

TECHNICAL SPECIFICATIONS

for the

CARSON DRIVE COMMUNITY STREETScape PROJECT (Bid Documents)

Prepared for:

THE CITY OF FORT WALTON BEACH

FORT WALTON BEACH, Florida

Prepared by:

ATKINS

2114 Airport Blvd, Suite 1450

Pensacola, Florida 32504

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CARSON DRIVE COMMUNITY STREETScape PROJECT

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SECTION 01300 - SUBMITTALS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

Drawings and General and Supplemental Provisions of the Contract, apply to this Section.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for submittals required for performance of the Work, including the following:

1. Contractor's construction schedule.
2. Submittal schedule.
3. Daily construction reports.
4. Shop drawings.
5. Product data.
6. Samples.
7. Quality assurance submittals.

B. Administrative Submittals: Refer to other Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to, the following:

1. Permits.
2. Applications for Payment.
3. Performance and payment bonds.
4. Insurance certificates.
5. List of subcontractors.

1.3 SUBMITTAL PROCEDURES

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.

The Engineer reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.

3. Processing: To avoid the need to delay construction as a result of the time required to process submittals, allow sufficient time for submittal review, including time for resubmittals. Allow 2 weeks for initial review. Allow additional time if the Engineer must delay processing to permit coordination with subsequent submittals.
 - a. If an intermediate submittal is necessary, process the same as the initial submittal.
 - b. Allow 2 weeks for reprocessing each submittal.
 - c. No extension of Contract Time will be authorized because of failure to transmit submittals to the Engineer sufficiently in advance of the Work to permit processing.
- B. Submittal Preparation: Place a permanent label or title block on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.
1. Provide a space approximately 4 by 5 inches (100 by 125 mm) on the label or beside the title block on Shop Drawings to record the Contractor's review and approval markings and the action taken.
 2. Include the following information on the label for processing and recording action taken.
 - a. Project name.
 - b. Date.
 - c. Name and address of the Engineer.
 - d. Name and address of the Contractor.
- C. Submittal Transmittal: Package each submittal appropriately for transmittal and handling. Six copies of each submittal shall be transmitted. Transmit each submittal from the Contractor to the Engineer using a transmittal form. The Engineer will not accept submittals received from sources other than the Contractor.

On the transmittal, record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including variations and limitations. Include Contractor's certification that information complies with Contract Document requirements on each submittal.

1.4 PROGRESS SCHEDULE

- A. Bar-Chart Schedule: Prepare a fully developed, horizontal bar-chart-type, contractor's construction schedule. Submit within 10 days after the date established for "Award of Contract." Include dates of shop drawing submittals.
- B. Cost Correlation: At the head of the schedule, provide a cost correlation line, indicating planned and actual costs. On the line, show dollar volume of Work per formed as of the dates used for preparation of payment requests.

1.5 DAILY CONSTRUCTION REPORTS

Prepare a daily construction report recording the following information concerning events at the site, and submit duplicate copies to the Engineer at weekly intervals:

1. Work performed.
2. Approximate count of personnel at the site.
3. Count and type of major equipment at the site.
4. High and low temperatures, general weather conditions, including daily rainfall amount from gauge installed on site jointly recorded by contractor and city representative.
5. Accidents and unusual events.
6. Meetings and significant decisions.
7. Stoppages, delays, shortages, and losses.
8. Emergency procedures.
9. Orders and requests of governing authorities.
10. Change Orders received, implemented.
11. Material Expenditures.

1.6 SHOP DRAWINGS

- A. Submit shop drawings for structures unless FDOT or City approved structures are used.
- B. Shop Drawings - Include the following information:
 1. Dimensions.
 2. Identification of products and materials included by sheet and detail number.
 3. Compliance with specified standards.

1.7 PRODUCT DATA

Product Data - Include the following information:

1. Manufacturer's printed recommendations.
2. Compliance with trade association standards.
3. Compliance with recognized testing agency standards.
4. Application of testing agency labels and seals.

1.8 SAMPLES

Submit samples as specified in the technical specifications.

1.9 QUALITY ASSURANCE SUBMITTALS

- A. Submit the QC Plan as per Section 105 of the FDOT Specifications to the Engineer for approval within 21 calendar days after the Contract Award. The Engineer will review the QC Plan and respond to the Contractor within 21 calendar days of receipt.

