment enclosures.
- F. Install dimmer cabinets for each zone.

3.2 IDENTIFICATION

- A. Comply with requirements in Division 16 Section "Electrical Identification" for identifying components and power and control wiring.
- B. Label each dimmer module with a unique designation.
- C. Label each scene control button with approved scene description.

3.3 FIELD QUALITY CONTROL

- A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.
- B. Perform tests and inspections and prepare test reports.
 - 1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
- C. Tests and Inspections:
 - 1. Continuity tests of circuits.
 - 2. Operational Test: Set and operate controls to demonstrate their functions and capabilities in a methodical sequence that cues and reproduces actual operating functions.
 - a. Include testing of dimming control equipment under conditions that simulate actual operational conditions. Record control settings, operations, cues, and functional observations.
- D. Remove and replace malfunctioning dimming control components and retest as specified above.
- E. Test Labeling: After satisfactory completion of tests and inspections, apply a label to tested components indicating test results, date, and responsible agency and representative.
- F. Reports: Written reports of tests and observations. Record defective materials and workmanship and unsatisfactory test results. Record repairs and adjustments.

3.4 TRAINING

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain central dimming controls. Laptop portable computer shall be used in training.
- B. **Provide in the Base Bid an initial eight (8) hour training session with the owner with the factory-authorized service representative. Training to be videotaped and given to the owner.**
- C. **In addition to the initial eight (8) hour training session, provide the owner two (2) four (4) hour training sessions at no additional cost. Training sessions to be scheduled by owner up to a year from the substantial completion date.**
- D. **FACTORY CERTIFIED TECHNICIAN (FCT) SHALL BE LOCATED WITHIN 125 MILES OF JOBSITE.**

END OF SECTION 16571

Section 16800

AUDIO-VISUAL SYSTEM

PART 1 - GENERAL

1.1 PROJECT INFORMATION

A. Location and Building: Goshen, Alabama

B. Installation Areas:

AVCS LOCATION	DESCRIPTION
#1 – Auditorium	Completely Installed and Programmed AVCS

C. Acronyms:

1. AVCC – Audio Visual Control Contractor
2. AVCD – Audio Visual Control Designer
3. AVCS – Audio Visual Control System
4. BYOD – Bring Your Own Device
5. EC – Electrical Contractor
6. FIX – Furnish, Install, Terminate, Update, Label, Configure, Program, Test, Warranty
7. GC – General Contractor
8. NTP – Notice to Proceed
9. OFOI – Owner Furnished Owner Installed
10. POTS – Plain Old Telephone Service
11. PTZ – Pan Tilt Zoom
12. RFI – Request For Information
13. sVTC – Soft Video Teleconference
14. VOIP – Voice Over Internet Protocol
15. VTC – Video Teleconference

D. Provisions:

1. It is 100% understood and agreed by the potential AVCC, that the AVCS work described herein shall be provided to the Owner complete in every detail. The AVCC is required to furnish, supply, install, program, label, integrate, train and provide all required documentation and videos for a 100% fully functional and operational AVCS per this Specification.
2. It is also 100% understood and agreed by the AVCC that by quoting this project, the AVCC has a 100% understanding of this AVCS scope and system design intent.
3. The AVCC assumes 100% responsibility to provide the owner with a fully 100% operational and functional AVCS system.
4. The AVCC will furnish any and all ancillary devices or equipment (whether stated or not) to make this system a 100% functional and operational AVCS as the following equipment lists intends.

5. **No change orders will be given unless the architect deems the request to be outside of the installation boundary of this Specification. Frivolous claims for additional payment for any reason will not be considered by the owner. It is the responsibility of the AVCC to include any required incidental AVCS equipment (even if not listed in this Specification) to provide the owner with complete and totally functional AVCS.**
6. The AVCC must promptly notify the Owner, in writing, of any issues that may hinder their coordination or timely completion of the work. Failure to do so must constitute AVCC acceptance of conditions and indicate that the site is suitable in all ways for this work to be accomplished, except for defects that may develop in the work of others after commencement of system installation.
7. It is hereby understood and agreed that verbal only communication is not sufficient for transmitting information. While telephone communication is permissible, any and all conversations pertaining to this project must also be documented via email, paper documents, drawings, facsimiles, postal mail, transmittals, etc. The final project team selection shall be copied on all emails as a whole.
8. The AVCS Consultant, Architect or Owner reserves the right to change or substitute new products which become available after the bid provided that:
 - a. The AVCC has not yet purchased the project scope AVCS equipment component stated in the equipment list.
 - b. The substitute equipment shall not increase the AVCC or AVCS purchase cost.
9. All materials and equipment shall be fully insured against loss or damage up until final acceptance of the system by the Owner or until the Owner relieves the AVCC in writing of this responsibility.
10. The AVCC must provide complete contact information including email addresses and cell phone numbers to the AVCD regarding the Installing Office Location, Project Manager, Site Superintendent, Control System Programmer and Lead Technicians.
11. If or when a quantity of AVCS devices conflict arises or exists between the specifications and the drawings, the AVCC shall provide the higher quantity of devices stated in the specifications or shown on the drawings.

