

Construction Specification 2—Clearing and Grubbing

1. Scope

The work consists of clearing and grubbing and disposal of trees, snags, logs, brush, stumps, shrubs, and rubbish from the designated areas.

2. Marking

The limits of the area(s) to be cleared and grubbed will be marked by stakes, flags, tree markings, or other suitable methods. All trees and plants to be removed will be according to design plans.

3. Clearing and grubbing

All trees and all snags, logs, brush, stumps, shrubs, rubbish, and similar materials shall be cleared from within the limits of the designated areas. Unless otherwise specified, all stumps, roots, and root clusters that have a diameter of 1 inch or larger shall be grubbed out to a depth of at least 2 feet below subgrade for concrete structures and 1 foot below the ground surface at embankment sites and other designated areas.

4. Disposal

All materials cleared and grubbed from the designated areas shall be disposed of at locations shown on the drawings or in a manner specified in section 7. The contractor is responsible for complying with all local rules and regulations and the payment of any and all fees that may result from disposal at locations away from the project site.

5. Measurement and payment

Method 1—For items of work for which specific units prices are established in the contract, the cleared and grubbed area is measured to the nearest 0.1 acre. Payment for clearing and grubbing is made for the total area within the designated limits at the contract unit price. Such payment will constitute full compensation for all labor, equipment, tools, and all other items necessary and incidental to the completion of the work.

Method 2—For items of work for which specific unit prices are established in the contract, the length of the cleared and grubbed area is measured to the nearest full station (100 feet) along the line designated on the drawing or identified in the specifications. Payment for clearing and grubbing is made for the total length within the designated limits at the contract unit price. Such payment will constitute full compensation for all labor, equipment, tools, and all other items necessary and incidental to the completion of the work.

Method 3—For items of work for which specific unit prices are established in the contract, each tree, stump, and snag having a diameter of 4 inches or larger and each log having a diameter of 4 inches or larger and a length of 10 feet are measured before removal. The size of each tree and snag is determined by measuring its trunk at breast height above the natural ground surface. The size of each log is determined by measuring the butt and by measuring its length from butt to tip. The size of each stump is measured at the top. Diameter is determined by dividing the measured circumference by 3.14.

Payment for clearing and grubbing of each tree, stump, and snag having a diameter of 4 inches or larger and each log having a diameter of 4 inches or larger and a length of 10 feet or larger is made at the contract unit price for its size designation as determined by the following schedule:

Measured diameter	Size designation
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(in)	(in)
4 to 8	6
8 to 12	10
12 to 24	18
24 to 36	30
36 to 60	48
Over 60	60

The sum of such payments shall constitute full compensation for clearing and grubbing (including the clearing and grubbing of smaller trees, stumps, snags, logs, brush, shrubs, and roots), applicable permits and associated fees, and rubbish removal. Such payment shall constitute full compensation for all labor, equipment, tools, and all other items necessary and incidental to the completion of the work.

Method 4—For items of work for which specific lump sum prices are established in the contract, payment for clearing and grubbing is made at the contract lump sum price. Such payment shall constitute full compensation for all labor, equipment, tools, and all other items necessary and incidental to the completion of the work.

All Methods—The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract, but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in section 7.

6. Items of Work and Construction Details

Items of work to be performed in conformance with this specification and the construction details therefore are:

Bid Item No. 1, Clearing and Grubbing

- (1) This item shall consist of the clearing and grubbing of the area required for the installation of the works of improvement as shown on the drawings.
- (2) All cleared and grubbed materials shall become the property and responsibility of the Contractor and shall be disposed of off the job site.
- (3) Clearing and grubbing shall be limited only to those areas designated in item (1) above. All other areas shall be left undisturbed.
- (4) All clearing and grubbing shall be accomplished in such a manner as to minimize air and water pollution.
- (5) Measurement and payment shall be according to the Santa Rosa County contract.

Construction Specification 3—Structure Removal

1. Scope

The work shall consist of the removal, salvage, and disposal of structures (including fences) from the designated areas.

2. Marking

Method 1—Each structure or structure part to be removed will be marked with stakes, flags, paint, or other suitable method.

Method 2—The area boundaries from which structures must be removed will be marked using stakes, flags, paint, or other suitable method. Structures to remain undisturbed or to be salvaged will be designated by special markings.

3. Removal

Method 1—All structures designated for removal in the contract shall be removed to the specified extent and depth.

Method 2—Within the areas so marked, all visible and buried structures identified shall be removed to the specified extent and depth.

4. Salvage

Structures or structure parts that are designated to be salvaged shall be carefully removed and neatly placed in the specified or approved storage location. Salvaged structures that are capable of being disassembled shall be dismantled into individual members or sections. Such structures shall be neatly and systematically match marked with paint before disassembly. All connectors and other parts shall be marked to indicate their proper location within the structure and shall be fastened to the appropriate structural member or packed in suitable containers.

Material from fences designated to be salvaged shall be placed outside the work area on the property on which the fence was originally located. Fence wire shall be rolled into uniform rolls of suitable size and neatly piled with other salvaged materials. Posts and rails shall be neatly stacked.

5. Disposal of refuse materials

Refuse materials resulting from structure removal shall be disposed of in a manner and at locations specified in section 7 of this specification or in an acceptable manner and at locations approved by the contracting officer. Disposal by burning shall be in accordance with local rules and regulations.

6. Measurement and payment

Method 1—For items of work for which specific unit prices are established by the contract, payment for the removal of each structure unit, except fences, is made at the contract unit price. Fences removed or removed and salvaged are measured to the nearest linear foot. Payment for fence removal or removal and salvage is made at the contract unit prices for each type and size of fence.

Such payment will constitute full compensation for all labor, equipment, tools, applicable permits and associated fees for burning and disposal of refuse, and all other items necessary and incidental to the completion of the work.

Method 2—For items of work for which specific lump sum prices are established by the contract, payment for structure removal is made at the contract lump sum price.

Such payment will constitute full compensation for all labor, equipment, tools, applicable permits and associated fees for burning and disposal of refuse, and all other items necessary and incidental to the completion of the work.

All Methods—The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract, but not listed as a contract line item number in the bid schedule, is included in the payment for the item of work to which it is made subsidiary. Such items and items to which they are made subsidiary are identified in section 7 of this specification.

7. Items of Work and Construction Details

Items of work to be performed in conformance with this specification and the construction details therefore are:

Bid Item No. 2, Structure Removal

- (1) This item shall consist of the removal of the existing Asphalt, Curbing, Striping, Pipe Sections, and other previous improvements and/or debris from within the work limits as shown on the drawings and as required for installation of proposed improvements.
- (2) The items / debris removed shall become the property and responsibility of the contractor and shall be disposed of off the job site.
- (3) Measurement and payment shall be according to the Santa Rosa County contract.

Construction Specification 5—Pollution Control

1. Scope

The work consists of installing measures or performing work to control erosion and minimize the production of sediment and other pollutants to water and air from construction activities.

2. Material

All material furnished shall meet the requirements of the material specifications listed in section 8 of this specification.

3. Erosion and sediment control measures and works

The measures and works shall include, but are not limited to, the following:

Staging of earthwork activities—The excavation and moving of soil materials shall be scheduled to minimize the size of areas disturbed and unprotected from erosion for the shortest reasonable time.

Seeding—Seeding to protect disturbed areas shall occur as soon as reasonably possible following completion of that earthwork activity.

Mulching—Mulching to provide temporary protection of the soil surface from erosion.

Diversions—Diversions to divert water from work areas and to collect water from work areas for treatment and safe disposition. They are temporary and shall be removed and the area restored to its near original condition when the diversions are no longer required or when permanent measures are installed.

Stream crossings—Culverts or bridges where equipment must cross streams. They are temporary and shall be removed and the area restored to its near original condition when the crossings are no longer required or when permanent measures are installed.

Sediment basins—Sediment basins collect, settle, and eliminate sediment from eroding areas from impacting properties and streams below the construction site(s). These basins are temporary and shall be removed and the area restored to its original condition when they are no longer required or when permanent measures are installed.

Sediment filters—Straw bale filters or geotextile sediment fences trap sediment from areas of limited runoff. Sediment filters shall be properly anchored to prevent erosion under or around them. These filters are temporary and shall be removed and the area restored to its original condition when they are no longer required or when permanent measures are installed.

Waterways—Waterways for the safe disposal of runoff from fields, diversions, and other structures or measures. These works are temporary and shall be removed and the area restored to its original condition when they are no longer required or when permanent measures are installed.

Other—Additional protection measures as specified in section 8 of this specification or required by Federal, State, or local government.

4. Chemical pollution

The contractor shall provide watertight tanks or barrels or construct a sump sealed with plastic sheets to dispose of chemical pollutants, such as drained lubricating or transmission fluids, grease, soaps, concrete mixer washwater, or asphalt, produced as a by-product of the construction activities. At the completion of the construction work, sumps shall be removed and the area restored to its original condition as specified in section 8 of this specification. Sump removal shall be conducted without causing pollution.

Sanitary facilities, such as chemical toilets, or septic tanks shall not be located next to live streams, wells, or springs. They shall be located at a distance sufficient to prevent contamination of any water source. At the completion of construction activities, facilities shall be disposed of without causing pollution as specified in section 8 of this specification.

5. Air pollution

The burning of brush or slash and the disposal of other materials shall adhere to state and local regulations.

Fire prevention measures shall be taken to prevent the start or spreading of wildfires that may result from project activities. Firebreaks or guards shall be constructed and maintained at locations shown on the drawings.

All public access or haul roads used by the contractor during construction of the project shall be sprinkled or otherwise treated to fully suppress dust. All dust control methods shall ensure safe construction operations at all times. If chemical dust suppressants are applied, the material shall be a commercially available product specifically designed for dust suppression and the application shall follow manufacturer's requirements and recommendations. A copy of the product data sheet and manufacturer's recommended application procedures shall be provided to the engineer 5 working days before the first application.

6. Maintenance, removal, and restoration

All pollution control measures and temporary works shall be adequately maintained in a functional condition for the duration of the construction period. All temporary measures shall be removed and the site restored to near original condition.

7. Measurement and payment

Method 1—For items of work for which specific unit prices are established in the contract, each item is measured to the nearest unit applicable. Payment for each item is made at the contract unit price for that item. For water or chemical suppressant items used for dust control for which items of work are established in section 8 of this specification, measurement for payment will not include water or chemical suppressants that are used inappropriately or excessive to need. Such payment will constitute full compensation for the completion of the work.

Method 2—For items of work for which lump sum prices are established in the contract, payment is made as the work proceeds and supported by invoices presented by the contractor that reflect actual costs. If the total of all progress payments is less than the lump sum contract price for this item, the balance remaining for this item will be included in the final contract payment. Payment of the lump sum contract price will constitute full compensation for completion of the work.

Method 3—For items of work for which lump sum prices are established in the contract, payment

will be prorated and provided in equal amounts on each monthly progress payment estimate. The number of months used for prorating shall be the number estimated to complete the work as outlined in the contractor's approved construction schedule. The final month's prorate amount will be provided with the final contract payment. Payment as described will constitute full compensation for completion of the work.

All Methods—The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract, but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items, and the items to which they are made subsidiary, are identified in section 8 of this specification.

8. Items of Work and Construction Details

Items of work to be performed in conformance with this specification and the construction details therefore are:

Bid Item No. 3, Pollution Control

- (1) This item shall consist of precautions taken by the Contractor to minimize degradation of water quality passing through the job site during construction operations. All necessary precautions shall be taken to ensure compliance with water quality standards of the State of Florida. All sections of the Florida Administrative code and all local, state, and federal regulations shall be adhered to at all times.
- (2) The Contractor shall be responsible for containment of pollution sources including, but not limited to the required excavations, clearing and grubbing, earthfill, and other disturbed areas.
- (3) Silt Containment barriers shall be installed prior to any excavation, structure removal, or placement of any improvements (permanent or temporary, except said barriers) and shall be maintained in effective condition at all locations until construction and vegetative measures are completed.
- (4) Measurement and payment shall be according to the Santa Rosa County contract.

Construction Specification 7—Construction Surveys

1. Scope

The work consists of performing all surveys, measurements, and computations required by this specification. This item shall be performed by a Professional Land Surveyor licensed in Florida.

2. Equipment and material

Equipment for construction surveys shall be of a quality and condition to provide the required accuracy. The equipment shall be maintained in good working order and in proper adjustment at all times. Records of repairs, calibration tests, accuracy checks, and adjustments shall be maintained and be available for inspection by the engineer. Equipment shall be checked, tested, and adjusted as necessary in conformance with manufacturer's recommendations.

Material is field notebooks, stakes, templates, platforms, equipment, spikes, steel pins, tools, and all other items necessary to perform the work specified.

3. Quality of work

All work shall follow recognized professional practice and the standards of the industry unless otherwise specified in section 9 of this specification. The work shall be performed to the accuracy and detail appropriate for the type of job. Notes, sketches, and other data shall be complete, recorded neatly, legible, reproducible and organized to facilitate ease in review and allow reproduction of copies for job documentation. Survey equipment that requires little or no manual recording of field data shall have survey information documented as outlined in section 9 of this specification.

All computations shall be mathematically correct and shall include information to identify the bid item, date, and who performed, checked, and approved the computations. Computations shall be legible, complete, and clearly document the source of all information used including assumptions and measurements collected.

If a computer program is used to perform the computations, the contractor shall provide the engineer with the software identification, vendor's name, version number, and other pertinent data before beginning survey activities. Computer generated computations shall show all input data including values assigned and assumptions made.

The elevations of permanent and temporary bench marks shall be determined and recorded to the nearest 0.01 foot. Differential leveling and transit traverses shall be of such precision that the error of vertical closure in feet shall not exceed plus or minus 0.1 times the square root of the traverse distance in miles. Linear measurements shall be accurate to within 1 foot in 5,000 feet, unless otherwise specified in section 9 of this specification. The angular error of closure for transit traverses shall not exceed 1 minute times the square root of the number of angles turned.

The minimum requirements for placing slope stakes shall be at 100-foot stations for tangents, as little as 25 feet for sharp curves, breaks in the original ground surface and at any other intermediate stations necessary to ensure accurate location for construction layout and measurement. Slope stakes and cross sections shall be perpendicular to the centerline. Significant breaks in grade shall be determined for cross sections. Distances shall be measured horizontally

and recorded to the nearest 0.1 foot. Side shots for interim construction stakes may be taken with a hand level.

Unless otherwise specified in section 9 of this specification, measurements for stationing and establishing the location of structures shall be made to the nearest 0.1 foot.

Elevations for concrete work, pipes, and mechanical equipment shall be determined and recorded to the nearest 0.01 foot. Elevations for earth work shall be determined and recorded to the nearest 0.1 foot.

4. Primary control

The baselines and bench marks for primary control, necessary to establish lines and grades needed for construction, are shown on the drawings and have been located on the job site.

These baselines and bench marks shall be used as the origin of all surveys, layouts, and measurements to establish construction lines and grades. The contractor shall take all necessary precautions to prevent the loss or damage of primary control points. Any stakes or control points lost or damaged by construction activity will be reestablished by the contractor or at contractor expense.

5. Construction surveys

Before work starts that requires contractor performed surveys, the contractor shall submit in writing for the engineer's review: the name, qualifications, and experience of the individuals to be assigned to the survey tasks.

Method 1—Contractor performed surveys shall include:

- checking and any supplemental or interim staking
- performing quantity surveys, measurements, and computations for progress payment
- other surveys as described in section 9 of this specification

Method 2—Contractor performed surveys shall consist of all work necessary for:

- establishing line and grade for all work
- setting slope stakes for all work
- checking and any supplemental or interim staking
- establishing final grade stakes
- performing quantity surveys, measurements, and computations for progress payment
- other surveys as described in section 9 of this specification

Method 3—Contractor performed surveys shall consist of all work necessary for:

- establishing line and grade for all work
- setting slope stakes for all work
- checking and any supplemental or interim staking
- establishing final grade stakes
- performing quantity surveys, measurements, and computations for progress payments
- performing original (initial) and final surveys for determinations of final quantities
- other surveys as described in section 9 of this specification.

6. Staking

The construction staking required for the item shall be completed before work on any item starts. Construction staking shall be completed as follows or as otherwise specified in section 9 of this specification:

Clearing and grubbing—The boundary of the area(s) to be cleared and grubbed shall be staked or flagged at a maximum interval of 200 feet, closer if needed, to clearly mark the limits of work. When contractor staking is the basis for determining the area for final payment, all boundary stakes will be reviewed by the engineer before start of this work item.

Excavation and fill—Slope stakes shall be placed at the intersection of the specified slopes and ground line. Slope stakes and the reference stakes for slopes shall be marked with the stationing, required cut or fill, slope ratio, and horizontal distance from the centerline or other control line. The minimum requirements for placing slope stakes is outlined in section 3, Quality of work.

Structures—Centerline and offset reference line stakes for location, alignment, and elevation shall be placed for all structures.

7. Records

All survey data shall be recorded in fully identified standard hard-bound engineering survey field notebooks with consecutively numbered pages. All field notes and printed data shall include the purpose or description of the work, the date the work was performed, weather data, sketches, and the personnel who performed and checked the work. Electronically generated survey data and computations shall be bound, page numbered, and cross referenced in a bound field notebook containing the index for all survey activities. All work shall follow recognized professional practice.

The construction survey records shall be available at all times during the progress of the work for examination and use by the engineer and when requested, copies shall be made available. The original field notebooks and other records shall be provided to and become the property of the owner before final payment and acceptance of all work.

Complete documentation of computations and supporting data for progress payments shall be submitted to the engineer with each invoice for payment as specified in section 9 of the specification. When the contractor is required to conduct initial and final surveys as outlined in section 5, Construction Surveys, notes shall be provided as soon as possible after completion to the engineer for the purpose of determining final payment quantities.

8. Payment

Method 1—For items of work for which lump sum prices are established in the contract, payment is made as the work proceeds, after presentation of correct and accurate invoices by the contractor showing related costs and evidence of the charges of suppliers, subcontractors, and others for supplies furnished and work performed. Invoices for the total amount of the contract price will not be accepted until all surveys are complete and required documentation has been determined complete. If the total of such payments is less than the lump sum contract price for this item, the unpaid balance will be included in the final contract payment. Payment of the lump sum contract price will constitute full compensation for completion of all work under the bid item.

Method 2—For items of work for which lump sum prices are established in the contract, payment is made as the work proceeds with progress payment amounts determined as a percentage of the total work planned as projected from the contractor's approved construction schedule. Payment of the lump sum contract price will constitute full compensation for completion of all work under this bid item.