If at any time the Contractor is not in compliance with the approved QC Plan, or a part thereof, affected portions of the plan will be disapproved. Cease work in the affected operation(s) and submit a revision to the Engineer. If the QC Plan, or a part thereof, must be revised, submit the revision to the Engineer. The Engineer will review the revision and respond within seven calendar days of receipt.

Continue to work on operations that are still in compliance with the approved sections of the QC Plan.

- B. Certifications: Where other Sections of the Specifications require certification that a product, material, or installation complies with specified requirements, submit a certification from the manufacturer certifying compliance with specified requirements. C. Inspection and Test Reports: Submit two copies of Inspection and test reports to the Engineer. Requirements for specific testing are included in the technical specifications.

1.10 ENGINEER'S ACTION

Except for submittals for the record or information, where action and return is required, the Engineer will review each submittal, mark to indicate action taken, and return promptly. Compliance with specified characteristics is the Contractor's responsibility.

PART 2 - PRODUCTS (Not Applicable) PART 3 - EXECUTION (Not Applicable)

END OF SECTION 01300

SECTION 02230 - DEMOLITION/CLEARING & GRUBBING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions shall apply to this Section.
- B. Florida Department of Transportation, Standard Specifications for Road and Bridge Construction (FDOT Specs), Section 110, latest edition. Work shall comply with requirements of FDOT Specs as modified herein.
- C. GENERAL EXCEPTIONS: Any reference to FDOT Standard Specifications for Road and Bridge Construction (latest edition) Division I General Requirements & Covenants shall be excluded and not applicable to any specification referred here in, or otherwise listed in this document.

1.2 SUMMARY

- A. This Section includes, but is not limited to, the following:
 - 1. Protection of existing trees indicated to remain.
 - 2. Removal of trees and other vegetation.
 - 3. Clearing and grubbing.
 - 4. Removing above-grade improvements.
 - 5. Removing below-grade improvements.
- B. Extent of clearing & grubbing shall remain in right-of-way or easements unless otherwise noted or instructed.

1.3 PROJECT CONDITIONS

Provide protection for all public land corners and monuments within the limits of construction. Any Monuments disturbed while performing the work will be replaced at the contractor's expense.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 SITE CLEARING

- A. General: Remove trees, shrubs, grass, and other vegetation, improvements, or obstructions, as required, to permit installation of new construction. Remove similar items elsewhere on site or premises as specifically indicated. Removal includes digging outland off-site disposal of stumps and roots.

Carefully and cleanly cut minor roots and branches of trees indicated to remain in a manner where such roots and branches obstruct installation of new construction.

- B. Clearing and Grubbing: Clear site of trees, shrubs, and other vegetation, except for those indicated to remain.
1. Completely remove all stumps within the roadway. Remove roots and other debris to a depth of 12" below the ground surface.
 2. Use only hand methods for grubbing inside drip line of trees indicated to remain.
 3. Fill depressions caused by clearing and grubbing operations with satisfactory soil material, unless further excavation or earthwork is indicated in accordance with Section 2300.
- C. Removal of Improvements: Remove existing above-grade and below-grade improvements as indicated and as necessary to facilitate new construction, and other work as indicated.

3.2 DISPOSAL OF WASTE MATERIALS

- A. Burning: Burning is not permitted on City property. Requests to burn will be considered on a case by case basis. If approved, Contractor is to acquire permits and provide copy to the Engineer.
- B. Removal from City Property: Remove waste materials and unsuitable or excess topsoil from City property, and dispose of offsite in a legal manner.

PART 4 - MEASUREMENT/PAYMENT

4.1 METHOD OF MEASUREMENT

A. Lump Sum Payment

When direct payment is provided in the Contract for the quantity to be paid for as the lump sum quantity cleared and grubbed, no additional measurements will be made.

B. Payment By The Acre

For areas of Clearing and Grubbing that are designated to be paid for separately by the acre, the quantity to be paid for will be determined by measurement of the areas authorized by the Engineer to be cleared and grubbed, and acceptably completed.

4.2 BASIS OF PAYMENT

A. General

Price and payment will be full compensation for all Clearing and Grubbing required for the roadway right-of-way and for lateral ditches, channel changes, or other outfall areas, and any other Clearing and Grubbing indicated, or required for the construction of the entire project, except for any areas designated to be paid for separately or to be specifically included in the costs of other work under the contract.