E. Implied Descriptive Word Definitions:

1. **Provide** – to purchase, permanently install and program as required. The intent of the word is to give the owner a complete 100% operable product within the overall AVCS Scope of this project.
2. **Operational** – to provide 100% device functionality, DSP level and equalization settings programmed, signal routes and presets programmed, etc. Control System programming implementation of the device to be provided and ready for operation by the owner and review by the AVCD.

F. AVCC General Scope Requirements:

1. The AVCC shall be responsible for at a minimum, but not limited to, the following AVCS General Scope Requirements. Specific requirements and references per sub paragraph headings are listed in this document to follow.
 - a. **The selected AVCC for this project shall fully comply with all State, County, City and Local Applicable Laws regarding Licensing and Permits of any type to perform this work.**
 - b. Review of this AVCS Specification and any Addendums in their entirety.
 - c. Physical Verification and Review of applicable Site Working Conditions, Current Space Dimensions, Existing Furniture Dimensions, Existing Com/Data Rooms, Existing Conduit Systems, AC Power Requirements, Structural Support and Physical Attachment Requirements, etc.
 - d. Creation and Preparation of an Itemized Bid Proposal Complete with Itemized Pricing and Labor per the directives in this document.
 - e. Upon receiving the NTP; within 45 days, Create and Provide Electronic AVCS Product Submittal Data Portfolios and Proposed AVCS CAD Design Drawings in Adobe Acrobat .pdf Format. All documents shall be submitted per **Section 1.8** Below.
 - f. An on-site **Mandatory Coordination Meeting** between the /Owner, AVCD, Architect, Electrical Engineer and the AVCC must be scheduled and attended prior to commencement of work.
 - g. Complete and Professional AVCS Proposed CAD PDF Drawings and Manufacturer Documentation Submittal of the AVCS as directed below.
 - h. Provide and Install **New** AVCS Equipment with Full Manufacturer Warranties, AVCS Floor Box Connectors of Any Type As-Required (excluding the Owner Network Connections), AVCS Connectors of Any Type, Minor Low Voltage Cabling, etc.
 - i. The AVCC shall Provide a Complete Turn-Key, Professional, Clean, and Neat Permanent Installation of all AVCS Equipment and directed Low Voltage Cabling in this Specification. *Special care shall be taken to review the existing AVCS System Cabling (failure) and not repeat that current installed workmanship level of quality.*
 - j. Furnishing and installing the major AVCS Low Voltage Cabling is part of the General Construction Contract and separate from this Specification. The AVCC should note however, that there may be inevitable cable pull or cable installation items that may arise after the initial cable is installed. The AVCC shall adjust, provide and install as required at no extra charge.
 - k. AVCS Cable and Device Labeling (Per Specifications Section 4.1, Paragraph D, Item 1 & 2).
 - l. Verbal and Email Backup Communication Coordination as required with other appropriate Contractors, Trades and the Project Team.
 - m. Power Sequencing via Low Voltage Control, Remote Controls, etc. Fire Alarm Interrupt/Shut Down AVCS System Interface.