Payment will not be provided under this item for the purchase price of materials or equipment having a residual value.

Compensation for any item of work described in the contract, but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and the item to which they are made subsidiary are identified in section 9 of this specification.

9. Items of work and construction details

Items of work to be performed in conformance with this specification and the construction details are:

a. Bid Item No. 4, Construction Surveys

- (1) In Section 5, Construction Surveys, Method 3 will apply.
- (2) The contractor shall notify the Contracting Officer's Representative at least 7 days before beginning any surveys. The contractor shall schedule, with written confirmation, a conference with the Contracting Officer's Representative, prior to beginning any surveys. In this conference the contractor shall outline the details of the proposed surveys.
- (3) This item shall consist of performing all work specified herein:
 - a. establishing permanent references along the proposed alignment as shown on the drawings and at each structure location, berm location, pipe ends, edges (top and toe) of all rip rap, and any other construction item as applicable.
 - b. Establishing clearing boundaries.
 - c. Obtaining cross sections of the ground surface prior to construction. Cross sections shall be placed as a minimum at full stations, significant breaks in the original and final ground surface and other intermediate stations as necessary to assure accurate quantities. Proposed locations of sections shall be submitted to the Contracting Officer's Representative for approval at the pre-survey conference.
 - d. Setting cut stakes for all excavation.
 - e. Setting line and grade for roads, channels, pipes, conduits, structures, and other appurtenances.
 - f. Setting grades for all concrete work.

- g. Setting line, grade, and fill stakes for fills.
 - h. Checking and supplemental staking of all cuts and fills as the work progresses.
 - i. Setting "blue tops" for final grading of all fills.
 - j. Restaking any layout, or references that are removed or destroyed.
 - k. Making progress payment surveys.
 - l. Obtaining cross sections of all constructed surfaces that are required for determining the limit of pay quantity.
 - m. Plotting all sections necessary for quantity computations.
 - n. Computing and checking all quantities for progress payments and final quantities for final payments.
 - o. Contract modifications will be made for construction contract modifications that require additional surveys.
- (4) Surveys shall be certified by a surveyor licensed in the State of Florida.
 - (5) Excavation and fill quantities shall be computed by the average end area method or by acceptable electronic means approved by the Contracting Officer's Representative. Proposed method shall be discussed in the pre-survey conference.
 - (6) Measurement and payment shall be according to the Santa Rosa County contract.

Construction Specification 8—Mobilization and Demobilization

1. Scope

The work consists of the mobilization and demobilization of the contractor's forces and equipment necessary for performing the work required under the contract. It does not include mobilization and demobilization for specific items of work for which payment is provided elsewhere in the contract. Mobilization will not be considered as work in fulfilling the contract requirements for commencement of work.

2. Equipment and material

Mobilization shall include all activities and associated costs for transportation of contractor's personnel, equipment, and operating supplies to the site; establishment of offices, buildings, and other necessary general facilities for the contractor's operations at the site; premiums paid for performance and payment bonds including coinsurance and reinsurance agreements as applicable; and other items specified in section 4 of this specification.

Demobilization shall include all activities and costs for transportation of personnel, equipment, and supplies not required or included in the contract from the site; including the disassembly, removal, and site cleanup of offices, buildings, and other facilities assembled on the site specifically for this contract.

This work includes mobilization and demobilization required by the contract at the time of award. If additional mobilization and demobilization activities and costs are required during the performance of the contract as a result of changed, deleted, or added items of work for which the contractor is entitled to an adjustment in contract price, compensation for such costs will be included in the price adjustment for the item or items of work changed or added.

3. Payment

Payment will be made as the work proceeds, after presentation of paid invoices or documentation of direct costs by the contractor showing specific mobilization and demobilization costs and supporting evidence of the charges of suppliers, subcontractors, and others. When the total of such payments is less than the lump sum contract price, the balance remaining will be included in the final contract payment. Payment of the lump sum contract price for mobilization and demobilization will constitute full compensation for completion of the work.

Payment will not be made under this item for the purchase costs of materials having a residual value, the purchase costs of materials to be incorporated in the project, or the purchase costs of operating supplies.

4. Items of Work and Construction Details

Items of work to be performed in conformance with this specification and the construction details therefore are:

Bid Item No. 5, Mobilization and Demobilization

This item shall consist of all work as described in Section 1 above.

Construction Specification 9—Traffic Control

1. Scope

The work shall consist of establishing traffic control and maintaining safe, convenient use of public roads and rights-of-way.

2. Traffic and access

The contractor's operations shall cause no unnecessary inconvenience to the public. The public rights-of-way shall be maintained at all times unless interruption is authorized by proper local authority. Contractor's authorized closing or detour plans shall be provided to the engineer for approval.

Safe and adequate access shall be provided and maintained to all public protection devices and to all critical utility control locations. Facility access shall be continuous and unobstructed unless otherwise approved.

3. Storage of equipment and material in public streets

Construction materials and equipment shall not be stored or parked on public streets, roads, or highways. During any material or equipment loading or unloading activities that may temporarily interfere with traffic, an acceptable detour shall be provided for the duration of the activity. Any associated expense for this activity is the responsibility of the contractor.

Excavated material, including suitable material that is intended for adjacent trench backfill or other earth backfill as specified in section 5 of this specification, shall not be stored on public streets, roads, or highways that remain in service for the public. Any waiver of this requirement must be obtained from the proper local authority and approved by the engineer. All excess and unsuitable material shall be removed from the site as soon as possible. Any spillage shall be removed from roadways before they are used by the public.

4. Street closures, detours, and barricades

The contractor shall comply with the requirements of all applicable responsible units of government for closure of any street, road, or highway. The contractor shall provide the required barriers, guards, lights, signs, temporary bridges, and flaggers together with informing the public of any detours and construction hazards by the most suitable means available, such as local newspapers or radio stations. The contractor is also responsible for compliance with additional public safety requirements that may arise during construction. The contractor shall furnish, install, and, upon completion of the work, promptly remove all signs, warning devices, and other materials used in the performance of this work.

Unless otherwise specified, the contractor shall notify, in writing, the fire chief, police chief, county sheriff, state patrol, schools that operate school buses, or any other government official as may be appropriate no less than 7 days before closing, partly closing, or reopening any street, road, or highway.

Unless otherwise specified, the contractor shall furnish to the engineer a written plan showing the proposed method of signing, barricading for traffic control, and safety for street detours and closures.

All temporary detours will be maintained to ensure use of public rights-of-way is provided in a safe manner. This may include dust control, grading, and graveling as required in section 7 of this specification.

5. General and specific references

All signs, signals, barricades, use of flaggers, and other traffic control and public safety devices shall conform to the general requirements set forth in the Manual of Uniform Traffic Control Devices (MUTCD) and the latest edition of *Standard Highway Signs and Standard Alphabets for Highway Signs* and/or *OSHA Construction Industry Standards (29 CFR Part 1926), Subpart G, Signs, Signals, and Barricades* unless otherwise specified in section 7 of this specification.

6. Measurement and payment

For items of work for which specific lump sum prices are established in the contract, payment for the work is made at the contract lump sum price. Progress payments will be made based upon the percentage of estimated total time that traffic control will be required unless otherwise specified in section 7 of this specification. Payment will constitute full compensation for all flaggers, labor, materials, equipment, and all other items necessary and incidental to completion of the work.

Compensation for any item of work described in the contract, but not listed in the bid schedule will be included in the payment for the item of work to which it is made subsidiary. Such items and items to which they are made subsidiary are identified in section 7 of this specification.

7. Items of Work and Construction Details

Items of work to be performed in conformance with this specification and the construction details therefore are:

Bid Item No.6, Traffic Control

- (1) This item shall consist of providing traffic warning signs and providing traffic control during construction. Current work areas shall be clearly marked and traffic shall be directed to other areas within the parking lot.
- (2) Warning signs and signals shall be placed in accordance with FDOT Manual on Uniform Traffic Control Devices (MUTCD) and a plan shall be designed and implemented by certified personnel.
- (3) Flagmen shall be required when vehicles transporting equipment, materials, and supplies are entering and leaving the construction site.
- (4) Measurement and payment shall be according to the Santa Rosa County contract.

Construction Specification 10—Water for Construction

1. Scope

The work consists of furnishing, transporting, measuring, and applying water as specified.

2. Facilities and equipment

The contractor shall install and maintain access and haul roads and furnish, operate, and maintain all pumps, meters, piping, tanks, storage, and other facilities required to load, transport, store, distribute, and use construction water as specified.

These facilities shall be equipped with accurate, work dedicated meters; tanks of known volume; or other devices that provide a correct measurement of water supplied. Meters shall be installed at the point of delivery into water hauling equipment or application system, such as sprinkler systems or flooding systems, as specified.

3. Dust abatement and haul road maintenance

Water for dust abatement and haul road maintenance shall be applied to haul roads and other dust producing areas as needed to prevent air pollution or excessive dust (which causes impaired vision on trafficked roads and in work areas) and to maintain the roads in good condition for safe and efficient operation during periods of use. Roads that may be jointly used with the public and by the contractor's equipment shall have dust abatement provisions acceptable to the public entity that has road maintenance responsibility. Compensation for water used for dust abatement and haul road maintenance shall be as specified in section 8 of this specification.

4. Earthfill, drainfill, and rockfill

Water required for proper installation of earthfill, drainfill, and/or rockfill shall be used in the fill materials as specified in the applicable construction specification(s). Compensation for construction water used for earthfill, drainfill, and/or rockfill shall be as specified in section 8 of this specification.

5. Concrete, mortar, and grout

Water required in the mixing or curing of concrete, shotcrete, roller compacted concrete, or other portland cement mortar or grout shall meet the requirements of the applicable construction specifications and shall be used in conformance with those specifications. Payment for construction water used in these items is covered by the applicable concrete, mortar, or grout specification, or a combination of these.

6. Other construction requiring water

Water required and used for other construction activities under this contract, but not specifically covered by this specification shall be considered subsidiary to the item(s) of work that requires its use.

7. Measurement and payment

Method 1—For water items for which specific unit prices are established in the contract, the volume of water furnished and used in accordance with the specifications will be measured to the nearest 1,000 gallons.

Payment for water is made at the contract unit price. Such payment will constitute full compensation for the direct costs of water. All other costs necessary for applying water are subsidiary to the items of work they are associated.

Method 2—For water items for which specific unit prices are established in the contract, the volume of water furnished and used in accordance with the specifications will be measured to the nearest 1,000 gallons.

Payment for water and the cost associated with transportation, distribution, and application is made at the contract unit price. Such payment will constitute full compensation for completion of the work.

Method 3—For water items for which specific unit prices are established in the contract, the volume of water used in accordance with the specifications will be measured to the nearest 1,000 gallons.

Payment for water is made at the contract unit price. Such payment, excluding water cost, will constitute full compensation for completion of the work.

All methods—The following provisions apply to all methods of measurement and payment:

- The measurement for payment will include all water used except as noted in sections 5, 6, and 8 of this specification. Measurement for payment will not include water that is used inappropriately or in excessive to need.
- Compensation for any item of work described in the contract, but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in section 8 of this specification.

8. Items of work and construction details

Items of work to be performed in conformance with this specification and the construction details therefore are:

a. Subsidiary Item, Water for Construction

- (1) This item shall consist of all water necessary and incidental to curing of concrete, obtaining proper moisture content for compaction of earthfill, proper watering of new vegetation, and all other items that may require water to be successfully installed as required on the drawings and in the specifications.
- (2) No separate payment shall be made for this item. Compensation shall be included in the payment for the respective bid item to which it is incidental.

Construction Specification 11—Removal of Water

1. Scope

The work consists of the removal of surface water and ground water as necessary to perform the construction required by the contract in accordance with the specifications. It shall include: (1) constructing, installing, building, and maintaining all necessary temporary water containment facilities, channels, and diversions; (2) furnishing, installing, and operating all necessary pumps, piping, and other facilities and equipment; and (3) removing all such temporary works and equipment after their intended function is no longer required.

2. Diverting surface water

The contractor shall install, maintain, and operate all cofferdams, channels, flumes, sumps, and all other temporary diversion and protective works needed to divert streamflow and other surface water through or around the construction site. Control of surface water shall be continuous during the period that damage to construction work could occur. Unless otherwise specified and/or approved, the diversion outlet shall be into the same drainageway that the water would have reached before being diverted.

The contractor shall furnish the contracting officer, in writing, a proposed plan for diverting surface water before beginning any construction activities for which a diversion is required, unless waived in section 8 of this specification. Acceptance of this plan or the waiving of the plan requirement will not relieve the contractor of the responsibilities related to this activity during the process of completing the work as specified.

3. Dewatering the construction site

Foundations, cutoff trenches, and all other parts of the construction site shall be dewatered and kept free of standing water and muddy conditions as necessary for the proper execution of the work. The contractor shall furnish, install, operate, and maintain all drains, sumps, pumps, casings, well points, and all other equipment required to properly dewater the site as specified. Dewatering systems that cause a loss of soil fines from the foundation areas will not be permitted.

The contractor shall furnish the contracting officer, in writing, a proposed plan for dewatering before commencing with any construction activity for which dewatering may be required, unless waived in section 8 of this specification. Acceptance of this plan or the waiving of the plan requirement will not relieve the contractor of the responsibilities for completing the specified work.

4. Dewatering borrow areas

The contractor shall maintain all borrow areas free of surface water or otherwise provide for timely and effective removal of surface and subsurface water that accumulates within the borrow area, unless waived in section 8 of this specification. Borrow material shall be processed as necessary to achieve proper and uniform moisture content at the time of placement.

If pumping to dewater borrow areas is included as a bid item of work in the bid schedule, each pump discharge pipe shall be equipped with a water meter. The meter shall be such that the measured quantity of water is accurate within 3 percent of the true quantity. The contractor shall provide necessary support to perform accuracy tests of the water meter when requested by the

contracting officer.

5. Erosion and pollution control

Removal of water from the construction site, including the borrow areas, shall be accomplished so that erosion and the transporting of sediment and other pollutants are minimized. Dewatering activities shall be accomplished in a manner that the water table water quality is not altered. Pollution control activities shall not conflict with the requirements of Construction Specification 5, Pollution Control, if it is a part of this contract.

6. Removal of temporary works

When temporary works are no longer needed, the contractor shall remove and return the area to a condition similar to that which existed before construction. Areas where temporary works were located shall be graded for sightly appearance with no obstruction to natural surface waterflows or the proper functioning and access to the works of improvement installed. The contractor shall exercise extreme care during the removal stages to minimize the loss of soil sediment and debris that was trapped during construction.

Pipes, casings, and any other material used to dewater the site shall be removed from temporary wells. The wells shall be filled to ground level with clean gravel or other suitable material approved by the contracting officer. The contractor shall exercise extreme care to prevent pollution of the ground water by these actions.

7. Measurement and payment

Method 1—Items of work listed in the bid schedule for removal of water, diverting surface water, and dewatering construction sites and borrow areas are paid for at the contract lump sum prices. Such payment will constitute full compensation for all labor, equipment, tools, and all other items necessary and incidental to the completion of the work.

Method 2—Items of work listed in the bid schedule for removal of water, diverting surface water, dewatering construction sites, and dewatering borrow areas are paid for at the contract lump sum prices. Such payment will constitute full compensation for furnishing, installing, operating, and maintaining the necessary trenches, drains, sumps, pumps, and piping and for all labor, equipment, tools, and all other items necessary and incidental to the completion of the work. The exception is that additional payment for pumping to dewater borrow areas and the removal of water will be made as described in the following paragraph.

If pumping to dewater borrow areas is a contract bid item, payment is made at the contract unit price, which shall be the price per 1,000 gallons shown in the bid schedule. Such payment will constitute full compensation for pumping only. Compensation for equipment and preparation and for other costs associated with pumping is included in the lump sum payment for removal of water or the lump sum payment for dewatering the borrow areas. Payment is made only for pumping that is necessary to dewater borrow areas that cannot be effectively drained by gravity or that must have the water table lowered to be usable as a suitable borrow source. Pumping for other purposes will not be included for payment under this item.

All Methods—The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract, but not listed in the bid schedule is included in the payment for the contract line item to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in section 8 of this specification.

8. ITEMS OF WORK AND CONSTRUCTION DETAILS

Items of work to be performed in conformance with this specification and the construction details therefore are:

Bid Item No. 7, Removal of Water

- (1) This item shall consist of all works necessary and incidental to the removal of water in the work area as needed to install the works of improvement. A Geotechnical Report is available and is considered a part of the plans and specifications.
- (2) The dewatering operation shall not create erosive conditions nor cause a condition of polluted water downstream from the work site.
- (3) A written plan for dewatering the work site shall be submitted to the engineer for approval prior to beginning work. Unless otherwise approved in writing by the engineer, at minimum, a well point system adequate to handle the existing water condition shall be installed, operated, and maintained by the contractor until improvements are complete.
- (4) Measurement and payment shall be according to the Santa Rosa County contract.

Construction Specification 21—Excavation

1. Scope

The work shall consist of the excavation required by the drawings and specifications and disposal of the excavated materials.

2. Classification

Excavation is classified as common excavation, rock excavation, or unclassified excavation in accordance with the following definitions.

Common excavation is defined as the excavation of all materials that can be excavated, transported, and unloaded using heavy ripping equipment and wheel tractor-scrapers with pusher tractors or that can be excavated and dumped into place or loaded onto hauling equipment by excavators having a rated capacity of one cubic yard or larger and equipped with attachments (shovel, bucket, backhoe, dragline, or clam shell) appropriate to the material type, character, and nature of the materials.

Rock excavation is defined as the excavation of all hard, compacted, or cemented materials that require blasting or the use of ripping and excavating equipment larger than defined for common excavation. The excavation and removal of isolated boulders or rock fragments larger than 1 cubic yard encountered in materials otherwise conforming to the definition of common excavation shall be classified as rock excavation. The presence of isolated boulders or rock fragments larger than 1 cubic yard is not in itself sufficient cause to change the classification of the surrounding material.

For the purpose of these classifications, the following definitions shall apply:

Heavy ripping equipment is a rear-mounted, heavy duty, single-tooth, ripping attachment mounted on a track type tractor having a power rating of at least 250 flywheel horsepower unless otherwise specified in section 10.

Wheel tractor-scraper is a self-loading (not elevating) and unloading scraper having a struck bowl capacity of at least 12 cubic yards.

Pusher tractor is a track type tractor having a power rating of at least 250 flywheel horsepower equipped with appropriate attachments.

Unclassified excavation is defined as the excavation of all materials encountered, including rock materials, regardless of their nature or the manner in which they are removed.