Price and payment, either lump sum or by the acre will be full compensation for all the work specified in this Section, including all necessary hauling, furnishing equipment, equipment operation, furnishing any areas required for disposal of debris, leveling of terrain and the landscaping work of trimming, etc., as specified herein.

B. Lump Sum Payment

Payment shall be made at the lump sum contract price for Clearing and Grubbing, lump sum.

C. Payment By The Acre

Payment shall be made at the per unit contract price for Clearing and Grubbing, per acre.

END OF SECTION 02230

SECTION 02300 - EARTHWORK

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.
- B. Florida Department of Transportation, Standard Specifications for Road and Bridge Construction (FDOT Specs), Section 120, latest edition. Work shall comply with requirements of FDOT Specs as modified herein.
- C. GENERAL EXCEPTIONS: Any reference to FDOT Standard Specifications for Road and Bridge Construction (latest edition) Division I General Requirements & Covenants shall be excluded and not applicable to any specification referred herein, or otherwise listed in this document.

1.2 SUMMARY

- A. This Section includes preparing and grading subgrades for pavements and curbs.
- B. Related Sections: The following Sections contain requirements that relate to this Section.
 - 1. Section 2230 "Clearing & Grubbing" for clearing, grubbing, and tree protection.
 - 2. Section 2600 "Stormwater System" for installation of stormwater systems.

1.3 DEFINITIONS

- A. Excavation consists of the removal of material encountered to subgrade elevations and the reuse or disposal of materials removed.
- B. Subgrade: The uppermost surface of an excavation or the top surface of a fill or backfill immediately below subbase, base, drainage fill, or topsoil materials.
- C. Borrow: Soil material obtained off-site when sufficient approved soil material is not available from excavations.
- D. Subbase Course: The layer placed between the subgrade and base course in a paving system or the layer placed between the subgrade

and surface of a pavement or sidewalk or the existing layer beneath this base.

- E. Base Course: The layer placed between the subbase and surface pavement in a paving system.
- F. Unauthorized excavation consists of removing materials beyond indicated subgrade elevations or dimensions without direction by the Engineer. Unauthorized excavation, as well as remedial work directed by the Engineer, shall be at the Contractor's expense.
- G. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, curbs, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below ground surface.
- H. Utilities include on-site above ground utilities, overhead utilities and underground utilities including: pipes, conduits, ducts, and cables, as well as related appurtenances and underground services within building lines.
- I. Unsuitable Material: Any material such as muck, wood, rock, organic peat, garbage, very fine soil particles unsuitable for compaction, and any other material that is considered unsuitable by the City or its representative shall be considered unsuitable.
- J. Topsoil: Topsoil is defined as friable clay loam surface soil found normally to a depth of at least 4 inches. Satisfactory topsoil is reasonably free of subsoil, clay lumps, stones, and other objects over 2 inches in diameter, and without weeds, roots, and other objectionable material.

1.4 SUBMITTALS

- A. General: Submit the following in accordance with Section 1300, "Submittals and the General Conditions."
- B. Product Data and Samples of the following:
 - 1. 1-lb representative samples of each proposed fill and backfill soil material from borrow sources as selected by the Engineer.
 - 2. 12-by-12-inch sample of filter fabric.
- C. Test Reports: In addition to test reports required under field quality control, submit the following original copy directly to the Engineer from the testing services, with a copy to the Contractor:

1. Laboratory analysis of each soil material proposed for fill and backfill from borrow sources.
2. One optimum moisture-maximum density curve for each soil material.
3. Report of actual unconfined compressive strength and/or results of bearing tests of each stratum tested.

1.5 QUALITY ASSURANCE

- A. Codes and Standards: Perform earthwork complying with all requirements of authorities having jurisdiction. All material and construction methods shall be in accordance with the Standard Specifications for Road and Bridge Construction, State of Florida, Department of Transportation, latest edition.
- B. Testing and Inspection Service: During earthwork operations employ, at the Contractor's expense, a qualified independent geotechnical engineering testing agency, under the direction of a Professional Engineer, licensed in the State of Florida to classify, perform soil tests, and provide inspection services for quality control. All proposed borrow soils will require the testing agency to verify that soils comply with specified requirements and to perform required field and laboratory testing. Contractor shall replace materials removed for testing purposes. Should any work or materials fail to meet the requirements set forth in the plans and specifications, contractor shall pay for re-testing of same.
- C. Testing Laboratory Qualifications: To qualify for acceptance, the geotechnical testing laboratory must demonstrate to the Engineer's satisfaction, based on evaluation of laboratory-submitted criteria, that it has the experience and capability to conduct required field and laboratory geotechnical testing without delaying the progress of the work.