- n. Audio Networking, Dante, AES50, AVCS Device Specific 10/100/1000 Managed Network Switches If Required (where instructed by the AVCS Manufacturer).
- o. Video Networking, Control Networking, NVX Fiber Distribution, DM Distribution, DTP Distribution, HDBASE-T, HDMI, etc.
- p. Installation of Video Projectors and Projection Screens, Suspension Devices, Wall Mounts, Uni-Strut, Nuts, Bolts, Safety Cables, etc.
- q. Any Required Custom Steel Brackets, Structural Support, PE Stamped Drawings, Welding, etc.
- r. Rental Equipment of any type, Man-Lifts, Scaffolding, Ladders, Barriers, Safety Equipment, Storage Units, etc. as Required.
- s. Daily Cleanup of Cardboard Boxes, Packing Materials, Surplus Debris, etc. Discard off the site as required. Prior to removal, review these materials with TSC to make sure any of these materials are or are not desired.
- t. Site Safety Directives, Safety Meeting Attendance, OSHA Directives, etc. Maintain an Actively Engaged Weekly Schedule without interruption until the project is complete. Provide On-Site Jobsite Meetings with Owner as required.
- u. Inspections, Internal Punch List Generation, Factory Assisted Projection System Installation, Alignment and Testing, Factory Assisted VTC System Setup and Testing, and System Final Adjustments.
- v. Demonstration and Training – (1 Training Days) (8 Hours Each) On Site Training by the AVCC, Extensive “How to Do” Videos and Written Operational Instructions shall be provided.
- w. Update all Electronic Device Firmware Versions to the Latest Manufacturer Recommended Version as Required.
- x. Provide (1) Year On-Site Parts and Labor Warranty with (1) Year Technical Phone Support Warranty.
- y. **AVCC to provide and install Projector Control Cable from Projector to HMP. Hookup, wire accordingly for Eiki Handheld Remote to Operate Projector.**

G. Code, Regulation and Reference Requirements:

- 1. Active electronic equipment shall be UL, CE or other testing agency listed, if the product is applicable to this process. It shall comply with the National Electrical Code or equivalent authority, if the product is applicable to this process. All applicable regulations of serving utilities and governmental bodies having jurisdiction shall also apply.
- 2. All required Federal, State, County, City license and permits shall be provided as required by law.

1.2 - BID PROPOSAL - PRICE

A. Instructions to Bidders:

Renovation to Arts Center For
Goshen High School For The
Pike County Schools BOE
Troy, Alabama

Section 16800-4

1. Carefully examine the contract documents and the construction site to obtain first-hand knowledge of any existing conditions. The AVCC will not be given extra payments for conditions which can be determined by examining documents or the site and will not be relieved of any obligations with respect to bid.
2. By submitting a bid, the proposing AVCC indicates that it has studied the contract documents, the AVCS Specification, and is in agreement that the AVCS for this project as indicated in this Specification is a totally functional and fully operable system for the Owner. It is the responsibility of the AVCC to supply systems in full working order and furnish all minor equipment or any items needed for a complete system even if not specifically mentioned in these specifications or in the associated drawings. Claim for additional payment will not be considered. Notify the Architect of any considered discrepancies before the bid. Failing to provide such notification shall not release the AVCC from the desired operational functions as illustrated and stated in these specifications. Supply any needed additional items and quantities according to the intent of the specifications and drawings, without claim for additional payment.
3. Submit a Bid Proposal - Price to the appropriate GC or EC for this section of work, including all equipment as specified, complete installation and integration labor, applicable taxes as required, fees, licenses, shipping charges, freight, rental equipment, engineering, programming of any kind, per diem, travel expenses, bonding, special needs, on-site manufacturer factory assistance, work by others to be included in the bid price, etc.

1.3 – SUBSTITUTIONS

A. Procedure:

1. Be advised that the consultant has described product performance and attributes herein which he feels best represents the quality level of the AVCS desired by the Owner. This is not an effort to sole source any particular product line, but is a simple effort to guarantee specific functionality and desired operational performance from a professional commercial 24/7 quality AVCS.
2. Reasonable product comparisons and functionality research should be utilized by the AVCC in choosing the product that meets at a minimum or exceeds the performance attributes of each product listed below.
3. Verify with manufacturers availability and cost of all equipment proposed, including equipment specified herein. No cost increases will be allowed for manufacturers' cost increases, or for substitutions required because of unavailability of proposed equipment.

1.4 - CONTRACTOR EXPERIENCE

A. Qualifications:

1. The AVCC must be an authorized dealer or factory reseller of the products described herein and regularly engaged in the layout and installation of AVCS of similar size and complexity as required for this installation.
2. The AVCC, and/or managing personnel of the AVCC must have successfully completed the layout, installation, testing and warranty of not less than (3) similar systems of the scope of this project and must have been regularly engaged in the business of AVCC installation continuously since.