3. Blasting

The transportation, handling, storage, and use of dynamite and other explosives shall be directed and supervised by a person(s) of proven experience and ability who is authorized and qualified to conduct blasting operations.

Blasting shall be done in a manner as to prevent damage to the work or unnecessary fracturing of the underlying rock materials and shall conform to any special requirements in section 10 of this

specification. When specified in section 10, the contractor shall furnish the engineer, in writing, a blasting plan before blasting operations begin.

4. Use of excavated material

Method 1—To the extent they are needed, all suitable material from the specified excavations shall be used in the construction of required permanent earthfill or rockfill. The suitability of material for specific purposes is determined by the engineer. The contractor shall not waste or otherwise dispose of suitable excavated material.

Method 2—Suitable material from the specified excavations may be used in the construction of required earthfill or rockfill. The suitability of material for specific purposes is determined by the engineer.

5. Disposal of waste materials

Method 1—All surplus or unsuitable excavated materials are designated as waste and shall be disposed of at the locations shown on the drawings.

Method 2—All surplus or unsuitable excavated materials are designated as waste and shall be disposed of by the contractor at sites of his own choosing away from the site of the work. The disposal shall be in an environmentally acceptable manner that does not violate local rules and regulations.

6. Excavation limits

Excavations shall comply with OSHA Construction Industry Standards (29CFR Part 1926) Subpart P, Excavations, Trenching, and Shoring. All excavations shall be completed and maintained in a safe and stable condition throughout the total construction phase. Structure and trench excavations shall be completed to the specified elevations and to the length and width required to safely install, adjust, and remove any forms, bracing, or supports necessary for the installation of the work. Excavations outside the lines and limits shown on the drawings or specified herein required to meet safety requirements shall be the responsibility of the contractor in constructing and maintaining a safe and stable excavation.

7. Borrow excavation

When the quantities of suitable material obtained from specified excavations are insufficient to construct the specified earthfills and earth backfills, additional material shall be obtained from the designated borrow areas. The extent and depth of borrow pits within the limits of the designated borrow areas shall be as specified in section 10 or as approved by the engineer.

Borrow pits shall be excavated and finally dressed to blend with the existing topography and sloped to prevent ponding and to provide drainage.

8. Overexcavation

Excavation in rock beyond the specified lines and grades shall be corrected by filling the resulting voids with portland cement concrete made of materials and mix proportions approved by the engineer. Concrete that will be exposed to the atmosphere when construction is completed shall meet the requirements of concrete selected for use under Construction Specification 31, Concrete for Major Structures, or 32, Structure Concrete, as appropriate.

Concrete that will be permanently covered shall contain not less than five bags of cement per

cubic yard. The concrete shall be placed and cured as specified by the engineer.

Excavation in earth beyond the specified lines and grades shall be corrected by filling the resulting voids with approved, compacted earthfill. The exception to this is that if the earth is to become the subgrade for riprap, rockfill, sand or gravel bedding, or drainfill, the voids may be filled with material conforming to the specifications for the riprap, rockfill, bedding, or drainfill. Before correcting an overexcavation condition, the contractor shall review the planned corrective action with the engineer and obtain approval of the corrective measures.

9. Measurement and payment

For items of work for which specific unit prices are established in the contract, the volume of each type and class of excavation within the specified pay limits is measured and computed to the nearest cubic yard by the method of average cross-sectional end areas or by methods outlined in section 10 of this specification. Regardless of quantities excavated, the measurement for payment is made to the specified pay limits except that excavation outside the specified lines and grades directed by the engineer to remove unsuitable material is included. Excavation required because unsuitable conditions result from the contractor's improper construction operations, as determined by the engineer, is not included for measurement and payment.

Method 1—The pay limits shall be as designated on the drawings.

Method 2—The pay limits shall be defined as follows:

- a. The upper limit shall be the original ground surface as it existed before the start of construction operations except that where excavation is performed within areas designated for previous excavation or earthfill, the upper limit shall be the modified ground surface resulting from the specified previous excavation or earthfill.
- b. The lower and lateral limits shall be the neat lines and grades shown on the drawings.

Method 3—The pay limits shall be defined as follows:

- a. The upper limit shall be the original ground surface as it existed before the start of construction operations except that where excavation is performed within areas designated for previous excavation or earthfill, the upper limit shall be the modified ground surface resulting from the specified previous excavation or earthfill.
- b. The lower and lateral limits shall be the true surface of the completed excavation as directed by the engineer.

Method 4—The pay limits shall be defined as follows:

- a. The upper limit shall be the original ground surface as it existed before the start of construction operations except that where excavation is performed within areas designated for previous excavation or earthfill, the upper limit shall be the modified ground surface resulting from the specified previous excavation or earthfill.
- b. The lower limit shall be at the bottom surface of the proposed structure.
- c. The lateral limits shall be 18 inches outside of the outside surface of the proposed structure or shall be vertical planes 18 inches outside of and parallel to the footings, whichever gives the larger pay quantity, except as provided in d below.
- d. For trapezoidal channel linings or similar structures that are to be supported upon the sides of the excavation without intervening forms, the lateral limits shall be at the underside of

the proposed lining or structure.

- e. For the purposes of the definitions in b, c, and d, above, any specified bedding or drainfill directly beneath or beside the structure will be considered to be a part of the structure.

All methods—The following provisions apply to all methods of measurement and payment.

Payment for each type and class of excavation is made at the contract unit price for that type and class of excavation. Such payment will constitute full compensation for all labor, materials, equipment, and all other items necessary and incidental to the performance of the work except that extra payment for backfilling overexcavation will be made in accordance with the following provisions.

Payment for backfilling overexcavation, as specified in section 8 of this specification, is made only if the excavation outside specified lines and grades is directed by the engineer to remove unsuitable material and if the unsuitable condition is not a result of the contractor's improper construction operations as determined by the engineer.

Compensation for any item of work described in the contract, but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in section 10 of this specification.

10. Items of Work and Construction Details

Items of work to be performed in conformance with this specification and the construction details therefore are:

a. Subsidiary Item, Excavations

- (1) This item shall consist of all common excavation necessary and incidental to the installation of the inlets, pipe, basins, riprap, focal points, urban forest tree boxes, geotextile, trees, and all other items that require excavation for installation to the specified neat lines and grades as shown on the drawings.
- (2) All suitable material resulting from the required excavation shall be stockpiled for later use in topsoiling operations. All excess unsuitable material shall become the property and responsibility of the Contractor to dispose of off-site.
- (3) All excavations shall be performed in a manner so as to minimize siltation and pollution to both air and water.
- (4) No separate payment shall be made for this item. Compensation shall be included in the payment for the respective bid item to which it is incidental.

Construction Specification 23—Earthfill

1. Scope

The work consists of the construction of earth embankments, other earthfills, and earth backfills required by the drawings and specifications.

Earthfill is composed of natural earth materials that can be placed and compacted by construction equipment operated in a conventional manner.

Earth backfill is composed of natural earth material placed and compacted in confined spaces or adjacent to structures (including pipes) by hand tamping, manually directed power tampers or vibrating plates, or their equivalent.

2. Material

All fill material shall be obtained from required excavations and designated borrow areas. The selection, blending, routing, and disposition of material in the various fills shall be subject to approval by the engineer.

Fill materials shall contain no frozen soil, sod, brush, roots, or other perishable material. Rock particles larger than the maximum size specified for each type of fill shall be removed prior to compaction of the fill.

The types of material used in the various fills shall be as listed and described in the specifications and drawings.

3. Foundation preparation

Foundations for earthfill shall be stripped to remove vegetation and other unsuitable material or shall be excavated as specified.

Except as otherwise specified, earth foundation surfaces shall be graded to remove surface irregularities and shall be scarified parallel to the axis of the fill or otherwise acceptably scored and loosened to a minimum depth of 2 inches. The moisture content of the loosened material shall be controlled as specified for the earthfill, and the surface material of the foundation shall be compacted and bonded with the first layer of earthfill as specified for subsequent layers of earthfill.

Earth abutment surfaces shall be free of loose, uncompacted earth in excess of 2 inches in depth normal to the slope and shall be at such a moisture content that the earthfill can be compacted against them to produce a good bond between the fill and the abutments.

Rock foundation and abutment surfaces shall be cleared of all loose material by hand or other effective means and shall be free of standing water when fill is placed upon them. Occasional rock outcrops in earth foundations for earthfill, except in dams and other structures designed to restrain the movement of water, shall not require special treatment if they do not interfere with compaction of the foundation and initial layers of the fill or the bond between the foundation and the fill.

Foundation and abutment surfaces shall be no steeper than one horizontal to one vertical unless otherwise specified. Test pits or other cavities shall be filled with compacted earthfill conforming to the specifications for the earthfill to be placed upon the foundation.

4. Placement

Earthfill shall not be placed until the required excavation and foundation preparation have been completed and the foundation has been inspected and approved by the engineer. Earthfill shall not be placed upon a frozen surface nor shall snow, ice, or frozen material be incorporated in the earthfill matrix.

Earthfill shall be placed in approximately horizontal layers. The thickness of each layer before compaction shall not exceed the maximum thickness specified in section 10 or shown on the drawings. Materials placed by dumping in piles or windrows shall be spread uniformly to not more than the specified thickness before being compacted.

Hand compacted earth backfill shall be placed in layers whose thickness before compaction does not exceed the maximum thickness specified for layers of earth backfill compacted by manually directed power tampers.

Earth backfill shall be placed in a manner that prevents damage to the structures and allows the structures to assume the loads from the earth backfill gradually and uniformly. The height of the earth backfill adjacent to a structure shall be increased at approximately the same rate on all sides of the structure.

Earthfill and earth backfill in dams, levees, and other structures designed to restrain the movement of water shall be placed to meet the following additional requirements:

- (a) The distribution of materials throughout each zone shall be essentially uniform, and the earthfill shall be free from lenses, pockets, streaks, or layers of material differing substantially in texture, moisture content, or gradation from the surrounding material. Zone earthfills shall be constructed concurrently unless otherwise specified.
- (b) If the surface of any layer becomes too hard and smooth for proper bond with the succeeding layer, it shall be scarified parallel to the axis of the fill to a depth of not less than 2 inches before the next layer is placed.
- (c) The top surface of embankments shall be maintained approximately level during construction with two exceptions: A crown or cross-slope of about 2 percent shall be maintained to ensure effective drainage, or as otherwise specified for drainfill or sectional zones.
- (d) Dam embankments shall be constructed in continuous layers from abutment to abutment except where openings to facilitate construction or to allow the passage of streamflow during construction are specifically authorized in the contract.
- (e) Embankments built at different levels as described under (c) or (d) above shall be constructed so that the slope of the bonding surfaces between embankment in place and embankment to be placed is not steeper than 3 feet horizontal to 1 foot vertical. The bonding surface of the embankment in place shall be stripped of all material not meeting the requirements of this specification and shall be scarified, moistened, and recompacted when the new earthfill is placed against it. This ensures a good bond with the new earthfill and obtains the specified moisture content and density at the contact of the in-place and new earthfills.

5. Control of moisture content

During placement and compaction of earthfill and earth backfill, the moisture content of the material being placed shall be maintained within the specified range.

The application of water to the earthfill material shall be accomplished at the borrow areas insofar as practicable. Water may be applied by sprinkling the material after placement on the earthfill, if necessary. Uniform moisture distribution shall be obtained by disking.

Material that is too wet when deposited on the earthfill shall either be removed or be dried to the specified moisture content prior to compaction.

If the top surface of the preceding layer of compacted earthfill or a foundation or abutment surface in the zone of contact with the earthfill becomes too dry to permit suitable bond, it shall either be removed or scarified and moistened by sprinkling to an acceptable moisture content before placement of the next layer of earthfill.

6. Compaction

Earthfill—Earthfill shall be compacted according to the following requirements for the class of compaction specified:

Class A compaction—Each layer of earthfill shall be compacted as necessary to provide the density of the earthfill matrix not less than the minimum density specified in Section 10 or identified on the drawings. The earthfill matrix is defined as the portion of the earthfill material finer than the maximum particle size used in the compaction test method specified.

Class B compaction—Each layer of earthfill shall be compacted to a mass density not less than the minimum density specified.

Class C compaction—Each layer of earthfill shall be compacted by the specified number of passes of the type and weight of roller or other equipment specified or by an approved equivalent method. Each pass shall consist of at least one passage of the roller wheel or drum over the entire surface of the layer.

Earth backfill—Earth backfill adjacent to structures shall be compacted to a density equivalent to that of the surrounding in-place earth material or adjacent required earthfill or earth backfill. Compaction shall be accomplished by hand tamping or manually directed power tampers, plate vibrators, walk-behind, miniature, or self-propelled rollers. Unless otherwise specified heavy equipment including backhoe mounted power tampers or vibrating compactors and manually directed vibrating rollers shall not be operated within 2 feet of any structure. Towed or self-propelled vibrating rollers shall not be operated within 5 feet of any structure. Compaction by means of drop weights operating from a crane or hoist is not permitted.

The passage of heavy equipment will not be allowed:

- Over cast-in-place conduits within 14-days after placement of the concrete
- Over cradled or bedded precast conduits within 7 days after placement of the concrete cradle or bedding
- Over any type of conduit until the backfill has been placed above the top surface of the structure to a height equal to one-half the clear span width of the structure or pipe or 2 feet, whichever is greater, except as may be specified in section 10.

Compacting of earth backfill adjacent to structures shall not be started until the concrete has attained the strength specified in section 10 for this purpose. The strength is determined by compression testing of test cylinders cast by the contractor's quality control personnel for this purpose and cured at the work site in the manner specified in ASTM C 31 for determining when a structure may be put into service.

When the required strength of the concrete is not specified as described above, compaction of earth backfill adjacent to structures shall not be started until the following time intervals have elapsed after placement of the concrete.

Structure	Time interval (days)
Vertical or near-vertical walls with earth loading on one side only	14
Walls backfilled on both sides simultaneously	7
Conduits and spillway risers, cast-in-place (with inside forms in place)	7
Conduits and spillway risers, cast-in-place (inside forms removed)	14
Conduits, pre-cast, cradled	2
Conduits, pre-cast, bedded	1
Cantilever outlet bents (backfilled both sides simultaneously)	3

7. Reworking or removal and replacement of defective earthfill

Earthfill placed at densities lower than the specified minimum density or at moisture contents outside the specified acceptable range of moisture content or otherwise not conforming to the requirements of the specifications shall be reworked to meet the requirements or removed and replaced by acceptable earthfill. The replacement earthfill and the foundation, abutment, and earthfill surfaces upon which it is placed shall conform to all requirements of this specification for foundation preparation, approval, placement, moisture control, and compaction.

8. Testing

During the course of the work, the engineer will perform quality assurance tests required to identify material; determine compaction characteristics; determine moisture content; and determine density of earthfill in place. Tests performed by the engineer will be used to verify that the earthfills conform to contract requirements of the specifications and not as a replacement for the contractor's quality control program.

Densities of earthfill requiring Class A compaction will be determined in accordance with ASTM D 1556, D 2167, D 2922, or D 2937 except that the volume and moist weight of included rock particles larger than those used in the compaction test method specified for the type of fill will be determined and deducted from the volume and moist weight of the total sample before computation of density or, if using the nuclear gauge, added to the specified density to bring it to the measure of equivalent composition for comparison (See ASTM D 4718). The density so computed is used to determine the percent compaction of the earthfill matrix. Unless otherwise specified, moisture content is determined by one of the following methods: ASTM D 2216, D 3017, D 4643, D 4944, or D 4959.

9. Measurement and payment

For items of work for which specific unit prices are established in the contract, the volume of each type and compaction class of earthfill and earth backfill within the specified zone boundaries and pay limits is measured and computed to the nearest cubic yard by the method of average cross-sectional end areas. Unless otherwise specified in section 10, no deduction in volume is made for embedded items, such as, but not limited to, conduits, inlet structures, outlet structures, embankment drains, sand diaphragm and outlet, and their appurtenances.

The pay limits shall be as defined below, with the further provision that earthfill required to fill voids resulting from overexcavation of the foundation, outside the specified lines and grades, will be included in the measurement for payment only under the following conditions:

- Where such overexcavation is directed by the engineer to remove unsuitable material, and
- Where the unsuitable condition is not a result of the contractor's improper construction operations as determined by the engineer.

Earthfill beyond the specified lines and grades to backfill excavation required for compliance with OSHA requirements will be considered subsidiary to the earthfill bid item(s).

Method 1—The pay limits shall be as designated on the drawings.

Method 2—The pay limits shall be the measured surface of the foundation when approved for placement of the earthfill and the specified neat lines of the earthfill surface.

Method 3—The pay limits shall be the measured surface of the foundation when approved for placement of the earthfill and the measured surface of the completed earthfill.

Method 4—The pay limits shall be the specified pay limits for excavation and the specified neat lines of the earthfill surface.

Method 5—The pay limits shall be the specified pay limits for excavation and the measured surface of the completed earthfill.

Method 6—Payment for each type and compaction class of earthfill and earth backfill is made at the contract unit price for that type and compaction class of earthfill. Such payment will constitute full compensation for all labor, material, equipment, and all other items necessary and incidental to the performance of the work.

Method 7—Payment for each type and compaction class of earthfill and earth backfill is made at the contract unit price for that type and compaction class of earthfill. Such payment will constitute full compensation for all labor, material, equipment, and all other items necessary and incidental to the performance of the work except furnishing, transporting, and applying water to the foundation and earthfill material. Water applied to the foundation and earthfill material is measured and payment made as specified in Construction Specification 10.

All methods—The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract, but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in section 10 of this specification.

10. Items of Work and Construction Details

Items of work to be performed in conformance with this specification and the construction details therefore are:

A. Subsidiary Item, Earthfill

- (1) This item shall consist of the purchase, loading, hauling, placement and compaction of all earthfill required for the installation of inlets, pipe, basins, riprap, geotextile, trees to the specified neat lines and grades as shown on the drawings.
- (2) The source of borrow shall be from on-site excavations.
- (3) Compaction shall be Class C. The material shall be free from sod, brush, roots, or other perishable materials, large rocks and hard lumps or clods larger than 6 inches in size. The moisture content of fill material shall be maintained within the limits necessary to permit efficient blending, bonding, and compaction of the materials. The fill materials shall be deposited evenly in layers not exceeding 9-inches in depth before compaction except adjacent to structures where the layer thickness shall not exceed 6-inches. Each layer shall be thoroughly compacted by at least one pass over the entire surface by standard earth moving equipment in order to provide a uniformly dense fill. Adjacent to structures, each layer shall be thoroughly compacted by manually directed power tampers or plate vibrators. Care should be taken to avoid striking the sides of pipes. Unless otherwise specified on the drawings, all earthfill shall be compacted to 90% of the modified proctor as specified in ASTM D- 1557
- (4) All earthfill shall be placed in a manner so as to minimize air and water pollution.
- (5) No separate payment shall be made for this item. Compensation shall be included in the payment for the respective bid item to which it is incidental.