1.6 PROJECT CONDITIONS

- A. Site Information: Data in the subsurface investigation report was used for the basis of the design and are available to the contractor for information only. Conditions are not intended as representations or warranties of accuracy or continuity between soil borings. The Engineer/Owner will not be responsible for interpretations or conclusions drawn from this data by the contractor.

- B. Existing Utilities: Contractor is responsible for contacting all utility companies to obtain locations of all existing utilities or obstructions that he may encounter during construction. After location of utilities by the appropriate utility company, it is the Contractor's liability to protect all such utility lines, including service lines and appurtenances, and to replace at his own expense any that may be damaged by the Contractor's equipment or forces during construction of the Project.
1. Provide a minimum of 48-hours' notice to the Engineer and receive written notice to proceed before interrupting any utility.
 2. The contractor is responsible for contacting all utility companies to verify locations of all existing utilities, utility-related obstructions, or utility relocations that he may encounter during construction.
 3. Adequate provision shall be made for the flow of existing sewers, drains, and water courses encountered during construction, and structures which may be disturbed shall be satisfactorily restored by the Contractor.
- C. Should uncharted, or incorrectly charted, piping or other utilities be encountered during the course of the work, consult Engineer immediately for directions. Cooperate with owner and utility companies in keeping respective services and facilities in operation.

PART 2 - PRODUCTS

2.1 SOIL MATERIALS

- A. General: Soils used as fill shall be clean sands, similar to existing site soil, with less than 5% passing the number 200 sieve when existing subgrade conditions are considered wet as per the City and/or its representative. Soils as described above with less than 12% passing the number 200 sieve and meeting the requirements of Section 902-6 of the FDOT Specifications may be used when existing subgrade conditions are considered dry as per the City and/or its representative. The sand shall have a maximum dry density of at least 100 pounds per cubic foot, according to the Standard Proctor compaction test, AASHTO T-99, ASTM D698. Provide approved borrow soil materials from off-site when sufficient satisfactory soil materials are not available from excavations. Provide laboratory certification that soils meet requirements of specifications.

If the Contractor elects to import any materials other than that excavated on site, then he will do so only with Engineer's approval

and at his own expense, unless separate payment for such items are called for in these specifications.

- B. Sub-base Material: Naturally or artificially graded mixture of natural or crushed gravel, crushed stone, and natural or crushed sand, ASTM D 2940, with at least 95 percent passing a 1-1/2-inch sieve, and not more than 8 percent passing a No. 200 sieve.

PART 3 - EXECUTION

3.1 DEWATERING

- A. Prevent surface water and subsurface or ground water from entering excavations, from ponding on prepared subgrades, and from flooding project site and surrounding area.
- B. Protect subgrades and foundation soils from softening and damage by rain or water accumulation.
- C. The Contractor shall prevent the accumulation of water in excavated areas, and shall remove by pumping or other means any water that accumulates in the excavation. The Contractor shall prevent the accumulation of water in both structural and trench excavations and shall remove by well point system or by other means water which accumulates. The Contractor shall provide, install and operate a suitable and satisfactory dewatering system. The contractor shall be responsible for any required permitting and permit fees. The contractor shall include the cost of this pumping equipment, work, and any required permitting in the unit price bid for the work.
- D. Establish and maintain temporary diversions outside excavation limits to convey rainwater and water removed from excavations to collection or runoff areas. Do not use trench excavations as temporary drainage ditches.

3.2 EXCAVATION

- A. Explosives: Not permitted.
- B. Unclassified Excavation: Excavation is unclassified and includes excavation to required subgrade elevations regardless of the character of materials and obstructions encountered.
- C. Strip topsoil to whatever depths encountered in a manner to prevent intermingling with underlying subsoil or other objectionable material. Remove heavy growths of grass from areas before stripping. Where existing trees are indicated to remain,

leave existing topsoil in place within drip lines to prevent damage to root systems.