3. The AVCC must have an existing permanent office located within **100** miles of the job site from which installation and warranty service operations will be performed.
4. The AVCC must use sufficient numbers of skilled workers who are thoroughly trained and experienced in the necessary AVCC crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work in this specification. The AVCC Site Superintendent must have at least ten (10) years direct experience in similar work, evidence of which must be verified in writing with appropriate references. The AVCC Project Manager must have at least fifteen (15) years direct experience in similar work, evidence of which must be verified in writing with appropriate references. The AVCC Programmer must have at least (10) years direct experience in similar AVCS work, certified on the proposed control system programming and readily accessible by phone or email.
5. The right is reserved by the Owner, Architect, Electrical Engineer or AVCD to inspect previous equipment or systems as furnished or installed by the proposing AVCC. In addition, the right is reserved to reject a AVCC who has failed in any respect to comply with the provisions of previous contracts awarded to them.
6. The Architect shall be the final judge regarding suitability and qualification experience.

1.5 - WORK BY OTHERS

A. Work Statements:

1. The EC shall supply and install all applicable AC power conduit, low voltage conduit, AC power, AC Duplex Receptacles, Stainless AC Duplex Receptacle Covers, Screw Cover Back Boxes of any type (recessed or flush mounted), Standard Back Boxes, Pull Strings, Cable Trays, Wire-ways, etc.
2. The EC shall install all Floor Boxes furnished by the AVCC. Special care should be taken by the EC to review any AC Receptacle needs in any Floor.
3. The EC shall supply and install any required Fire Alarm Interrupt Relay or interface as required to the AVCS Fire Alarm Power Sequencer Interface.
4. The Owner shall Furnish, Install, Update, Terminate, Label, Configure, Program and Test any Required **Facility IP/Internet Data Network Products**. Products that are **OFOI FIX** shall also include any required Servers, Server Associated Video Monitors, Keyboards, Desktop or Laptop Computers, UPS Battery Backups, Emergency Generator Backup, PDU, CPU, GPU, Thin/Zero Clients, KVM Switches, CAT"X" RJ45 Patch Cables, Fiber Optic Network Switches as Required of Any Type, SFP Modules of Any Type, Non-AVCS Related Multimode and Single Mode Plenum and Non-Plenum Fiber, Non AVCS Related Plenum and Non-Plenum Fiber Riser Cables of Any Type, Non-AVCS Plenum and Non-Plenum Innerduct, Non-AVCS Related Fiber Patch Panels, Underground Fiber of Any Type, MDF COM Room Network Equipment Racks, IDF COM Room Network Equipment Racks, Access Manholes, Duct Bank of Any Type, Wireways and Cable Trays for Low Voltage Use of Any Type, Conduit of Any Type, Network Associated Passive and Active Electronics, Power Supplies, etc.

1.6 – ASSISTIVE COORDINATION ITEMS WITH OTHERS:

A. Assistive Requirements:

1. The AVCC shall assist the Owner, Architect, General Contractor or Electrical Contractor in "finalizing device locations", dimensions, speaker locations, video monitor locations, floor and wall box locations, projection screen locations, projector locations, TV locations, Projection System back box locations, AC Power Outlets, etc.
2. The AVCC shall assist the Owner, Architect, General Contractor or Cabinetry Contractor in "finalizing device locations", dimensions, regarding countertop device placement, countertop height, under counter rack installation, etc.
3. To provide the Owner with the designated AVCS in this specification, certain OFOI systems will require proper scheduling and coordination with the AVCD, GC and EC by the AVCC for both Pre/Post Installation requirements of all systems. Implement as required.

1.7 - MISCELLANEOUS REQUIREMENTS

A. Jobsite:

1. OSHA and DOD Safety Directives.
2. Safety Meeting Attendance as required.
3. Project Gantt, Microsoft Project, Schedule or other Timeline Charts as required shall be provided to the GC and EC.
4. All other jobsite provisions as required or stated in the general provisions of the contract.

B. Communication Regarding Any Potential AVCC Project Problem or Issue:

1. Dated Photographs, email narratives, etc. of potential problem construction areas, issues, or concerns shall be submitted to the PT via email or (RFI).