B. Bid Items No. 8 thru 17, Earthfill, Class C

- (1) This item shall consist of the purchase, loading, hauling, and proper placement of all materials required for the Focal Point and Urban Forest Tree Box systems to the specified neat lines and grades as shown on the drawings.
- (2) All materials shall be as specified on the drawings. Approved alternate products will be allowed if the alternate is proven to be equivalent. The burden of proof is the contractor's responsibility.
- (3) Compaction shall be according to the manufacturer recommendations.
- (4) All earthfill shall be placed in a manner so as to minimize air and water pollution.
- (5) Measurement and Payment shall be according to the Santa Rosa County Contract.

Construction Specification 24—Drainfill

1. Scope

The work consists of furnishing, placing, and compacting drainfill required in the construction of structure drainage systems.

2. Material

Method 1—Drainfill material shall conform to the requirements of Material Specification 521, Aggregates for Drainfill and Filters. A minimum of 30 days before delivery of materials to the site, the contractor shall inform the engineer in writing of the source(s) from which drainfill material will be obtained. The contractor shall provide the engineer free access to the source(s) for the purpose of obtaining samples for testing.

Method 2—Drainfill material shall be sand, gravel, or crushed stone, or mixtures thereof, obtained from the specified sources. The material shall be selected as necessary to avoid the inclusion of organic matter, clay balls, excessive fine particles, or other substances that would interfere with their free-draining properties.

3. Base preparation

Foundation surface and trenches shall be clean and free of organic matter, loose soil, foreign substance, and standing water when the drainfill is placed. Earth surfaces upon or against which drainfill will be placed shall not be scarified.

4. Placement

Drainfill shall not be placed until the subgrade has been inspected and approved by the engineer. Drainfill shall not be placed over or around pipe or drain tile until the installation of the pipe or tile has been inspected and approved.

Drainfill shall be placed uniformly in layers not to exceed 12 inches thick before compaction. When compaction is accomplished by manually controlled equipment, the layers shall not exceed 8 inches thick. The material shall be placed to avoid segregation of particle sizes and to ensure the continuity and integrity of all zones. No foreign material shall be allowed to become intermixed with or otherwise contaminate the drainfill.

Traffic shall not be permitted to cross over drains at random. Equipment cross-overs shall be maintained, and the number and location of such crossovers shall be established and approved before the beginning of drainfill placement. Each crossover shall be cleaned of all contaminating material and shall be inspected and approved by the engineer before the placement of additional drainfill material.

Any damage to the foundation surface or the trench sides or bottom occurring during placement of drainfill shall be repaired before drainfill placement is continued.

The upper surface of drainfill constructed concurrently with adjacent zones of earthfill shall be maintained at a minimum elevation of 1 foot above the upper surface of adjacent earthfill.

Drainfill over and/or around pipe or drain tile shall be placed to avoid any displacement in line or

grade of the pipe or tile.

Drainfill shall not be placed adjacent to structures until the concrete has attained the strength specified in section 9 of this specification. The strength shall be determined by compression testing of concrete test cylinders cast and field cured at the project site in accordance with ASTM Method C 31 for determining when a structure may be placed into service.

When the required strength of the concrete is not specified as described above, placement of drainfill adjacent to concrete structures shall not be commenced until the following item intervals have elapsed following placement of the concrete:

Structure type	Time interval (days)
Vertical or near-vertical wall with earth loading on one side only (retaining walls and counterforts)	14
Walls backfilled on both sides simultaneously	7
Conduits and galleries, cast-in-place (with inside forms in place)	7
(inside forms removed)	14
Conduits, precast, cradled	2
Conduits, precast, bedded	1
Cantilever outlet bents backfilled on both sides simultaneously	3

5. Control of moisture

The moisture content of drainfill material shall be controlled as specified in section 9 of this specification. When additional water is required, it shall be applied in a manner to avoid excessive wetting to adjacent earthfill. Except as specified in section 9 of this specification, control of moisture content will not be required.

6. Compaction

Drainfill shall be compacted according to the following requirements for the class of compaction specified:

Class A compaction—For drainfill materials with more than 70 percent passing the 3/4 inch sieve, each layer of drainfill shall be compacted to a minimum dry density of not less than the density specified in section 9 of this specification as determined by ASTM D 698. For drainfill materials with 70 percent or less passing the 3/4 inch sieve, each layer of drainfill shall be compacted to a relative density of not less than 70 percent as determined by ASTM D 4254.

Class I compaction—Each layer of drainfill shall be compacted by a minimum of two passes over the entire surface with a steel-drum vibrating roller weighing at least 5 tons and exerting a vertical vibrating force of not less than 20,000 pounds at a minimum frequency of 1,200 times per minute, or by an approved equivalent method.

Class II compaction—Each layer of drainfill shall be compacted by one of the following methods or by an approved equivalent method. (A pass is defined as at least one complete coverage of the roller wheel, tire, or drum over the entire surface for each layer.)

- a. A minimum of two passes over the entire surface with a pneumatic-tired roller exerting a minimum pressure of 75 pounds per square inch.
- b. A minimum of four passes over the entire surface with the track of a crawler-type tractor weighing at least 20 tons.
- c. Controlled movement of the hauling equipment so that the entire surface is traversed by not less than one tread track of the loaded hauling equipment.

Class III compaction—No compaction will be required beyond that resulting from the placing and spreading operations.

When compaction other than Class III compaction is specified, material placed in trenches or other locations inaccessible to heavy equipment shall be compacted by manually controlled pneumatic or vibrating tampers as specified in section 9 of this specification.

Heavy equipment shall not be operated within 2 feet of any structure. Vibrating rollers shall not be operated within 5 feet of any structure. Compaction by means of drop weights operating from cranes, hoists, or similar equipment will not be permitted.

7. Testing

The contractor shall conduct such tests as necessary to verify that the drainfill material and the inplace drainfill meets the specification requirements.

The engineer shall be granted access to perform such tests as are required to verify that the drainfill materials and the drainfill in place meets the requirements of the specifications. These tests are not intended to provide the contractor with information needed to assure that the materials and workmanship meet the specification requirements. These verification tests will not relieve the contractor of the responsibility of performing required tests for that purpose.

8. Measurement and payment

Method 1—For items of work for which specific unit prices are established in the contract, the volume of drainfill within the neat lines shown on the drawings are measured and computed to the nearest cubic yard. Where the engineer directs placement of drainfill outside the neat lines to replace unsuitable foundation material, the volume of such drainfill is included. The volume included is only to the extent that the unsuitable condition is not a result of the contractor's improper construction operation in the determination of the engineer.

Payment for drainfill is made at the contract unit price for each type of drainfill, complete in place. Except as otherwise specified in section 9 of this specification, such payment will constitute full compensation for all labor, equipment, material, and all other items necessary and incidental to the performance of the work.

Method 2—For items of work for which specific unit prices are established in the contract, the quantity of drainfill placed within the specified limits is computed to the nearest 0.1 ton by actual weight. Where the engineer directs placement of drainfill outside the neat lines to replace unsuitable foundation material, the weight of such drainfill is included. The weight included is only to the extent that the unsuitable condition is not a result of the contractor's improper construction operation in the determination of the engineer.

Payment for drainfill is made at the contract unit price for each type of drainfill, complete in

place. Except as otherwise specified in section 9 of this specification, such payment will constitute full compensation for all labor, equipment, material, and all other items necessary and incidental to the performance of the work.

Compensation for any item of work described in the contract, but not included in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in section 9 of this specification.

9. Items of Work and Construction Details

Items of work to be performed in conformance with this specification and the construction details therefore are:

Subsidiary Item, Drainfill

- (1) This item shall consist of furnishing and placing the coarse aggregate drainfill (Bridging Stone) as shown and specified on the drawings to the neat lines and grades as shown on the drawings.
- (2) The drainfill (Bridging Stone) shall be 3/8" pea gravel. Crushed stone is not acceptable.
- (3) Compaction shall be Class III.
- (4) No separate payment shall be made for this item. Compensation shall be included in the payment for the respective bid item to which it is incidental.

Construction Specification 26—Topsoiling

1. Scope

The work consists of furnishing and spreading topsoil to specified depths at locations shown on the drawings.

2. Quality of topsoil

Topsoil shall consist of friable surface soil reasonably free of grass, roots, weeds, sticks, rocks, or other unsuitable material. Additional quality requirements, if any, are in section 7 of this specification.

3. Furnishing

Method 1—Topsoil shall be salvaged from designated earth surfaces that will be disturbed by construction activities. After designated sites have been cleared and grubbed, the topsoil shall be removed from the designated areas and stockpiled at locations shown on the drawings or acceptable to the engineer. Unsuitable material encountered during removal of topsoil shall be disposed of at locations shown on the drawings or approved by the engineer, or it will be otherwise hauled and disposed of at locations removed from the construction site. The contractor is responsible for complying with all local rules and regulations and the payment of any and all fees that may result from the disposal at locations outside the construction work limits.

Method 2—Topsoil shall be furnished from an offsite source designated by the contractor. The engineer shall be granted access to the source for inspection and acceptance before delivery to the site. Test results and samples shall be provided when specified in section 7 of this specification.

4. Stockpiling

Stockpiles of topsoil shall not conflict with the requirements of Construction Specification 5, Pollution Control, when made a part of this contract.

5. Spreading

Method 1—Spreading shall not be conducted when the ground or topsoil is frozen, excessively wet, or otherwise in a condition detrimental to uniform spreading operations. Surfaces designated to receive a topsoil application shall be lightly scarified just before the spreading operation.

Following the spreading operation, the topsoil surface shall be left reasonably smooth and without ruts or surface irregularities that could contribute to concentrated waterflow downslope.

Method 2—Spreading shall not be performed when the ground or topsoil is frozen, excessively wet, or otherwise in a condition detrimental to uniform spreading operations. Surfaces designated to receive a topsoil application shall be lightly scarified just before the spreading operation. Where compacted earthfills are designated to be topsoiled, the topsoil shall be placed concurrently with the earthfill and shall be bonded to the compacted fill with the compacting equipment.

Following the spreading operation, the topsoil surface shall be left reasonably smooth and without ruts or surface irregularities that could contribute to concentrated waterflow downslope.

6. Measurement and payment

Method 1—The total surface covered by topsoil is measured and the area(s) computed to the nearest square yard. Payment for furnishing and placing topsoil is made at the contract unit price.

Method 2—The total surface covered by topsoil, except the surface area of embankments, levees, dikes, and other earthfills not included for payment, is measured and the area(s) computed to the nearest square yard.

Payment for topsoil spread on the surface of embankments, levees, dikes, and other earthfills is included in the measurement and payment for that item of earthfill where topsoil application occurred.

Method 3—For items of work for which specific unit prices are established in the contract, the volume of topsoil furnished and spread is computed to the nearest cubic yard by the method of average cross-sectional end areas from surveys of the excavated topsoil stockpile or, if not stockpiled, cross-sectional surveys of the borrow area(s). Payment for furnishing and spreading topsoil is made at the contract unit price.

All methods—The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract, but not listed in the bid schedule is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in section 7 of this specification.

All payment methods—Payment will constitute full compensation for all labor, equipment, material, and all other items necessary and incidental to the completion of the work. This includes excavating, stockpiling, hauling, spreading, and the wasting of unsuitable excavated material.

7. Items of work and construction details

Items of work to be performed in conformance with this specification and the construction details therefore are:

Bid Item No. 18, Topsoiling

- (1) This item shall consist of the purchase, loading, hauling, and proper placement of 4" minimum thickness topsoil in all disturbed areas where vegetation is proposed.
- (2) Existing topsoil may be used if properly excavated and stockpiled during excavation operations. The extent of existing topsoil to be used can vary by the chosen means and methods of the selected contractor. Additional topsoil material may be needed.
- (3) All topsoil shall be placed in a manner so as to minimize air and water pollution.
- (4) Measurement and Payment shall be according to the Santa Rosa County Contract.

Construction Specification 32—Structure Concrete

1. Scope

The work shall consist of furnishing, forming, placing, finishing, and curing portland cement concrete as required to build the structures described in section 24 of this specification.

2. Material

Aggregates shall conform to the requirements of Material Specification 522, Aggregates for Portland Cement Concrete, unless otherwise specified. The grading of coarse aggregates shall be as specified in section 24.

Portland cement shall conform to the requirements of Material Specification 531, Portland Cement, for the specified type.

Fly ash shall conform to the requirements of Material Specification 532, Mineral Admixtures for Concrete.

Air-entraining admixtures shall conform to the requirements of Material Specification 533, Chemical Admixtures for Concrete. If air-entraining cement is used, any additional air-entraining admixture shall be of the same type as that in the cement.

Water reducing and/or retarding admixtures shall conform to the requirements of Material Specification 533, Chemical Admixtures for Concrete.

Curing compound shall conform to the requirements of Material Specification 534, Concrete Curing Compound.

Preformed expansion joint filler shall conform to the requirements of Material Specification 535, Preformed Expansion Joint Filler.

Waterstops shall conform to the requirements of Material Specifications 537, Nonmetallic Waterstops, and 538, Metal Waterstops, for the specified kinds.

Water used in mixing and curing concrete shall be clean and free from injurious amounts of oil, salt, acid, alkali, organic matter, or other deleterious substances.

3. Class of concrete

Concrete for structure concrete shall be classified as follows:

Class of concrete	Maximum net water content (gal/bag)	Minimum cement content (bags/yd ³)
3000M	6	5.5
4000M	6	6

4. Air content and consistency

Unless otherwise specified, the slump shall be 3 to 5 inches. If air entrainment is specified, the air content, by volume, shall be 4 to 7 percent of the volume of the concrete. When specified, directed, or approved by the engineer, a water-reducing, set-retarding, or other admixture shall be used. High range, water reducing agents (superplasticizers) may be used to increase workability, reduce water content, and control concrete temperature in hot weather. The maximum slump after adding high range water reducing agents shall be 7.5 inches.

5. Design of the concrete mix

The proportions of the aggregates shall be such as to produce a concrete mixture that works readily into the corners and angles of the forms and around reinforcement when consolidated, but does not segregate or exude free water during consolidation.

Fly ash may be used as a partial substitution for portland cement in an amount of no more than 25 percent (by weight) of the cement in the concrete mix, unless otherwise specified.

Before the concrete is placed, the contractor shall furnish the contracting officer, for approval, a statement of the materials and mix proportions (including admixtures, if any) intended for use. The statement shall include evidence satisfactory to the contracting officer that the materials and proportions will produce concrete conforming to this specification. The materials and proportions so stated shall constitute the "job mix." After a job mix has been approved, neither the source, character, or grading of the aggregates nor the type or brand of cement or admixture shall be changed without prior notice to the contracting officer. If such changes are necessary, no concrete containing such new or altered material shall be placed until the contracting officer has approved a revised job mix.

6. Inspection and testing

The engineer shall have free entry to the plant and equipment furnishing concrete under the contract. Proper facilities shall be provided for the engineer to inspect materials, equipment, and processes and to obtain samples of the concrete. All tests and inspections will be conducted so as not to interfere unnecessarily with manufacture and delivery of the concrete.

7. Handling and measurement of material

Materials shall be stockpiled and batched by methods that prevent segregation or contamination of aggregates and ensure accurate proportioning of the ingredients of the mix. Except as otherwise provided in section 8, cement and aggregates shall be measured as follows:

Cement shall be measured by weight or in bags of 94 pounds each. When cement is measured in bags, no fraction of a bag shall be used unless weighed.

Aggregates shall be measured by weight. Mix proportions shall be based on saturated, surface-dry weight. The batch weight of each aggregate shall be the required saturated, surface-dry weight plus the weight of surface moisture it contains.

Water shall be measured, by volume or by weight, to an accuracy within 1 percent of the total quantity of water required for the batch.

Admixtures shall be measured within a limit of accuracy of 3 percent.

8. Mixers and mixing

Concrete shall be uniform and thoroughly mixed when delivered to the work site. Variations in slump of more than 1 inch within a batch are considered evidence of inadequate mixing and shall be corrected by increasing mixing time or other acceptable alternative.

For stationary mixers, the mixing time after all cement and aggregates are in the mixer drum shall be not less than 1.5 minutes. When concrete is mixed in a truck mixer, the number of revolutions of the drum or blades at mixing speed shall be not less than 70 nor more than 100.

Unless otherwise specified, volumetric batching and continuous mixing at the construction site are permitted. To produce concrete meeting the specified proportioning and uniformity requirements, the batching and mixing equipment shall conform to the requirements of ASTM Specification C 685 and shall be demonstrated by tests with the job mix before the concrete is placed. Concrete made by this method shall be produced, inspected, and certified in conformance with sections 6, 7, 8, 13, and 14 of ASTM Specification C 685.

No mixing water in excess of the amount called for by the job mix shall be added to the concrete during mixing or hauling or after arrival at the delivery point.

9. Forms

Forms shall be of wood, plywood, steel, or other approved material and shall be mortar tight. The forms and associated falsework shall be substantial and unyielding and shall be constructed so that the finished concrete will conform to the specified dimensions and contours. Form surfaces shall be smooth and free from holes, dents, sags, or other irregularities. Forms shall be coated with a nonstaining form release agent before being set into place.

Metal ties or anchorages within the forms shall be equipped with cones, she-bolts or other devices that permit their removal to a depth of at least 1 inch without injury to the concrete. Ties designed to break off below the surface of the concrete shall not be used without cones.

All edges that will be exposed to view when the structure is completed shall be chamfered, unless finished with molding tools as specified in Section 18.

10. Preparation of forms and subgrade

Prior to placement of concrete, the forms and subgrade shall be free of chips, sawdust, debris, water, ice, snow, extraneous oil, mortar, or other harmful substances or coatings and the temperature of all surfaces to be in contact with the new concrete shall be not be less than 40 degrees Fahrenheit. Any oil on the reinforcing steel or other surfaces required to be bonded to the concrete shall be removed. Rock surfaces shall be cleaned by air-water cutting, wet sandblasting, or wire brush scrubbing, as necessary, and shall be wetted immediately before placement of concrete. The earth surface shall be firm and damp. Placement of concrete on mud, dried earth, or uncompacted fill or frozen subgrade is not permitted.

Items to be embedded in the concrete shall be positioned accurately and anchored firmly.

Weepholes in walls or slabs shall be formed with nonferrous material.

11. Conveying

Concrete shall be delivered to the site and discharged into the forms within 1-1/2 hours after the introduction of the cement to the aggregates. In hot weather or under conditions contributing to

quick stiffening of the concrete, the time between the introduction of the cement to the aggregates and discharge shall not exceed 45 minutes.

The engineer may allow a longer time, provided the setting time of the concrete is increased a corresponding amount by the addition of an approved set-retarding admixture. In any case, concrete shall be conveyed from the mixer to the forms as rapidly as practicable by methods that prevent segregation of the aggregates and assure no loss of mortar occurs.

12. Placing

Concrete shall not be placed until the subgrade, forms, steel reinforcement, and embedded items have been inspected and approved. No concrete shall be placed except in the presence of the engineer. The contractor shall give reasonable notice to the engineer each time concrete is to be placed. Such notice shall provide sufficient time for the engineer to inspect the subgrade, forms, steel reinforcement, and other preparations for compliance with the specifications. Other preparations include, but are not limited to, the concrete mixing plant; delivery equipment system; placing, finishing, and curing equipment and system; schedule of work; workforce; and heating or cooling facilities, if applicable. Deficiencies are to be corrected before concrete is delivered for placing.

The concrete shall be deposited as closely as possible to its final position in the forms. It shall be worked into the corners and angles of the forms and around all reinforcement and embedded items in a manner to prevent segregation of aggregates or excessive laitance. Formed concrete shall be placed in horizontal layers not more than 20 inches thick. Concrete shall not be dropped more than 5 feet vertically unless suitable equipment is used to prevent segregation. When high range water reducing agents are used, the concrete shall not be allowed to drop more than 10 feet. Hoppers and chutes, pipes, or "elephant trunks" shall be used as necessary to prevent segregation and the splashing of mortar on the forms and reinforcing steel above the layer being placed.

Immediately after the concrete is placed in the forms, it shall be consolidated by spading, hand tamping, or vibration as necessary to ensure a smooth surface and dense concrete. Each layer shall be consolidated to ensure monolithic bond with the preceding layer. If the surface of a layer of concrete in place sets to the degree that it will not flow and merge with the succeeding layer when spaded or vibrated, the contractor shall discontinue placing concrete and shall make a construction joint according to the procedure specified in section 13.

If placing is discontinued when an incomplete horizontal layer is in place, the unfinished end of the layer shall be formed by a vertical bulkhead.

13. Construction joints

Construction joints shall be made at the locations shown on the drawings. If construction joints are needed that are not shown on the drawings, they shall be placed in locations approved by the engineer.

Where a feather edge would be produced at a construction joint, as in the top surface of a sloping wall, an insert form shall be used so that the resulting edge thickness on either side of the joint is not less than 6 inches.

In walls and columns, as each lift is completed, the top surface shall be immediately and carefully protected from any condition that might adversely affect the hardening of the concrete.

Steel tying and form construction adjacent to concrete in place shall not be started until the concrete has cured at least 12 hours. Before new concrete is deposited on or against concrete that has hardened, the forms shall be retightened. New concrete shall not be placed until the hardened concrete has cured at least 12 hours.

The surface of construction joints shall be cleaned of all unsatisfactory concrete, laitance, coatings, or debris by washing and scrubbing with a wire brush or wire broom or by other means approved by the engineer. The surface shall be kept moist for at least 1 hour before the new concrete is placed.

14. Expansion and contraction joints

Expansion and contraction joints shall be made only at locations shown on the drawings.

Exposed concrete edges at expansion and contraction joints shall be carefully tooled or chamfered, and the joints shall be free of mortar and concrete. Joint filler shall be left exposed for its full length with clean and true edges.

Preformed expansion joint filler shall be held firmly in the correct position as the concrete is placed.

When open joints are specified, they shall be constructed by the insertion and subsequent removal of a wooden strip, metal plate, or other suitable template in such a manner that the corners of the concrete are not chipped or broken. The edges of open joints shall be finished with an edging tool before the joint strips are removed.

15. Waterstops

Waterstops shall be held firmly in the correct position as the concrete is placed. Joints in metal waterstops shall be soldered, brazed, or welded. Joints in rubber or plastic waterstops shall be cemented, welded, or vulcanized as recommended by the manufacturer.

16. Removal of forms

Forms shall not be removed without the approval of the engineer. Forms shall be removed in such a way as to prevent damage to the concrete. Supports shall be removed in a manner that permits the concrete to take the stresses of its own weight uniformly and gradually.

17. Finishing formed surfaces

Immediately after the forms are removed:

- a. All fins and irregular projections shall be removed from exposed surfaces.
- b. The holes produced on all surfaces by the removal of form ties, cone-bolts, and she-bolts shall be cleaned, wetted, and filled with a dry-pack mortar. The mortar will consist of one part portland cement, three parts sand that will pass a No. 16 sieve, and just sufficient water to produce a consistency such that the filling is at the point of becoming rubbery when the material is solidly packed.

18. Finishing unformed surfaces

All exposed surfaces of the concrete shall be accurately screeded to grade and then float finished, unless specified otherwise.

Excessive floating or troweling of surfaces while the concrete is soft is not permitted.

Adding dry cement or water to the surface of the screeded concrete to expedite finishing is not allowed.

Joints and edges on unformed surfaces that will be exposed to view shall be chamfered or finished with molding tools.

19. Curing

Concrete shall be prevented from drying for a curing period of at least 7 days after it is placed. Exposed surfaces shall be kept continuously moist for the entire period, or until curing compound is applied as specified below. Moisture shall be maintained by sprinkling, flooding, or fog spraying, or by covering with continuously moistened canvas, cloth mats, straw, sand, or other approved material. Wood forms left in place during the curing period shall be kept continuously wet. A formed surface shall be thoroughly wetted immediately after forms are removed and shall be kept wet until patching and repairs are completed. Water or covering shall be applied in such a way that the concrete surface is not eroded or otherwise damaged.

Concrete, except at construction joints, may be coated with the approved curing compound instead of continued application of moisture, except as otherwise specified in section 24. The compound shall be sprayed on the moist concrete surface as soon as free water has disappeared, but shall not be applied to any surface until patching, repairs, and finishing of that surface are completed. The compound shall be applied at a uniform rate of not less than 1 gallon per 175 square feet of surface and shall form a continuous adherent membrane over the entire surface. Curing compound shall be thoroughly mixed before applying and continuously agitated during application. Curing compound shall not be applied to a surface requiring bond to subsequently placed concrete, such as construction joints, shear plates, reinforcing steel, and other embedded items. If the membrane is damaged during the curing period, the damaged area shall be resprayed at the rate of application specified above. Any surface covered by the membrane shall not be trafficked unless protected from wear.

20. Removal and replacement or repair

When concrete is honeycombed, damaged, or otherwise defective, the contractor shall remove and replace the structure or structural member containing the defective concrete or, where feasible, correct or repair the defective parts. The contracting officer determines the required extent of removal, replacement, or repair. Before starting repair work, the contractor shall obtain the contracting officer's approval of the plan for repairs. The contractor shall perform all repair work in the presence of the engineer.

21. Concreting in cold weather

Concrete shall not be mixed nor placed when the daily minimum atmospheric temperature is less than 40 degrees Fahrenheit unless facilities are provided to prevent the concrete from freezing. The use of accelerators or antifreeze compounds is not allowed.

22. Concreting in hot weather

The contractor shall apply effective means to maintain the temperature of the concrete below 90 degrees Fahrenheit during mixing, conveying, and placing.

23. Measurement and payment

For items of work for which specific unit prices are established in the contract, concrete is measured to the neat lines shown on the drawings and the volume of concrete is computed to the nearest 0.1 cubic yard. Measurement of concrete placed against the sides of an excavation without using intervening forms is made only to the neatness or pay limits shown on the drawings. No deduction in volume is made for chamfers, rounded or beveled edges, or for any void or embedded item that is less than 5 cubic feet in volume.

Payment for each item of structure concrete is made at the contract unit price or the contract lump sum; whichever is applicable for that item. Such payment constitutes full compensation for all labor, material, equipment, transportation, tools, forms, falsework, bracing, and all other items necessary and incidental to the completion of the work except items listed for payment elsewhere in the contract. Compensation for any item of work described in the contract, but not listed in the bid schedule, is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in section 24 of this specification.

24. Items of Work and Construction Details

Items of work to be performed in conformance with this specification and the construction details therefore are:

A. Bid Item No. 19, Concrete Inlet, FDOT Type C

- (1) This item shall consist of furnishing and installing the concrete inlet(s) and accessories to the neat lines and grades as shown on the drawings.
- (2) Cement shall be Type II conforming to the Material Specification 531.
- (3) The inlet(s) shall be formed and poured in place according to the FDOT standard drawings and specifications.
- (4) Fine aggregate shall conform to the gradation limits as specified in ASTM C 33.
- (5) Coarse aggregate shall conform to the gradation limits of size number 57 or 67 as specified in ASTM C 33.
- (6) The concrete shall be Class 4000M Concrete (4,000 psi @ 28 days).
- (7) Reinforcement shall be steel reinforcement.
- (8) Concrete slump shall be no greater than 4 inches.
- (9) Measurement and Payment shall be according to the Santa Rosa County Contract.

B. Bid Items No. 20 and 21, Concrete Curb, Class 4000M

- (1) This item shall include furnishing all materials and installing the concrete curb(s) to the neat lines and grades as shown on the drawings.
- (2) Cement shall be Type II conforming to Material Specification 531.
- (3) The concrete shall be Class 4000M Concrete (4,000 psi @ 28 days).
- (4) The coarse aggregates shall conform to the gradation limits of ASTM C-33, size number 57 or 67 (also FDOT size number 57 or 67).
- (5) The fine aggregates shall conform to the gradation limits as specified in ASTM C-33.
- (6) Concrete slump shall be no greater than 4 inches.
- (7) Reinforcement shall be fiber as in (8) below and reinforcing steel as shown on the drawings.
- (8) Fibrillated polypropylene fiber shall be mixed at a ratio of 1 percent fiber by volume per cubic yard of concrete.
- (9) Measurement and Payment shall be according to the Santa Rosa County Contract.

Construction Specification 32-A—Asphalt

1. Scope

The work shall consist of furnishing, placing, and finishing the Type S-1 Asphalt shoulder and curbing and the base material as required to build the structures described in the “Items of Work...” section of this specification.

2. Asphalt Shoulder and Curbing Construction

All asphalt shoulders and curbing shall be constructed in accordance with the appropriate details on the construction drawings and with the Standard Specifications of the Florida Department of Transportation (Standard Specifications) as applicable.

2.1 Subgrade

Subgrade stabilization shall be done in accordance with applicable portions of the Standard Specifications. Unsuitable material such as roots, stumps, muck, etc., will be removed to at least a depth of 2 feet below the subgrade. The subgrade and shoulders shall be stabilized to a depth of 12 inches and a width of 3 feet beyond the curb. The stabilized area shall be free of muck, roots, stumps, and other objectionable material. The subgrade and shoulders shall be stabilized to obtain a minimum limerock bearing ratio of 40 and compacted to a minimum of 96% and an average of 98% of maximum density as determined by Modified Proctor ASTM D 1557. Compaction tests shall be done for every 500 linear feet of shoulder being constructed.

2.2 Excavation and Embankment

Excavation and embankment shall be done in accordance with appropriate sections of the Standard Specification to lines and grades indicated on the construction plans.

2.3 Curbing

The entire shoulder length along both sides of the roadway shall be constructed with asphalt curbs as indicated on the plans. The curb shall be of the header type, 6” wide and 6” high as indicated on the plans. The curb shall be machine placed with a mold to match the detail on the plans.

2.4 Base

Base shall be 6” thick Limerock as indicated on the plans. The material shall conform to the appropriate section of the Standard Specifications and shall be primed and constructed according to the appropriate section of the Standard Specifications. Thickness and density of the base shall be measured at intervals of not less than 200 feet, in holes through the base of not less than 3 inches in diameter. Where the compacted base is deficient by more than ½ inch, the contractor shall correct such areas by scarifying and adding material for a distance of 100 feet in each direction from the edge of the deficient area, and the affected area shall be brought to the required state of compaction and to the required thickness and cross section. The base shall be compacted to 98% of maximum density as determined by Modified Proctor ASTM D 1557. Compaction tests shall be done for every 500 linear feet of shoulder being constructed.

2.5 Surfacing Asphalt

Type S-1 asphalt with a minimum thickness of 1-1/2” shall be installed along both sides of the

roadway to create a shoulder as indicated on the plans. The asphalt shall meet all specifications as given in the appropriate section of the Standard Specifications, or equivalent, as determined by the engineer.

2.6 Inspection and Testing

During the construction, a field inspection of each phase will be made by the engineer or his designee. It is the contractor's responsibility to notify the engineer at least 48 hours before each phase of construction will be ready for inspection. All testing of subgrade, base, and asphalt as indicated on the plans and in this specification shall be done by a qualified testing company at the contractor's expense. Certified satisfactory test results must be submitted to the engineer at least 2 weeks prior to request for final payment of this item.

3. Measurement and payment

For items of work for which specific unit prices are established in the contract, asphalt is measured to the neat lines shown on the drawings and is computed to the nearest square yard. No deduction in volume is made for chamfers, rounded or beveled edges, or for any void or embedded item that is less than 5 cubic feet in volume.

Payment for asphalt is made at the contract unit price. Such payment constitutes full compensation for all labor, material, equipment, transportation, tools, forms, falsework, bracing, and all other items necessary and incidental to the completion of the work except items listed for payment elsewhere in the contract. Compensation for any item of work described in the contract, but not listed in the bid schedule, is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in section 4 of this specification.

4. Items of Work and Construction Details

Items of work to be performed in conformance with this specification and the construction details therefore are:

A. Bid Item No. 22, Asphalt, 2" Thick Type SP-12.5 with 8" Thick Base

- (1) This item shall consist of furnishing and installing the 2" thick SP-12.5 asphalt and 8" thick GAB or Limerock base to the neat lines and grades as shown on the drawings.
- (2) Subgrade, Base, and Asphalt shall be installed according to the detail on the drawings.
- (3) Measurement and Payment shall be according to the Santa Rosa County Contract.

B. Bid Item No. 23, Asphalt, Thermoplastic Striping

- (1) This item shall consist of furnishing and installing the Thermoplastic Striping for parking stalls, stop bars, lane lines, and directional arrows to the neat lines as shown on the drawings.
- (2) Measurement and Payment shall be according to the Santa Rosa County Contract.

Construction Specification 34—Steel Reinforcement

1. Scope

The work shall consist of furnishing and placing steel reinforcement for reinforced concrete or pneumatically applied mortar.

2. Material

Steel reinforcement shall conform to the requirements of Material Specification 539, Steel Reinforcement (for concrete). Before reinforcement is placed, the surface of the bars and fabric and any metal supports shall be cleaned to remove any loose, flaky rust, mill scale, oil, grease, or other undesirable coatings or foreign substances. Epoxy-coated steel reinforcement shall be free of surface damage. After placement, the reinforcement shall be maintained in a clean and serviceable condition until it is completely embedded within the concrete.

3. Bar schedule, lists and diagrams

Any supplemental bar schedules, bar lists or bar-bending diagrams required in section 10 of this specification to accomplish the fabrication and placement of steel reinforcement shall be provided by the contractor. Before reinforcement is placed, the contractor shall furnish four copies of any such lists or diagrams to the contracting officer for approval. Acceptance of the reinforcement is not based on approval of these lists or diagrams, but on inspection of the steel reinforcement after it has been placed, tied, and supported and is ready to receive concrete.

4. Bending

Reinforcement shall be cut and bent in compliance with the requirements of the American Concrete Institute Standard 315. Bars shall not be bent or straightened in a manner that will injure or weaken the material. Bars with kinks, cracks, or improper bends will be rejected.

5. Splicing bar reinforcement

Method 1—Splices of reinforcement shall be made only at locations shown on the drawings and provided by the steel schedule. Placement of bars at the lap splice locations shown, when not in contact, shall not be farther apart than one-fifth the shown lap length and in any case no greater than 6 inches.

Method 2—Splices of reinforcement shall be limited to those locations shown on the drawings. Splice lengths shall be determined before fabrication and meet the requirements of ACI Standard 318, Building Code Requirements for Reinforced Concrete, based upon design information in section 10 of this specification. Bar placement drawings and schedules shall be provided for approval before fabrication. The drawings shall show all splice locations, layouts, and lap dimensions.

6. Splicing welded wire fabric

Unless otherwise specified, welded wire fabric shall be spliced in the following manner:

End-to-end—Adjacent sections shall be spliced end-to-end (longitudinal lap) by overlapping a minimum of one full mesh plus 2 inches plus the length of the two end overhangs. The splice length is measured from the end of the longitudinal wires in one piece of fabric to the end of the longitudinal wire in the lapped piece of fabric.

Side-to-side—Adjacent sections shall be spliced side to side (transverse lap) a minimum of

one full mesh plus 2 inches. The splice length shall be measured from the centerline of the first longitudinal wire in one piece of fabric to the centerline of the first longitudinal wire in the lapped piece of fabric.

7. Placing

Reinforcement shall be accurately placed and secured in position to prevent its displacement during the placement of concrete. Tack welding of bars is not permitted. Metal chairs, metal hangers, metal spacers, and concrete chairs may be used to support the reinforcement. Metal hangers, spacers, and ties shall be placed in such a manner that they are not exposed in the finished concrete surface. The legs of metal chairs or side form spacers that may be exposed on any face of slabs, walls, beams, or other concrete surfaces shall have a protective coating or finish. The coating or finish can be hot dip galvanizing, epoxy coating, plastic coating, or stainless steel. Metal chairs and spacers not fully covered by a protective coating or finish shall have a minimum cover of 0.75 inch of concrete over the unprotected metal part. The exception is that those with plastic coatings may have a minimum cover of 0.5 inch of concrete over the unprotected metal part. Precast concrete chairs shall be manufactured of the same class of concrete as specified for the structure and shall have the tie wires securely anchored in the chair or a V-shaped groove at least 0.75 inch in depth molded into the upper surface to receive the steel bar at the point of support. Precast concrete chairs shall be clean and moist at the time concrete is placed.

High density or structural plastic rebar accessories designed to ensure maximum concrete bond may be substituted for metal or concrete accessories in spacer applications as approved by the contracting officer. Exposure of plastic rebar accessories at the finished concrete surface shall be kept to a minimum. Plastic rebar accessories, when used, shall be staggered along adjacent parallel bars and shall be placed at intervals no closer than 12 inches. Plastic rebar accessories shall not be used in concrete sections 6 inches or less in thickness.