1.8 - SUBMITTALS

A. Electronic PDF Data Binders & Shop Drawings: AVCS Electronic Adobe Acrobat .pdf - Data Specification Submittal Binders shall be:

- a. **(1) Continuous .pdf File** for All AVCS Submittal Equipment Lists and Equipment Specification Sheets consisting of the following:
 - **Title Page** - AVCC Logo, Date, Project Name, Description, Address, Phone Number, Email Address; Architect Name, Address, Phone Number, Project Manager Name, Phone Number, Email Address; Electrical Engineer Company Name, Address, Phone Number; Project Manager Name, Phone Number, Cell Number, Email Address. AVCC Company Name, Address, Phone Number, Project Manager Name, Phone Number, Cell Number, Email Address.
 - **1st Page** – Itemized Equipment List with Quantities, Model Number and Manufacturer Description and Itemized Pricing with Labor.
 - **Consecutive Pages** – Specification Sheets (highlighted with yellow marker to note pertinent information, colors, model numbers, etc.) All AVCS Specification Sheets shall contain a visual Image of the device,

dimensions, performance characteristics, power requirements, warranty information, special notes, manufacturer contact information, etc.

(1) AVCS Adobe Acrobat (PDF) File of Proposed Point to Point Line Drawings including the following minimum information. Additional Pages are permitted with the proper page number suffix extensions i.e. AV03.01, AV03.02, etc.

- a. **Architectural E** Sheet Size.
- b. Details – Not Less than 1/4" = 1'.
- c. Plan – Not Less than 1/8" = 1'.
- d. Each Architectural Page Title Block Shall State the Following:
 - Bold Text Page Number Per Labeling Scheme Stated Below
 - Sheet Sub Title
 - Scale (If Applicable)
 - Revision Number
 - Company Information
 - Project Title
 - Date
 - Drawn By
 - Checked By
- e. **AV01.00** - Title Page with the Same Information as Stated in the Data Specification Submittal Binder Title Page Above. Add an additional Table for Drawing Page Contents.
- f. **AV02.00** - Legend Page – AVCS Numbered Connectivity Table, AVCS Numbered Device Symbol Table (Black Filled, White Text) with Device Elevation, Flush or Surface Mount, Notes.
- g. **AV03.00** - Floor Plan Pages
 - AVCS Device Locations Shall be Black Filled with White Text with a connecting line illustrating the exact wall position of the device.
 - Floor Plan Opacity shall be lowered 60% to easily identify the AVCS device location.
- h. **AV04.00** - Reflected Ceiling Plan Pages
 - AVCS Device Locations Shall be Black Filled with White Text with a connecting line illustrating the exact wall position of the device.
 - Reflected Ceiling Plan Opacity shall be lowered 60% to easily identify the AVCS device location.
- i. **AV05.00** - Point to Point Line Drawings – Audio Components
- j. **AV06.00** - Point to Point Line Drawings – Video Components
- k. **AV07.00** - Point to Point Line Drawings – Control/Network Components
- l. **AV08.00** - Floor and Wall Box Details.
- m. **AV10.00** - Miscellaneous Mounting and Installation Details as Required.

- n. **AV11.00** - Rack Elevations, Control Booth Elevations with Stated Devices.
- o. **AV12.00** – Video Matrix Switcher Tables and Connections
- p. **AV13.00** - Control System and Touchscreen Function Narrative in Table Format.
Headings as follows:
 - Control Initiation Device Manufacturer and Model Number.
 - Destination Controlled Device Manufacturer and Model Number Being Controlled.
 - Functions being Controlled by Control Initiation Device.
 - Notes, Special Requirements, Etc.