Reinforcement shall not be placed until the prepared site has been inspected and approved. After placement of the reinforcement, concrete shall not be placed until the reinforcement has been inspected and approved by the contracting officer's technical representative (COTR).

8. Storage

Steel reinforcement stored at the work site shall be placed on platforms, skids, or other supports. This is done so that contact with the ground is avoided and the material is protected from mechanical damage and/or corrosion.

9. Measurement and payment

Method 1—For items of work for which specific unit prices are established in the contract, the weight of steel reinforcement placed in the concrete in accordance with the drawings is determined to the nearest pound by computation from the placing drawings. Measurement of hooks and bends is based on the requirements of ACI Standard 315. Computation of weights of reinforcement is based on the unit weights established in tables 34–1 and 34–2 of this specification. Computation of weights for welded wire fabric not shown in table 34–2 shall be based on ACI Standard 315. The area of welded wire fabric reinforcement placed in the concrete in accordance with the drawings is determined to the nearest square foot by computation from the placing drawings with no allowance for required laps. The weight of steel reinforcing in extra splices or extra-length splices approved for the convenience of the contractor or the weight of supports and ties is not included in the measurement for payment.

Payment for furnishing and placing reinforcing steel is made at the contract unit price. Such payment constitutes full compensation for all labor, material, equipment, and all other items necessary and incidental to the completion of the work including preparing and furnishing bar schedules, lists, or diagrams; furnishing and attaching ties and supports; and furnishing, transporting, storing, cutting, bending, cleaning, and securing all reinforcements.

Method 2—For items of work for which specific unit prices are established in the contract, the weight of bar reinforcement placed in the concrete in accordance with the drawings is determined to the nearest pound by computation from the placing drawings. Measurement of hooks and bends is based on the requirements of ACI Standard 315. Computation of weights of bar reinforcement is based on the unit weights established in table 34–1 of this specification. The weight of steel reinforcing in extra splices or extra length splices approved for the convenience of the contractor or the weight of supports and ties is not included in the measurement for payment.

The area of welded wire fabric reinforcement placed in the concrete in accordance with the drawings is determined to the nearest square foot by computation from the placing drawings with no allowance for required laps.

Payment for furnishing and placing bar reinforcing steel is made at the contract unit price for bar reinforcement. Payment for furnishing and placing welded wire fabric reinforcing steel is made at the contract unit price for welded wire fabric reinforcement. Such payment constitutes full compensation for all labor, material, equipment, and all other items necessary and incidental to the completion of the work including preparing and furnishing bar schedules, lists, or diagrams; furnishing and attaching ties and supports; and furnishing, transporting, cutting, bending, cleaning, and securing all reinforcement.

All Methods—The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract, but not listed in the bid schedule, is included in the payment for the item of work to which it is made subsidiary. Such items to which they are made subsidiary are identified in section 10 of this specification.

Table 34–1 Standard reinforcing bars

Bar size no.	Weight (lb/ft)
3	0.376
4	0.668
5	1.043
6	1.502
7	2.044
8	2.670
9	3.400
10	4.303
11	5.313
14	7.650
18	13.600

Table 34-2 Rectangular welded wire fabric

----- Style designation 1/----- by steel wire gauge	----- by W-number	Weight (lb./100ft ²)
6 x 6 – 10 x 10	6 x 6 – W1.4 x W1.4	21
6 x 6 – 8 x 8	6 x 6 – W2.1 x W2.1	30
6 x 6 – 6 x 6	6 x 6 – W2.9 x W2.9	42
6 x 6 – 4 x 4	6 x 6 – W4.0 x W4.0	58
4 x 4 – 10 x 10	4 x 4 – W1.4 x W1.4	31
4 x 4 – 8 x 8	4 x 4 – W2.1 x W2.1	44
4 x 4 – 6 x 6	4 x 4 – W2.9 x W2.9	62
4 x 4 – 4 x 4	4 x 4 – W4.0 x W4.0	85
4 x 12 – 8 x 12	4 x 12 – W2.1 x W0.9 2/	25
4 x 12 – 7 x 11	4 x 12 – W2.5 x W1.1 2/	31

1/ Style designation is defined in ACI Standard 315 of the American Concrete Institute.

2/ Welded smooth wire fabric with wires smaller than size W1.4 is manufactured from galvanized wire.

10. Items of Work and Construction Details

Items of work to be performed in conformance with this specification and the construction details therefore are:

Subsidiary Item, Steel Reinforcement

- (1) This item shall consist of furnishing and placing all reinforcement required in the construction of the concrete inlets to the neat lines and grades as shown on the drawings.
- (2) No separate payment shall be made for this item. Compensation shall be included in the payment for the respective bid items to which it is incidental.

Construction Specification 45—Plastic Pipe

1. Scope

The work consists of furnishing and installing plastic pipe (except corrugated polyethylene tubing) and the necessary fittings and appurtenances as shown on the drawings or as specified herein.

2. Material

Pipe, fittings, and gaskets shall conform to the requirements of Material Specification 547, Plastic Pipe, and as specified in section 14 of this specification or as shown on the drawings.

Perforated pipe shall conform to the requirements of Material Specification 547, Plastic Pipe, and as specified in section 14 of this specification or as shown on the drawings.

Unless otherwise specified, concrete shall conform to the requirements of Construction Specification 32, Structure Concrete, and section 8 of this specification.

Unless otherwise specified, earth backfill shall conform to the requirements of Construction Specification 23, Earthfill.

Unless otherwise specified, drainfill shall conform to the requirements of Construction Specification 24, Drainfill.

3. Handling and storage

Pipe shall be delivered to the job site and handled by means that provide adequate support to the pipe and do not subject it to undue stresses or damage. When handling and placing plastic pipe, care shall be taken to prevent impact blows, abrasion damage, and gouging or cutting (by metal edges and/or surface or rocks). The manufacturer's special handling requirements shall be strictly observed. Special care shall be taken to avoid impact when the pipe must be handled at a temperature of 40 degrees Fahrenheit or less.

Pipe shall be stored on a relatively flat surface so that the barrels are evenly supported. Unless the pipe is specifically manufactured to withstand exposure to ultraviolet radiation, it shall be covered with an opaque material when stored outdoors for 15 days or longer.

4. Excavation

Excavation shall be in accordance with Construction Specification 21, Excavation, and section 14 of this specification or as shown on the drawings.

The pipe foundation shall be excavated a minimum of 4 inches lower than the pipe grade shown on the drawings or staked in the field whenever bedrock, boulders, cobbles, or other material that may cause pipe damage is encountered at planned pipe grade.

5. Laying the pipe

Plastic pipe conduits complete with fittings and other related appurtenances shall be installed to the lines and grades shown on the drawings or specified in section 14 of this specification. The pipe shall be installed so that there is no reversal of grade between joints unless otherwise shown on the drawings. The pipe shall not be dropped or dumped on the bedding or into the pipe trench. The ground surface near the pipe trench shall be free of loose rocks and stones greater than 1 inch

in diameter. This ensures that rock will not be displaced and impact the pipe.

Just before placement, each pipe section shall be inspected to ensure that all foreign material is removed from inside the pipe. The pipe ends and the couplings shall be free of foreign material when assembled. At the completion of a work shift, all open ends of the pipeline shall be temporarily closed off using a suitable cover or plug.

Care shall be taken to prevent distortion and damage during hot or cold weather. During unusually hot weather (daytime high temperature of more than 90 °F), the pipe assembled in the trench shall be lightly backfilled or shaded to keep it as near to ground temperature as possible until final backfill is placed. Backfill operations should be performed during daily construction periods when the ground temperature and the temperature of the pipe do not vary more than 40 degrees Fahrenheit.

Perforated pipe shall be installed with the perforations down and oriented symmetrically about the vertical centerline. Perforations shall be clear of any obstructions on the inside and outside of the pipe when the pipe is approved by the engineer for backfill.

During installation, the pipe shall be firmly and uniformly bedded throughout its entire length, to the depth and in the manner specified in section 14 of this specification or as shown on the drawings. Bell-holes shall be placed in bedding material under bells, couplings, and other fittings to assure the pipe is uniformly supported throughout its entire length. Blocking or mounding beneath the pipe to bring the pipe to final grade is not permitted.

6. Pipe embedment

Earth bedding—The pipe shall be firmly and uniformly placed on compacted earthfill bedding or an in-place earth material bedding of ample bearing strength to support the pipe without noticeable settlement. The earth material on which the pipe is placed shall be of uniform density to prevent differential settlement.

Unless otherwise specified, a groove that closely conforms to the outside surface of the pipe shall be formed in the bedding. The depth of the groove shall be equal to or greater than 0.3 of the pipe diameter.

Earth bedding shall be compacted to a density not less than adjacent undisturbed in-place earth material or be compacted earth backfill. Earthfill material used for compacted earth bedding shall be free of rocks or stones greater than 1 inch in diameter and earth clods greater than 2 inches in diameter. The pipe shall be loaded sufficiently during the compaction of bedding under the haunches and around the sides of the pipe to prevent displacement from its final approved placement.

Sand, gravel, or crushed rock bedding—When sand, gravel, or crushed rock bedding is specified, the pipe shall be firmly and uniformly placed on the bedding material. Material for bedding shall not exceed 1 inch in diameter. Unless otherwise specified in section 14 of this specification or shown on the drawings, the coarse-grained bedding material shall be carefully placed and compacted to a depth equal to or greater than 0.3 of the diameter of the pipe above the bottom of the pipe. The pipe shall be loaded sufficiently during backfilling and compaction around the sides to prevent displacement of the pipe from its final approved placement.

Pipe encased in drainfill—The pipe shall be firmly and uniformly placed on bedding of specified drainfill. Drainfill shall be placed and compacted as specified in section 14 of this specification or as shown on the drawings to form a continuous uniform support around the entire circumference of the pipe. The pipe shall be loaded sufficiently during backfilling around the sides and during compaction to prevent displacement of the pipe.

7. Backfill

Initial backfill—Unless otherwise specified, initial backfill to 6 inches above the top of the conduit is required. Earth haunching and initial backfill material shall consist of soil material that is free of rocks, stones, or hard clods more than 1 inch in diameter. Coarse backfill material shall be the specified sand, gravel, crushed rock, or drainfill material.

Initial backfill shall be placed in two stages. In the first stage (haunching), backfill is placed to the pipe spring line (center of pipe). In the second stage, it is placed to 6 inches above the top of the pipe.

The first stage material shall be worked carefully under the haunches of the pipe to provide continuous support throughout the entire pipe length. The haunching backfill material shall be placed in layers that have a maximum thickness of about 6 inches and are compacted as specified in section 14 of this specification or as shown on the drawings. During compaction operations, care shall be taken to ensure that the tamping or vibratory equipment does not come in contact with the pipe and the pipe is not deformed or displaced.

When pressure testing is not specified, the pipe shall be covered with a minimum of 6 inches of backfill material as soon as possible following assembling of the pipe in the trench, but not later than within the same day that placement has occurred. When pressure testing is specified, sufficient backfill material shall be placed over the pipe to anchor the conduit against movement during pressure testing activities.

Final backfill—Final backfill shall consist of placing the remaining material required to complete the backfill from the top of the initial backfill to the ground surface, including mounding at the top of the trench. Final backfill material within 2 feet of the top of the pipe shall be free of debris or rocks larger than 3 inches nominal diameter. Coarse backfill material shall be the specified sand, gravel, crushed rock, or drainfill. Final backfill shall be placed in approximately uniform, compacted layers. Final backfill compaction requirements shall be as specified in section 14 of this specification or as shown on the drawings.

Vehicles or construction equipment shall not be allowed to cross the pipe until the minimum earth cover and required density as specified in section 14 of this specification has been obtained.

8. Pipe encasement in concrete

Concrete encasement shall be carefully placed to form a continuous uniform support around the entire circumference of the pipe as specified in section 14 of this specification or as shown on the drawings. Pipes encased in concrete shall be securely anchored to prevent movement of the pipe during concrete placement. A clear distance of 1.5 inch shall be maintained between the pipe and the reinforcing steel.

The concrete for the encasement shall conform to the requirements of Construction Specification 32, Structure Concrete, for Class 3000M concrete unless otherwise specified.

9. Joints

Unless otherwise specified in section 14 of this specification or shown on the drawings, joints shall be either bell and spigot type with elastomeric gaskets, coupling type, solvent cement bell and spigot, or jointed by butt heat fusion. When a lubricant is required to facilitate joint assembly, it shall be a type having no deleterious affect on the gasket or pipe material.

Pipe joints shall be watertight at the pressures specified except where unsealed joints are indicated.

Pipe shall be installed and joined in accordance with the manufacturer's recommendations. Laying deflections and joint fitting or stab depths shall be within the manufacturer's recommended tolerances.

When solvent cement joints are specified for PVC or ABS pipe and fittings, they shall be made in accordance with the following ASTMs and the related appendix of each ASTM; D 2855 for PVC pipe and fittings and D 2235 for ABS pipe and fittings.

Flanged, banded, heat-fusion, or elastomeric-sealed mechanical joints shall be used when joining polyethylene (PE) and high density polyethylene (HDPE) pipe and fittings unless otherwise specified in section 14 of this specification or as shown on the drawings.

Pipe ends shall be cut square and be deburred to provide a uniform, smooth surface for the jointing process. Reference marks shall be placed on the spigot ends to assist in determining when proper seating depth has been achieved within the joint.

10. Fittings

Unless otherwise specified, steel fittings, valves, and bolted connections shall be painted or coated as recommended by the manufacturer.

Fittings for nonpressure pipe shall be of the same or similar material as the pipe and shall provide the same durability, watertightness, and strength as the pipe unless otherwise specified.

11. Thrust blocks and anchors

When specified, concrete thrust blocks and anchors shall be installed as shown on the drawings or specified in section 14 of this specification.

The concrete for the thrust blocks and anchors shall conform to the requirements of Construction Specification 32, Structure Concrete, for Class 3000M concrete unless otherwise specified in section 14 of this specification.

The thrust block cavity shall be hand dug into undisturbed soil or previously placed compacted backfill. The cavity shall be formed with soil or wood to hold the freshly placed concrete without displacement until an initial set has occurred.

When excavation beyond the designated trench widths and depths as shown on the drawings or specified in section 14 of this specification occurs at locations where installation of concrete thrust blocks is required, the contractor shall install an alternative thrust block provision. The concrete thrust block shall have a thickness of one pipe diameter and a contact face area that shall

be formed against the pipe as shown on the drawings or specified in section 14 of this specification. Backfill shall be placed on all sides of the thrust block and to the sides of the excavation. It shall be compacted as specified for initial backfill.

12. Pressure testing

Method 1—Pressure testing of the completed conduit is not required.

Method 2—The conduit shall be tested for leaks in the following manner:

- a. Before pressure testing:
 - (1) Joints of the assembled pipeline shall be allowed to cure as recommended by the manufacturer.
 - (2) Pipeline shall be flushed and cleaned.
 - (3) All concrete anchors and thrust blocks shall be in place and allowed to cure for a minimum of 3 days.
 - (4) Earth backfill shall be sufficient to anchor the conduit against movement during the pressure testing and shall be compacted as specified in Section 14 of this specification or as shown on the drawings.
 - (5) The conduit shall be braced, anchored, or both, at each end to restrict all potential pipe movement.
 - (6) The ends of the conduit shall be plugged. The upstream plug shall have a standpipe installed vertically having a minimum diameter of 2 inches and shall be equipped with a shutoff valve. All high points in the line shall be vented to evacuate air pockets. The conduit and the standpipe shall be slowly filled with water such that no air is entrapped during the filling operation. After filling is complete, all vents shall be closed.
- b. During pressure testing, the water level in the standpipe shall be continuously maintained at a minimum of 10 feet above the highest invert elevation of the conduit for no less than 2 hours unless otherwise specified in section 14 of this specification or as shown on the drawings.

The volume of water leakage in the 2-hour test period shall be recorded. The maximum allowable leakage (L) in gallons per hour shall not exceed 0.02 times the nominal pipe diameter (D) in inches for each 1,000 feet of pipe line, which is about 50 pipe joints ($L = 0.02 \times D$).

- c. When observed leakage exceeds the allowable, leaks shall be sealed by replacement of pipe and fittings as necessary. The conduit shall be retested as described above. This procedure shall be repeated until the conduit leakage does not exceed the allowable specified above.

The contractor shall be fully responsible for any and all work required to correct leakage exceeding the amount specified.

Method 3—The conduit shall be tested for leaks in the following manner:

- a. Before pressure testing:
 - (1) Joints of the assembled pipeline shall be allowed to cure as recommended by the manufacturer.
 - (2) Pipeline shall be flushed and cleaned.

- (3) All concrete anchor and thrust blocks shall be in place and allowed to cure for at least 3 days.
 - (4) Earth backfill shall be sufficient to anchor the conduit against movement during the pressure testing and compacted as specified in section 14 of this specification or as shown on the drawings.
 - (5) The conduit shall be braced and/or anchored at each end to prevent all potential pipe movement.
 - (6) The ends of the conduit shall be plugged, and a pressure gauge shall be attached to the upstream and downstream ends. All high points along the pipeline shall be vented to permit the complete removal of all air within the pipeline. The conduit shall be slowly filled with water such that no air is entrapped during the filling operations.
- b. The testing pressure specified in section 14 of this specification shall be continuously maintained at the upstream gauge for a minimum of 2 hours. The pressure at the downstream gauge shall not exceed the pressure rating of the pipe.
 - c. The volume of water leakage for the 2-hour test period shall be recorded. Maximum allowable leakage shall be in accordance with the following:

Allowable leakage for plastic pipe
(gal/hr/1,000 feet, or 50 pipe joints) ^{1/}

Nominal pipe size (in)	Test pressure in the pipeline (lb/in ²)			
	50	100	150	200
	----- Allowable leakage -----			
4	.19	.27	.33	.38
6	.29	.41	.50	.57
8	.38	.54	.66	.76
10	.48	.68	.83	.96
12	.57	.81	.99	1.15
14	.67	.95	1.16	1.34
15	.72	1.02	1.25	1.44
16	.76	1.07	1.32	1.52
18	.86	1.22	1.49	1.72

1/ Computation basis



where:

L = allowable leakage in gallons per hour

N = number of joints (pipe and fittings)

D = nominal diameter of pipe in inches

P = test pressure in pounds per square inch

- d. When observed leakage exceeds the allowable, leaks shall be sealed by replacement of pipe and fittings as necessary. The conduit shall be retested as described in this section. The procedure shall be repeated until the conduit leakage does not exceed the allowable specified above.

The contractor shall be fully responsible for any and all work required to correct leakage

exceeding the amount specified.

13. Measurement and payment

Method 1—For items of work for which specific unit prices are established in the contract, the quantity of each kind, size, and class of pipe is determined to the nearest foot by measurement of the laid length along the crown centerline of the conduit. Payment for each kind, size, and class of pipe is made at the contract unit price for that kind, size, and class. Such payment constitutes full compensation for furnishing, transporting, and installing the pipe including excavation, shoring, backfill, bedding, thrust blocks, and all fittings, appurtenances, and other items necessary and incidental to the completion of the work. Payment for appurtenances listed separately in the bid schedule is made at the contract prices for those items.

Method 2—For items of work for which specific unit prices are established in the contract, the quantity of each kind, size, and class of pipe is determined as the sum of the nominal laying lengths of the sections used. Payment for each kind, size, and class of pipe is made at the contract unit price for the kind, size, and class. Such payment constitutes full compensation for furnishing, transporting, and installing the pipe including excavation, shoring, backfill, bedding, thrust blocks, and all fittings, appurtenances, and other items necessary and incidental to the completion of the work. Payment for appurtenances listed separately in the bid schedule is made at the contract prices for those items.

Method 3—For items of work for which specific unit prices are established in the contract, the quantity of each kind, size, and class of pipe is determined to the nearest foot by measurement of the laid length along the crown centerline of the conduit. Payment for each kind, size, and class of pipe is made at the contract unit price for the kind, size, and class. Such payment constitutes full compensation for furnishing, transporting, and installing the pipe including shoring, all fittings, thrust blocks, appurtenances, and other items necessary and incidental to the completion of the work. Payment for appurtenances listed separately in the bid schedule is made at the contract prices for those items.

Method 4—For items of work for which specific unit prices are established in the contract, the quantity of each kind, size, and class of pipe is determined as the sum of the nominal laying lengths of the pipe sections used. Payment for each kind, size, and class of pipe is made at the contract unit price for that kind, size, and class. Such payment constitutes full compensation for furnishing, transporting, and installing the pipe including shoring, all fittings, thrust blocks, appurtenances, and other items necessary and incidental to the completion of the work. Payment for appurtenances listed separately in the bid schedule is made at the contract prices for those items.

Methods 3 and 4—Excavation, backfill, and bedding is paid separately under their respective bid items.

All measurement and payment methods—Compensation for any items of work described in the contract, but not listed in the bid schedule, is included in the payment for the item of work to which it is made subsidiary. Such items and items to which they are made subsidiary are identified in section 14 of this specification.

14. Items of work and construction details

Items of work to be performed in conformance with this specification and the construction details therefore are:

A. Bid Item No. 24, 4" Diameter HDPE Pipe

- (1) This item shall consist of furnishing and installing the 4" Diameter HDPE pipe as shown on the drawings.
- (2) The pipe and fittings shall be 4-inch diameter ADS HDPE or approved equivalent.
- (3) The pipe shall be non-perforated as shown on the drawings.
- (4) Pressure testing will not be required.

Measurement and Payment shall be according to the Santa Rosa County Contract.

B. Bid Item No. 25, 12" Diameter HDPE Pipe

- (5) This item shall consist of furnishing and installing the 4" Diameter HDPE pipe as shown on the drawings.
- (6) The pipe and fittings shall be 4-inch diameter ADS HDPE or approved equivalent.
- (7) The pipe shall be non-perforated as shown on the drawings.
- (8) Pressure testing will not be required.

Measurement and Payment shall be according to the Santa Rosa County Contract.

Construction Specification 61—Rock Riprap

1. Scope

The work shall consist of the construction of rock riprap revetments and blankets, including filter or bedding where specified.

2. Material

Rock riprap shall conform to the requirements of Material Specification 523, Rock for Riprap, or if so specified, shall be obtained from designated sources. It shall be free from dirt, clay, sand, rock fines, and other materials not meeting the required gradation limits.

At least 30 days before rock is delivered from other than designated sources, the contractor shall designate in writing the source from which rock material will be obtained and provide information satisfactory to the contracting officer that the material meets contract requirements. The contractor shall provide the contracting officer's technical representative (COTR) free access to the source for the purpose of obtaining samples for testing. The size and grading of the rock shall be as specified in section 8.

Rock from approved sources shall be excavated, selected, and processed to meet the specified quality and grading requirements at the time the rock is installed.

When specified in section 8 or requested by the contracting officer, a gradation quality control check shall be made by the contractor and be subject to inspection by the COTR. The test shall be performed at the worksite in accordance to ASTM D 5519 Test Method B Size, Size-Range Grading, on a test pile of representative rock. The weight or size of the test pile shall be large enough to ensure a representative gradation of rock from the source and to provide test results within a 5 percent accuracy.

Based on a specific gravity of 2.65 (typical of limestone and dolomite) and assuming the individual rock is shaped midway between a sphere and a cube, typical size/weight relationships are:

Sieve size of rock	Approx. weight of rock	Weight of test pile
16 inches	300 pounds	6,000 pounds
11 inches	100 pounds	2,000 pounds
6 inches	15 pounds	300 pounds

The results of the test shall be compared to the gradation required for the project. Test pile results that do not meet the construction specifications shall be cause for the rock to be rejected. The test pile that meets contract requirements shall be left on the job site as a sample for visual comparison. The test pile shall be used as part of the last rock riprap to be placed.

Filter or bedding aggregates when required shall conform to Material Specification 521, Aggregates for Drainfill and Filters, unless otherwise specified. Geotextiles shall conform to Material Specification 592, Geotextile.

3. Subgrade preparation

The subgrade surface on which the rock riprap, filter, bedding, or geotextile is to be placed shall be cut or filled and graded to the lines and grades shown on the drawings. When fill to subgrade lines is required, it shall consist of approved material and shall conform to the requirements of the specified class of earthfill.

Rock riprap, filter, bedding, or geotextile shall not be placed until the foundation preparation is completed and the subgrade surface has been inspected and approved.

4. Equipment-placed rock riprap

The rock riprap shall be placed by equipment on the surface and to the depth specified. It shall be installed to the full course thickness in one operation and in such a manner as to avoid serious displacement of the underlying material. The rock for riprap shall be delivered and placed in a manner that ensures the riprap in place is reasonably homogeneous with the larger rocks uniformly distributed and firmly in contact one to another with the smaller rocks and spalls filling the voids between the larger rocks. Some hand placing may be required to provide a neat and uniform surface.

Rock riprap shall be placed in a manner to prevent damage to structures. Hand placing is required as necessary to prevent damage to any new and existing structures.

5. Hand placed rock riprap

The rock riprap shall be placed by hand on the surface and to the depth specified. It shall be securely bedded with the larger rocks firmly in contact one to another without bridging. Spaces between the larger rocks shall be filled with smaller rocks and spalls. Smaller rocks shall not be grouped as a substitute for larger rock. Flat slab rock shall be laid on its vertical edge except where it is laid like paving stone and the thickness of the rock equals the specified depth of the riprap course.

6. Filter or bedding

When the contract specifies filter, bedding, or geotextile beneath the rock riprap, the designated material shall be placed on the prepared subgrade surface as specified. Compaction of filter or bedding aggregate is not required, but the surface of such material shall be finished reasonably smooth and free of mounds, dips, or windrows.

7. Measurement and payment

Method 1—For items of work for which specific unit prices are established in the contract, the quantity of each type of rock riprap placed within the specified limits is computed to the nearest ton by actual weight. The volume of each type of filter or bedding aggregate is measured within the specified limits and computed to the nearest cubic yard by the method of average cross-sectional end areas. For each load of rock riprap placed as specified, the contractor shall furnish to the COTR a statement-of-delivery ticket showing the weight to the nearest 0.1 ton.

Payment is made at the contract unit price for each type of rock riprap, filter, or bedding. Such payment is considered full compensation for completion of the work.

Method 2—For items of work for which specific unit prices are established in the contract, the quantity of each type of rock riprap placed within the specified limits is computed to the nearest 0.1 ton by actual weight. The quantity of each type of filter or bedding aggregate delivered and

placed within the specified limits is computed to the nearest 0.1 ton. For each load of rock riprap placed as specified, the contractor shall furnish to the engineer a statement-of-delivery ticket showing the weight to the nearest 0.1 ton. For each load of filter or bedding aggregate, the contractor shall furnish to the COTR a statement-of-delivery ticket showing the weight to the nearest 0.1 ton.

Payment is made at the contract unit price for each type of rock riprap, filter, or bedding. Such payment is considered full compensation for completion of the work.

Method 3—For items of work for which specific unit prices are established by the contract, the volume of each type of rock riprap and filter or bedding aggregate is measured within the specified limits and computed to the nearest cubic yard by the method of average cross-sectional end areas.

Payment is made at the contract unit price for each type of rock riprap, filter, or bedding. Such payment is considered full compensation for completion of the work.

Method 4—For items of work for which specific unit prices are established by the contract, the volume of each type of rock riprap, including filter and bedding aggregate, is measured within the specified limits and computed to the nearest cubic yard by the method of average cross-sectional end areas.

Payment is made at the contract unit price for each type of rock riprap, including filter and bedding. Such payment is considered full compensation for completion of the work.

Method 5—For items of work for which specific unit prices are established by the contract, the quantity of each type of rock riprap placed within the specified limits is computed to the nearest ton by actual weight. For each load of rock for riprap placed as specified, the contractor shall furnish to the COTR a statement-of-delivery ticket showing the weight to the nearest 0.1 ton.

Payment is made at the contract unit price for each type of rock riprap, including geotextile used for filter or bedding. Such payment is considered full compensation for completion of the work.

Method 6—For items of work for which specific unit prices are established by the contract, the volume of each type of rock riprap is measured within the specified limits and computed to the nearest cubic yard by the method of average cross-sectional end areas.

Payment is made at the contract unit price for each type of rock riprap, including geotextile used for filter or bedding. Such payment is considered full compensation for completion of the work.

All methods—The following provision applies to all methods of measurement and payment. Compensation for any item of work described in the contract, but not listed in the bid schedule, is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in section 8.

No separate payment is made for testing the gradation of the test pile. Compensation for testing is included in the appropriate bid item for riprap.

8. Items of Work and Construction Details

Items of work to be performed in conformance with this specification and the construction details therefore are:

Bid Item No. 28, Rock Riprap, Class 1

- (1) This item shall consist of furnishing and installing the loose rock riprap to the neat lines and grades as shown on the drawings.
- (2) All excavation and shaping required to prepare the foundation for rock placement and backfill around the completed installation shall be considered as included in this item.
- (3) Riprap may be equipment placed with hand work to fill voids and provide uniformity. Hand placement of the rock will be required where adjacent to the concrete curbing and/or any other structure.
- (4) The riprap shall be a durable stone with a minimum unit weight of 165 pounds per cubic foot. Riprap gradation shall conform to the requirements of Class 1 riprap, Alabama Highway Department Standard Specification for Highway Construction, Section 814 (Current Edition).
- (5) Measurement and Payment shall be according to the Santa Rosa County Contract.

Bid Item No. 26 and 27, FDOT No. 57 Crushed Aggregate

- (1) This item shall consist of furnishing and installing the crushed aggregate beneath the loose rock riprap and pavers to the neat lines and grades as shown on the drawings.
- (2) Any incidental shaping required to prepare the foundation for rock placement and backfill around the completed installation shall be considered as included in this item.
- (3) Rock may be equipment placed with hand work to fill voids and provide uniformity. Hand placement of the rock will be required where adjacent to the concrete curbing.
- (4) The bedding material shall be durable stone with a minimum unit weight of 165 pounds per cubic foot. The rock shall be graded according to FDOT No. 57 crushed aggregate.
- (5) Measurement and Payment shall be according to the Santa Rosa County Contract.

Construction Specification 81—Metal Fabrication and Installation

1. Scope

The work consists of furnishing, fabricating, and erecting metalwork, including the metal parts and fasteners of the composite structures.

2. Material

Unless otherwise specified, material shall conform to the requirements of Material Specification 581, Metal. Steel shall be structural quality unless otherwise specified. Castings shall be thoroughly cleaned and subjected to careful inspection before installation. Finished surfaces shall be smooth and true to assure proper fit. Galvanizing shall conform to the requirements of Material Specification 582, Galvanizing.

3. Fabrication

Fabrication of structural steel shall conform to the requirements of Specification for the Design, Fabrication and Erection of Structural Steel for Buildings (Riveted, Bolted and Arc-Welded Construction), American Institute of Steel Construction.

Fabrication of structural aluminum shall conform to the requirements in the Aluminum Design Manual available from The Aluminum Association.

4. Erection

The frame of metal structures shall be installed true and plumb. Temporary bracing shall be placed wherever necessary to resist all loads to which the structure may be subjected, including those applied by the installation and operation of equipment. Such bracing shall be left in place as long as may be necessary for safety.

As erection progresses the work shall be securely bolted up, or welded, to resist all dead load, wind, and erection stresses. The contractor shall furnish such installation assisting bolts, nuts, and washers as may be required.

No riveting or welding shall be performed until the structure is stiffened and properly aligned.

Rivets driven in the field shall be heated and driven with the same care as those driven in the shop.

All field welding shall be performed in conformance to the requirements for shop fabrication except those that expressly apply to shop conditions only.

5. Protective coatings

Items specified to be galvanized shall be completely fabricated for field assembly before the application of the zinc coatings. Galvanized items shall not be cut, welded, or drilled after the zinc coating is applied.

Items specified to be painted shall be painted in conformance to the requirements of Construction Specification 82 for the specified paint systems.

6. Measurement and payment

Method 1—The work is not measured. Payment for metal fabrication and installation is made at

the contract lump sum price in the contract. Such payment constitutes full compensation for all labor, equipment, material, and all other items necessary and incidental to the completion of the work including connectors and appurtenances, such as rivets, bolts, nuts, pins, studs, washers, hangers, and weld metal.

Method 2—The weight of metal installed complete in place shall be determined to the nearest pound. Unless otherwise specified, the weight of metal shall be computed by the method specified in section 3 of the Code of Standard Practice for Steel Buildings and Bridges, American Institute of Steel Construction, except that the following unit weights shall also be used, as appropriate, as the basis of computation:

Material	Unit weight (lb/ft ³)
Aluminum alloy	173
Bronze or copper alloy	536
Iron, malleable	470
Iron, wrought	487

Payment for furnishing, fabricating, and installing metalwork is made at the contract unit price for the specified types of labor, material, equipment, and all other items necessary and incidental to the completion of the work.

Method 3—The work is not measured. Payment for furnishing, fabricating, and installing each item of metalwork is made at the contract price for that item. Such payment constitutes full compensation for all labor, equipment, material, and all other items necessary and incidental to the completion of the work including connectors and appurtenances, such as rivets, bolts, nuts, pins, studs, washers, hangers, and weld metal.

All methods—The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract, but not listed in the bid schedule, is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in section 7 of this specification.

7. Items of work and construction details

Items of work to be performed in conformance with this specification and the construction details therefore are:

Bid Item No. 29, Signs

- (1) This specification covers furnishing all materials, fabrication, and the installation of the Street Signs, Handicap Parking Signs, and Stop Signs as shown on the drawings.
- (2) All material shall conform to material specification 581.
- (3) All fasteners shall be stainless steel.
- (4) Measurement and Payment shall be according to the Santa Rosa County Contract.

Construction Specification 94—Contractor Quality Control

1. Scope

The work consists of developing, implementing, and maintaining a quality control system to ensure that the specified quality is achieved for all materials and work performed.

2. Equipment and materials

Equipment and material used for quality control shall be of the quality and condition required to meet the test specifications cited in the contract. Testing equipment shall be properly adjusted and calibrated at the start of operations and the calibration maintained at the frequency specified. Records of equipment calibration tests shall be available to the engineer at all times. Equipment shall be operated and maintained by qualified operators as prescribed in the manufacturer's operating instructions, the references specified, and as specified in section 10 of this specification. All equipment and materials used in performing quality control testing shall be as prescribed by the test standards referenced in the contract or in section 10.

All equipment and materials shall be handled and operated in a safe and proper manner and shall comply with all applicable regulations pertaining to their use, operation, handling, storage, and transportation.

3. Quality control system

Method 1—The contractor shall develop, implement, and maintain a system of quality control to provide the specified material testing and verification of material quality before use. The system activities shall include procedures to verify adequacy of completed work, initiate corrective action to be taken, and document the final results. The identification of the quality control personnel and their duties and authorities shall be submitted to the contracting officer in writing within 15 calendar days after notice of award.

Method 2—The contractor shall develop, implement, and maintain a system adequate to achieve the specified quality of all work performed, material incorporated, and equipment furnished before use. The system established shall be documented in a written plan developed by the contractor and approved by the contracting officer. The system activities shall include the material testing and inspection needed to verify the adequacy of completed work and procedures to be followed when corrective action is required. Daily records to substantiate the conduct of the system shall be maintained by the contractor. The quality control plan shall cover all aspects of quality control and shall address, as a minimum, all specified testing and inspection requirements. The plan provided shall be consistent with the planned performance in the contractor's approved construction schedule. The plan shall identify the contractor's onsite quality control manager and provide an organizational listing of all quality control personnel and their specific duties. The written plan shall be submitted to the contracting officer within 15 calendar days after notice of award. The contractor shall not proceed with any construction activity that requires inspection until the written plan is approved by the contracting officer.

All methods—The quality control system shall include, but not be limited to, a rigorous examination of construction material, processes, and operation, including testing of material and examination of manufacturer's certifications as required, to verify that work meets contract requirements and is performed in a competent manner.

4. Quality control personnel

Method 1—Quality control activities shall be accomplished by competent personnel. A competent person is: One who is experienced and capable of identifying, evaluating, and documenting that materials and processes being used will result in work that complies with the contract; and, who has authority to take prompt action to remove, replace, or correct such work or products not in compliance. Off-site testing laboratories shall be certified or inspected by a nationally recognized entity. The Contractor shall submit to the Contracting Officer, for approval, the names, qualifications, authorities, certifications, and availability of the competent personnel who will perform the quality control activities.

Method 2—Quality control activities shall be accomplished by competent personnel who are separate and apart from line supervision and who report directly to management. A competent person is one who is experienced and capable of identifying, evaluating, and documenting that material and processes being used will result in work that complies with the contract, and who has authorization to take prompt action to remove, replace, or correct such work or products not in compliance. Offsite testing laboratories shall be certified or inspected by a nationally recognized entity. The contractor shall submit to the contracting officer, for approval, the names, qualifications, authorities, certifications, and availability of the competent personnel who will perform the quality control activities.