PART 2 AVCS PRODUCTS MAJOR EQUIPMENT LIST & DESCRIPTION

2.1 – MAJOR AVCS EQUIPMENT LIST AND IMPLEMENTATION DESCRIPTION

<u>SECTION 16600</u>		
2	CBR15	YAMAHA 15" SPEAKER
1	SS7914B (PAIR)	ON STAGE WALL BRACKETS
1	TF 1	YAMAHA DSP MIXER
1	NY64D	YAMAHA DANTE CARD
1	TIO1608-D2	YAMAHA STAGEBOX
1	AS REQUIRED	SPEAKER FLY- SUSPENSION HARDWARE
1	PX10	YAMAHA POWER AMPLIFIER
1	CD-S303RK	YAMAHA MEDIA PLAYER
2	DHR12M	YAMAHA POWERED FLOOR MONITORS WITH CABLES
1	GFW-ELITERK-4U-BLK	GATOR DESKTOP RACK
1	RC5 RM	JUICE GOOSE KEYSWITCH
1	RC-DM3	JUICE GOOSE FA INTERFACE
4	CQ2200	JUICE GOOSE SPEAKER POWER SEQ. UNITS
1	RS1215-RA	TRIPP LITE POWER STRIP
4	XS1	SENNHEISER MICROPHONE
4	BASIC	ON STAGE BOOM STANDS
6	AT8314-50	AUDIO TECHNICA 50FT XLR CABLE
1	MISC.	MOUNTING HARDWARE
1	CUSTOM 255" DIAGONAL ULTIMATE ACCESS	DALITE 16:10 MOTORIZED FRONT PROJECTION SCREEN/LVC CONTROL WITH SWITCH AT RK1/BLACK DROP AS REQUIRED
-		XT1000E MATT WHITE/VIDEO MASKING/135"HX216"W VIEWING AREA, 48" BLACK DROP @ TOP, BUILT IN LVC-IV & STATION
-		RECONFIRM FINAL SCREEN DIMENSIONS @ SUBMITTAL STAGE OF PROJECT
1	EK-1000LU	EIKI 10,000 VIDEO PROJECTOR
1	AS REQUIRED	EIKI MOTORIZED ZOOM LENS
1	0173-5042	EIKI PROJECTOR MOUNT
1	CUSTOM	FABRICATEED POLE/UNISTRUT MOUNT/GRIPPLE SAFETY CABLE
1	RS1U	AURAY RACK SHELF

1	ALF-TRUK100-RS	ALFATRON AUTO-SWITCHING WALL PLATE & RECEIVER
1	ALF-MUH44E (GEN2)	ALFATRON SWITCHER WITH RECEIVERS
4	DB226	ROLLS AUDIO INTERFACE
1	EW-DX SK-SKM-S BASE SET (509463)	SENNHEISER DUAL CHANNEL DIGITAL WIRELESS WITH BODYPACK & HANDHELD TX
1	MMD 835-1 BK	SENNHEISER WIRELESS HANDHELD ELEMENT
1	EW-D CHARGING SET	SENNHEISER CHARGING SET
1	D-ARCW	RF VENUE WALL MOUNT ANTENNA
1	LWBR-2428	LOWELL RACK
1	LFD-24FV	LOWELL VENTED LOCKABLE FRONT DOOR
3	FL-400-SLD-BLK-C	FSR FLOOR BOX & COVER
6	D-XLR2	RDL MALE/FEMALE XLR MODULE
AS REQ.	227BK1000	WEST PENN SPEAKER CABLE
AS REQ.	4346AFBK1000	WEST PENN SHIELDED CAT6
AS REQ.	454	WEST PENN MIC/LINE CABLE
1	AS REQUIRED	HARDWARE/CABLE/CONNECTORS

PART 3 - INSTALLATION

3.1 – EXECUTION

A. Project Worksite Staffing:

1. The job must be adequately staffed at all times. Unless circumstances beyond the control of the AVCC occur, the same on-site individual shall be in charge throughout.

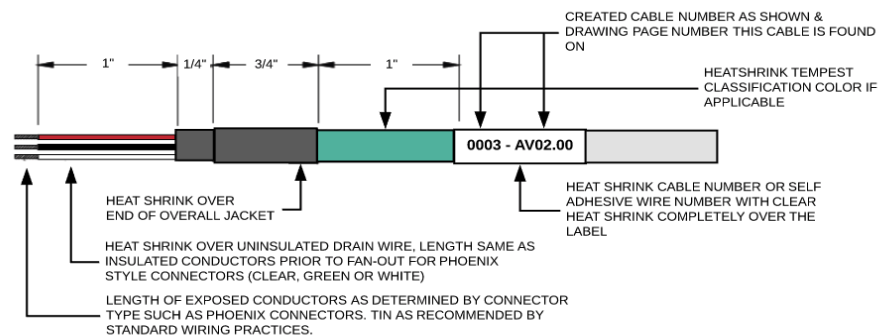
B. Wire and Cable Installation:

1. **SEE APPLICABLE AVCS CABLE PULL REQUIREMENTS** as shown on the ELECTRICAL Drawings. Note applicable "line types".
2. All AVCS wire and cable pulls of any kind shall be continuous - without splices - unless a designated termination point is shown on the design drawings.
3. All AVCS wire and cable shall be segregated as follows (as much as possible) in their respective conduit systems or cable pathways:
 - a. Mic Level (less than -20 dBm)
 - b. Line Level, Intercom (-20dBm to +30 dBm)
 - c. Video Level, Control, Fiber
 - d. Speaker Level (more than +30 dBm)
4. Do not pull AVCS wire or cable through any box fitting or enclosure where change of raceway alignment or direction occurs. Do not bend conductors to less than recommended radius. Employ temporary guides, sheaves, rollers and other necessary items to protect cables from excess installation.
5. Provide AVCS wire pulling lubricants and pulling tensions strictly in accordance with the wire and cable manufacturers' recommendations.