5. Post-award conference

The contractor shall meet with the contracting officer before any work begins and discuss the contractor's quality control system. The contracting officer and the contractor shall develop a mutual understanding regarding the quality control system.

6. Records

The contractor's quality control records shall document both acceptable and deficient features of the work and corrective actions taken. All records shall be on forms approved by the contracting officer, be legible, and be dated and signed by the competent person creating the record.

Unless otherwise specified in section 10 of this specification, records shall include:

- a. Documentation of shop drawings including date submitted to and date approved by the contracting officer, results of examinations, any need for changes or modifications, manufacturer's recommendations and certifications, if any, and signature of the authorized examiner.
- b. Documentation of material delivered including quantity, storage location, and results of quality control examinations and tests.
- c. Type, number, date, time, and name of individual performing quality control activities.
- d. The material or item inspected and tested, the location and extent of such material or item, and a description of conditions observed and test results obtained during the quality control activity.
- e. The determination that the material or item met the contract provisions and documentation that the engineer was notified.
- f. For deficient work, the nature of the defects, specifications not met, corrective action taken, and results of quality control activities on the corrected material or item.

7. Reporting results

The results of contractor quality control inspections and tests shall be communicated to the engineer immediately upon completion of the inspection or test. Unless otherwise specified in section 10, the original plus one copy of all records, inspections, tests performed, and material testing reports shall be submitted to the engineer within one working day of completion. The original plus one copy of documentation of material delivered shall be submitted to the engineer before the material is used.

8. Access

The contracting officer and the engineer shall be given free access to all testing equipment, facilities, sites, and related records for the duration of the contract.

9. Payment

Method 1—For items of work for which lump sum prices are established in the contract, payment is made as the work proceeds, after presentation by the contractor of invoices showing related costs and evidence of charges by suppliers, subcontractors, and others for furnishing supplies and work performed. If the total of such payments is less than the lump sum contract price for this item, the remaining balance is included in the final contract payment. Payment of the lump sum contract price constitutes full compensation for completion of the work.

Payment is not made under this item for the purchase cost of material and equipment having a residual value.

Method 2—For items of work for which lump sum prices are established in the contract, payment is prorated and paid in equal amounts on each monthly estimate. The number of months used for prorating shall be the number estimated to complete the work. The final month's prorate amount is made with the final payment. Payment as described above constitutes full compensation for completion of the work.

Payment is not made under this item for the purchase cost of material and equipment having a residual value.

All methods—Compensation for any item of work described in the contract, but not listed in the bid schedule, is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in section 10.

10. Items of work and construction details

Items of work to be performed in conformance with this specification and the construction details therefore are:

a. Bid Item No. 30, Contractor Quality Control

- (1) This item shall consist of the contractor providing and maintaining an effective quality control program on all items of work included in this contract.
- (2) In Section 3, Quality Control System, Method 2 shall apply
- (3) In Section 4, Quality Control Personnel, Method 2 shall apply.
- (4) The burden of proof that the work performed meets contract requirements is the contractor's.
- (5) Inspection is defined as a rigorous examination of construction materials, processes, and

operations to verify that work meets contract requirements.

- (6) The contractor's inspection system shall be approved by the contracting officer and be operational before commencement of work.
- (7) Quality control tests shall be conducted in accordance with the standard test methods identified in the specifications and on the drawings.
- (8) Measurement and Payment shall be according to the Santa Rosa County Contract.

Construction Specification 95—Geotextile

1. Scope

This work consists of furnishing all material, equipment, and labor necessary for the installation of geotextiles.

2. Quality

Geotextiles shall conform to the requirements of Material Specification 592 and this specification.

3. Storage

Before use, the geotextile shall be stored in a clean, dry location out of direct sunlight, not subject to extremes of either hot or cold temperatures, and with the manufacturer's protective cover undisturbed. Receiving, storage, and handling at the job site shall be in accordance with the requirements listed in ASTM D 4873.

4. Surface preparation

The surface on which the geotextile is to be placed shall be graded to the neat lines and grades as shown on the drawings. It shall be reasonably smooth and free of loose rock and clods, holes, depressions, projections, muddy conditions, and standing or flowing water (unless otherwise specified in section 7 of this specification).

5. Placement

Before the geotextile is placed, the soil surface will be reviewed for quality assurance of the design and construction. The geotextile shall be placed on the approved prepared surface at the locations and in accordance with the details shown on the drawings and specified in section 7 of this specification. It shall be unrolled along the placement area and loosely laid, without stretching, in such a manner that it conforms to the surface irregularities when material or gabions are placed on or against it. The geotextile may be folded and overlapped to permit proper placement in designated area(s).

Method 1—The geotextile shall be joined by machine sewing using thread material meeting the chemical requirements for the geotextile fibers or yarn. The sewn overlap shall be 6 inches, and the sewing shall consist of two parallel stitched rows at a spacing of about 1 inch and shall not cross (except for any required re-stitching). The stitching shall be a lock-type stitch. Each row of stitching shall be located a minimum of 2 inches from the geotextile edge. The seam type and sewing machine to be used shall produce a seam strength, in the specified geotextile, that provides a minimum of 90 percent of the tensile strength in the weakest principal direction of the geotextile being used, when tested in accordance with ASTM D 4884. The seams may be factory or field sewn.

The geotextile shall be temporarily secured during placement of overlying material to prevent slippage, folding, wrinkling, or other displacement of the geotextile. Unless otherwise specified, methods of securing shall not cause punctures, tears, or other openings to be formed in the geotextile.

Method 2—The geotextile shall be joined by overlapping a minimum of 18 inches (unless

otherwise specified) and secured against the underlying foundation material. Securing pins, approved and provided by the geotextile manufacturer, shall be placed along the edge of the panel or roll material to adequately hold it in place during installation. Pins shall be steel or fiberglass formed as a U, L, or T shape or contain "ears" to prevent total penetration through the geotextile. Steel washers shall be provided on all but the U-shaped pins. The upstream or upslope geotextile shall overlap the abutting downslope geotextile. At vertical laps, securing pins shall be inserted through the bottom layers along a line through approximately the mid-point of the overlap. At horizontal laps and across slope labs, securing shall be inserted through the bottom layer only. Securing pins shall be placed along a line about 2 inches in from the edge of the placed geotextile at intervals not to exceed 12 feet unless otherwise specified. Additional pins shall be installed as necessary and where appropriate to prevent any undue slippage or movement of the geotextile. The use of securing pins will be held to the minimum necessary. Pins are to remain in place unless otherwise specified.

Should the geotextile be torn or punctured, or the overlaps or sewn joint disturbed, as evidenced by visible geotextile damage, subgrade pumping, intrusion, or grade distortion, the backfill around the damaged or displaced area shall be removed and restored to the original approved condition. The repair shall consist of a patch of the same type of geotextile being used and overlaying the existing geotextile. When the geotextile seams are required to be sewn, the overlay patch shall extend a minimum of 1 foot beyond the edge of any damaged area and joined by sewing as required for the original geotextile except that the sewing shall be a minimum of 6 inches from the edge of the damaged geotextile. Geotextile panels joined by overlap shall have the patch extend a minimum of 2 feet from the edge of any damaged area.

Geotextile shall be placed in accordance with the following applicable specification according to the use indicated in section 7:

Slope protection—The geotextile shall not be placed until it can be anchored and protected with the specified covering within 48 hours or protected from exposure to ultraviolet light. In no case shall material be dropped on uncovered geotextile from a height of more than 3 feet.

Subsurface drains—The geotextile shall not be placed until drainfill or other material can be used to provide cover within the same working day. Drainfill material shall be placed in a manner that prevents damage to the geotextile. In no case shall material be dropped on uncovered geotextile from a height of more than 5 feet.

Road stabilization—The geotextile shall be unrolled in a direction parallel to the roadway centerline in a loose manner permitting conformation to the surface irregularities when the roadway fill material is placed on its surface. In no case shall material be dropped on uncovered geotextile from a height of more than 5 feet. Unless otherwise specified, the minimum overlap of geotextile panels joined without sewing shall be 24 inches. The geotextile may be temporarily secured with pins recommended or provided by the manufacturer, but they shall be removed before the permanent covering material is placed.

6. Measurement and payment

Method 1—For items of work for which specific unit prices are established in the contract, the quantity of geotextile for each type placed within the specified limits is determined to the nearest

specified unit by measurements of the covered surfaces only, disregarding that required for anchorage, seams, and overlaps. Payment is made at the contract unit price. Such payment constitutes full compensation for the completion of the work.

Method 2—For items of work for which specific unit prices are established in the contract, the quantity of geotextile for each type placed with the specified limits is determined to the nearest specified unit by computing the area of the actual roll size or partial roll size installed. The computed area will include the amount required for overlap, seams, and anchorage as specified. Payment is made at the contract unit price. Such payment constitutes full compensation for the completion of the work.

Method 3—For items of work for which specific lump sum prices are established in the contract, the quantity of geotextile is not measured for payment. Payment for geotextiles is made at the contract lump sum price and constitutes full compensation for the completion of the work.

All methods—The following provisions apply to all methods of measurement and payment. Compensation for any item of work described in the contract, but not listed in the bid schedule, is included in the payment for the item of work to which it is made subsidiary. Such items and the items to which they are made subsidiary are identified in section 7 of this specification.

7. Items of Work and Construction Details

Items of work to be performed in conformance with this specification and the construction details therefore are:

Subsidiary Item, Geotextile

- (1) This specification covers furnishing all materials and the installation of the geotextile for the Focal Point and Urban Forest Systems as shown on the drawings.
- (2) Geotextile shall be woven, Class I with a opening of a U.S. Standard Sieve No. 70. The geotextile shall have a minimum unit weight of 5.6 ounces per square yard. The geotextile shall be equal to the Mirafi Filterweave 700. Equal in this case includes the softness and pliability as exhibited by the Filterweave 700.
- (3) Placement of the geotextile shall be according to Method 2 as set forth in Section No. 5 of this specification.
- (4) The geotextile shall be anchored along all edges as indicated on the drawings. If not indicated on the drawings, the geotextile shall at minimum be anchored by one of the following methods as applicable:
 - (a) At rock edges: The geotextile shall be lapped into the rock with minimum 1 foot cover and a minimum of 3 feet of embedment.
 - (b) At structures: The geotextile shall be secured to the structure with liquid nails or equivalent type epoxy.
 - (c) At pipe joints: The geotextile shall be fastened to the pipe using heavy duty industrial strength tie straps or equivalent.
- (5) No separate payment shall be made for this item. Compensation shall be included in the payment for the respective bid items to which it is incidental.

Construction Specification 440—Vegetative Measures

1. Scope

The work shall consist of preparing the area for treatment, and placing seed, sod, mulch, fertilizer, lime, and irrigation as specified in the designated areas.

2. Materials

Seed used shall be in accordance with the rules and regulations under each Florida Seed Law in effect on the date of Invitation of Bids. Each container of seed shall be labeled as follows:

- a. lot number
- b. name of the kind or kind and variety
- c. percentages of pure seed, other crop seed, weed seeds, and inert matter
- d. percentage of germination, and hard seeds (if any)
- e. date tested (month and year)
- f. names and number per pound of noxious weed seed
- g. name and address of shipper

All seed shall be furnished in sealed standard containers, unless exception is granted in writing. Seed shall be thoroughly recleaned, and of uniformly good quality and appearance throughout each container. Seed which has become wet, moldy, or otherwise damaged in transit or in storage will not be acceptable. Each lot of seed shall be subject to sampling and testing. The seed shall contain no prohibited noxious weed seed. The total number of all restricted weed shall not exceed 300 per pound. Method of scarification shall be mechanical. Seeds shall conform to the quality requirements as shown in the following table:

Name of Seed or Mixture	Minimum Percent Pure Seed	Minimum Percent Germination and Hard Seed	Maximum Percent Weed Seed
Argentine Bahiagrass (50% scarified)	80	70	1.00
Rye	95	90	0.50
Browntop Millet	98	85	0.50
Common Bermudagrass (Hulled)	80	70	1.00

Argentine Bahiagrass, common bermudagrass, and a nurse crop of rye shall be used if planting is done between September and February. Argentine Bahiagrass, Common Bermudagrass, and a nurse crop of Browntop Millet shall be used if the seeding is done between March and August.

Sod shall be Argentine Bahiagrass and shall be 12-inch by 12-inch squares or other commercially available rectangles. The sod shall be sufficiently thick (minimum thickness of 2 inches) to provide a dense stand of live grass. The sod shall have been grown on a mineral soil. Sod shall be live, fresh, and uninjured at the time of planting and shall be protected from drying out by shading and watering from the time it is dug until it is planted.

Mulch materials, where seeding and mulching will be done, shall be straw or hay from any native clippings or other plants approved by the Engineer. The mulch material shall be air dry, and shall not be musty, moldy, caked or otherwise of low quality. The mulch material shall be free of seeds of competing plants and noxious weeds.

Fertilizer shall be either in the liquid or dry form. Fertilizer shall be uniform in composition, free-flowing and suitable for application with standard equipment. The fertilizer shall conform to the Florida Fertilizer Laws in effect on the date of the Invitation for Bids and shall be delivered in bags, bottles, drums, or other convenient containers, each fully labeled and bearing the name, trademark, analysis, and warranty of the product. Fertilizer equivalent plant food value and shall be mixed with the top 3 or 4 inches of soil.

Lime shall be Dolomitic limestone, and shall be in accordance with rules and regulations of Florida Fertilizer Law in effect on the date for Invitation for Bids.

Staples for sod placed on side slopes steeper than 3:1 shall be black iron wire not smaller than 14 gauge, and bent from a length of wire at least 25 inches long into a "U" with 1-inch width at the crown.

Water used for irrigation may be obtained from any approved source. It shall be free of excess and harmful chemicals, acids, alkalies, or any substance which is harmful to plant growth.

3. Site Preparation

Site preparation shall include preparing seedbeds to a depth of 3 to 4 inches. Fertilizer and lime shall be uniformly spread over the area and incorporated to a depth of 3 to 4 inches. Fertilizer shall be applied at the rate of 800 pounds per acre or 16 pounds per 1000 square feet of 13-13-13 or equivalent. Lime shall be applied at the rate of one ton per acre or 45 pounds per 1000 square feet.

Where sodding will be done, all loose rock, woody material and other obstructions that will interfere with sodding shall be removed and the area shall be reasonably smooth and uniform. Lime and fertilizer shall be applied in the same quantity and manner as for seeding.

4. Vegetative Treatment

Vegetative Treatment required by this specification shall consist of performing the items specified in the manner designated below:

Seeding and Mulching shall consist of site preparation, seeding, and mulching at the rates and manner described in this specification. All disturbed areas not sodded will be seeded and mulched. The seeding rate shall be:

Bahiagrass - 50 lbs/ac or 1.1 lbs/1000 sq.ft.

Common Bermuda Grass - 20 lbs/ac or 0.7 lbs/1000 sq.ft.

Sept. – Feb.
Rye - 56 lbs/ac or 1.3 lbs/1000 sq.ft.

Mar. – Aug.
Browntop Millet - 25 lbs/ac or 0.5 lbs/1000 sq.ft.

The seed shall be uniformly spread over the area and covered ½ to 1-inch deep.

After the seeding has been done, uniformly spread 2 tons of mulch per acre rate over the area so that 25 percent of the ground surface is visible. The mulch shall be anchored into the soil, which may be done by cutting the mulch to a depth of 3 inches with a disc set almost straight, or other similar method acceptable to the Government Representative. Approximately one-half of the mulch material shall be above the soil surface. The area shall be firmed with a cultipacker, roller, or other equipment approved by the engineer. The mulch anchoring and firming of the soil may be done in one operation if good workmanship is accomplished and it is approved by the Government Representative.

Sodding shall consist of site preparation, sodding and irrigating at the rates and manner described in this specification.

The sod strips shall be laid in a staggered pattern with snug even joints. All joints shall be butted tight to prevent voids. Immediately following sod placements, it shall be rolled or tamped to insure solid contact of root mat and soil surface. The sod shall be securely anchored to the soil by pinning with staples or wooden pegs when placed on slopes steeper than 3:1. Pin or peg every 3 feet along each strip of sod.

5. Irrigation Requirements for Sod

All areas to be sodded shall be irrigated with ½ inch of water just prior to placement of the sod if soil moisture is deficient.

6. Measurement Requirements for Sod

For items of work for which specific unit prices are established in the contract, the areas of vegetative treatment will be measured as follows:

SODDING:

Sodding shall be measured to the nearest square yard.

On slopes flatter than 10% (10 horizontal to 1 vertical), area measurements for sodding shall be based on horizontal distances. On slopes of 10% or steeper, area measurements for sodding shall be based on distances measured along the slope.

Payment shall be made at the contract unit price for sodding and shall constitute full compensation for all labor, equipment, materials, tools, and all other items necessary and incidental to the completion of work.

SEEDING AND MULCHING:

METHOD 1: For items of work, for which specific unit prices are established in the contract, each area treated as specified will be measured on a horizontal plane and the area will be calculated to the nearest 0.1 acre. Payment for treatment will be made at the contract unit price for the designated treatment which shall constitute full compensation for all materials, labor, equipment, tools, and other items necessary and incidental to the completion of the work.

METHOD 2: For items of work, for which specific lump sum prices are established in the contract, the quantity of seeding and mulching for protective cover will not be measured for payment. Payment for this item will be made at the contract lump sum price for the item and shall constitute full compensation for all labor, equipment, tools, and all other items necessary and incidental to the completion of the work.

ALL VEGETATIVE MEASURES:

Compensation for any item of work described in the contract, but not listed in the bid schedule, will be included in the payment for the item of work to which it is made subsidiary. Such items and items to which they are made subsidiary are identified in Section 6 of this specification.

7. Items of Work and Construction Details

Items of work to be performed in conformance with this specification and the construction details therefore are:

A. Bid Item No. 31, Vegetative Measures, Sodding, Centipede

- (1) This item shall consist of furnishing and placing the centipede sod in accordance with the requirements of this specification in the areas designated on the drawings.
- (2) Measurement and Payment shall be according to the Santa Rosa County Contract.

B. Bid Item No. 32, Vegetative Measures, Plants and Trees

- (1) This item shall consist of installing the plants and trees according to the landscape plan. Plants and trees will be supplied by Santa Rosa County and delivered to the job site.
- (2) Measurement and Payment shall be according to the Santa Rosa County Contract.