6. Each AVCS cable that breaks out from a harness for termination to a device shall be provided with an ample service loop. Provide ample service loops at all other terminations so that plates, panels and equipment can be de-mounted for service and inspection.
7. Neatly comb and lace all AVCS cabling utilizing appropriate "Black" cable ties. All cable ties shall be trimmed with a cable tie gun and free from burrs or sharp edges.
8. Separate AVCS wiring of differing classifications by at least four (4) inches wherever possible. Wherever lines of differing classification must come closer together than four (4) inches, cross them perpendicular to each other.
9. Use only Balanced AVCS Signal Circuits throughout the entire AVCS. It is permissible to utilize unbalanced circuits for certain systems or locations with Hi-Fi CD Players, DVD Players, etc. Refer to design drawings.
10. Under No Circumstances shall the "shield" from any AVCS wire or cable be cut off and discarded. It shall be dressed, terminated and secured as required.
11. Every device with low voltage wiring interconnect shall be installed with regard for proper polarity. Absolute polarity shall be maintained through the entire system.

C. AVCS Wire and Cable Dressing – Labeling:

1. Label all permanently installed AVCS wires on both ends with accepted Permanent Heat-Shrink labels, Panduit labels, (either direct hot-stamped or permanently printed heat-shrink labels or self-adhesive wire numbers).
2. AVCS Wire and Cable Labeling Scheme as Follows – To Be Implemented Fully by the AVCC:



D. Equipment Labeling:

1. Custom receptacles, plates and panels shall be engraved per drawings using 1/8" engraved lettering filled with contrasting paint unless otherwise specified.

2. Label all portable equipment with engraved block letters using initials and/or text. Label all portable cables similarly with printed heat-shrinkable tags located 12 inches from the male connector end.
3. Provide self-adhesive dots to all normally user-adjustable front-panel controls to indicate their nominal settings. Controls on mainframe modules shall be marked on the appropriate internal labels.

E. Connections:

1. Make required solder connections using 60/40 Rosin-Core solder. Utilize a temperature controlled soldering station where possible.
2. Soldering workmanship standards NASA-STD-8739.3 and NASA-STD-8739.4 are recommended references for proper soldering and cable termination, see <http://nepp.nasa.gov/>.
3. For coaxial or D type pin connectors, use crimping tools, which are specifically designed for the application. The presence of non-accepted ratchet style crimping tools in the Contractor's shop or on the job-site shall constitute prima-facie evidence of improper crimp-type connections, and may result in all crimp-type connections being redone.
4. Use insulated spade lugs or fork terminals on all exposed screw terminals. See design drawings for additional direction. The following manufacturers are acceptable:

Amp	Molex	Entelelec
Hubbell	IDEC	Wago

5. Acceptable AVCS Connector Manufacturers (where applicable):

Switchcraft AAA Series, R Series, EH Series, HPC Series, E Series, etc.	Neutrik X Series, XX Series, DL Series, SPX Series, FC Series, STX Series, NL Series, C Series, PX Series, Powercon, etc.
Hosa REAN	Whirlwind
Canare	AVCS
AMX	Extron
Crestron	Kings
ADC	Ramlatch
Gepco	Amphenol
West Penn	Bittree
Conxall	LEX
Hubbell	Rapco/Horizon
ProCo	Liberty
Canare	Comprehensive

6. All Connectors shall have "Gold, Nickel or Silver plated" pins or sockets as a minimum level of quality. Specific details are provided on all AVCS wall plates and panels, etc. Black is the preferred color of all connector shells where possible.
7. All speaker connection splicing shall utilize WAGO Lever Nuts as required.

F. Equipment Racks:

1. When possible, pre-assemble and test all equipment racks before delivery to the job site.
2. Provide adequate ventilation in racks to maintain in-rack temperatures of less than 100 degrees F. If required, provide accepted ventilation intake fans in the bottom facial of the rack and exhaust fans in the top of the racks.
3. Provide and install sized appropriately powder-coated steel rear rack rails for each rack. Utilize rear rack rail "L-Shape Slotted Lacing Bars" where applicable for crossing cabling and combing.
4. Use powder-coated steel or aluminum flanged blank panels where applicable for unused spaces.
5. Use 10-32 Standard Truss Head (Phillips) rack screws with washers.
6. Provide distribution of electrical power within the A/V equipment rack as shown on drawings and/or stated on the equipment list.
7. Use rubber grommets around cut-outs and knock-outs where conduit or chase nipples are not installed.
8. Supply and install any brackets, braces, heavy duty velcro or misc. supports where necessary.
9. Provide rear rack back planes to electrical contractors at acceptable rough-in time line when Middle Atlantic SR Series Racks are utilized.
10. Where small audio or video interfaces, relays, etc. are required at the rear of the rack; use rear rack panels for mounting these devices where possible.
11. Bond each rack to the Main Building Grounding System with #6 CU Green Insulated Stranded Cable via grounding compression terminals. Special care should be taken to assure bonding continuity between the rack and bonding connector by scraping the paint off of each rack at the bonding connector entrance location as required or utilizing grounding-piercing bolts/washers & specialty hardware to create electrical continuity. Continuity measurements should be made between the ground entrance of each equipment rack and the bottom, middle and top of each equipment rack to assure proper grounding of the entire vertical cabinet. Provide an internal Legrand/Middle Atlantic BB Series Copper Rack Ground Busbar in each rack (Length as required to facilitate rack equipment quantity chassis bonding). Bond each required AVC Rack Device to the Internal Ground Busbar via #14 CU Green Insulated Stranded Cable via compression terminals. For reference, see Panduit 2009 Article "Physical Infrastructure Reference Architecture Guide 1.0 – Section 4.3 Grounding and Bonding with special attention paid to page 4-50". See Standards ANSI/J-STD-607, TIA942, IEEE STD. 1100-2005 and BICSI/607.
12. Provide appropriately rack mounted shelves, drawers, etc. as required for misc. device mounting in the front or rear of the rack.

G. Overhead Rigging:

1. All overhead rigging shall be performed by qualified and insured personnel.

2. Overhead suspension systems shall conform to a 7:1 Safety Ratio.
3. All overhead rigging shall use qualified “drop forged” graded materials.
4. All shackle pins and turnbuckles shall be “moused”.
5. All nuts shall be of a locking type. No jam nuts are to be used.
6. Thimbles shall be used on all wire rope eyes.
7. Suspended items shall have a “Gripple” safety cable as a means of secondary support and shall be considered an emergency fail secure device.
8. Crosby Products is the preferred rigging product line.

PART 4 TRAINING, SYSTEM DEMONSTRATION & EVENT ATTENDANCE

7.1 – TRAINING REQUIREMENTS BY THE AVCC

A. Attendance:

1. Provide a Sign-In Sheet of all Owner Provided Attendees to the (AVC) System Training and System Demonstration. Include Date, Phone Numbers, Emails, Department Locations and Names.

B. Training Time Required:

1. (8 Hours) - Specifically Addressing the Following Items Below with Training and System Demonstration.

PART 5 WARRANTY / SERVICE

8.1 – SUPPORT

A. Warranty:

1. The AVCC shall supply the Owner with a (1) Year Installation Warranty from the written date of substantial completion or system first use by the Owner; whichever comes first. These items shall be provided in the form of a “Signed Warranty Certificate” and included as a PDF on the project close out documentation.
2. The AVCS equipment warranty from each AVCS manufacturer shall be in effect for each full respective term from the factory.
3. In the event that an equipment failure takes place after the (1) Year Installation Warranty has expired (but yet the manufacturer equipment warranty is still in effect), the Owner shall pay the AVCC their typical service rate to remove, pickup and return the failed device to the manufacturer for repair and then back again.

PART 6 PROJECT CLOSE-OUT

6.2 – PROVIDE:

1. (1) USB Flash Drive of Final Audio DSP Settings.
2. (1) USB Flash Drive of PDF Owner Manuals & PDF Final As-Built Drawing Documents.
3. (1) USB Flash Drive of All Video Training Session Files.

END OF SPECIFICATIONS