3.3 STABILITY OF EXCAVATIONS

- A. Comply with local codes, ordinances, and requirements of authorities having jurisdiction to maintain stable excavations.
- B. All excavation work shall conform to all applicable OSHA Publications, latest editions. The Contractor's method of providing protective support to prevent cave-ins shall conform to OSHA requirements. Slope excavations, shoring, and trench box usage in the field must be based on tabulated data and designed by the Contractor. The contractor is solely responsible for on site safety.

3.4 EXCAVATION FOR STRUCTURES

Excavate to indicated elevations and dimensions within a tolerance of plus or minus 0.10 foot. Extend excavations a sufficient distance from structures for placing and removing concrete formwork, installing services and other construction, and for inspections.

- A. Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
- B. Pile Foundations: Stop excavations from 6 inches to 12 inches above bottom of footing before piles are placed. After piles have been driven, remove loose and displaced material. Excavate to final grade, leaving solid base to receive concrete pile caps.
- C. Excavation for Underground Tanks, Basins, and Mechanical or Electrical Appurtenances: Excavate to elevations and dimensions indicated within a tolerance of plus or minus 0.10 foot. Do not disturb bottom of excavations intended for bearing surface.

3.5 EXCAVATION FOR WALKS AND PAVEMENTS

Excavate surfaces under walks and pavements to indicated cross sections, elevations, and grades.

3.6 EXCAVATION FOR STORMWATER SYSTEMS

Excavate and compact the backfill of trenches to the densities specified for embankment or subgrade, as applicable, and in accordance with the requirements of Section 2600.

3.7 STORAGE OF SOIL MATERIALS

Stockpile excavated materials acceptable for backfill and fill soil materials, including acceptable borrow materials. Stockpile soil materials without intermixing. Place, grade, and shape stockpiles to drain surface water. Cover to prevent wind-blown dust.

- A. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.
- B. Stockpile topsoil and other reusable soils in storage piles in areas indicated or directed. Construct storage piles to provide free drainage of surface water. Cover storage piles, if required, to prevent erosion.

3.8 BACKFILL

- A. Backfill excavations promptly, but not before completing the following:
 - 1. Acceptance of construction below finish grade including, where applicable, filter fabric, installation, and gravel bedding.
 - 2. Surveying locations of underground utilities for record documents.
 - 3. Testing, inspecting, and approval of underground utilities.
 - 4. Removal of trash and debris from excavation.
 - 5. Removal of temporary shoring, bracing, and sheeting unless specified to remain.
- B. No backfill material shall be placed, spread or rolled during unfavorable weather conditions. When the work is interrupted by heavy rain, backfill operations shall not be resumed until the moisture content and density of the fill are as previously specified.

3.9 FILL

- A. Preparation: Remove vegetation, topsoil, debris, wet, and unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placing fills. Plow strip, or break up sloped surfaces steeper than 1 vertical to 4 horizontal so fill material will bond with existing surface. In order to insure proper bond and prevent slipping between the original ground and fill, the surface of the original ground shall be scarified to a depth of at least three inches. Each layer of fill

material shall be compacted until the required density is achieved.

- B. When sub grade or existing ground surface to receive fill has a density less than that required for fill, break up ground surface to depth required, pulverize, moisture-condition or aerate soil and re-compact to required density.
- C. Place fill material in layers to required elevations for each location listed below.
 - 1. Under grass, use satisfactory excavated or borrow soil material.
 - 2. Under walks and pavements, steps, ramps, building slabs, footings, and foundations use subbase or base material, or satisfactory excavated or borrow soil material.

3.10 MOISTURE CONTROL

Uniformly moisten or aerate subgrade and each subsequent fill or backfill layer before compaction to within 2 percent of optimum moisture content.

- A. Do not place backfill or fill material on surfaces that contain excessive moisture.
- B. Remove and replace, or scarify and air-dry satisfactory soil material that is too wet to compact to specified density. Stockpile or spread and dry removed wet satisfactory soil material.

3.11 COMPACTION

- A. Place backfill and fill materials in layers not more than 8 inches in loose depth for material compacted by heavy compaction equipment, and not more than 4 inches in loose depth for material compacted by hand-operated tampers. The Contractor may construct embankments in successive layers of not more than 12" compacted thickness, if he can demonstrate with field tests that he has compacting equipment efficient to achieve required density for the full depth of a thicker lift. The Engineer reserves the right to terminate the Contractor's use of thick lift construction and have him revert to the 8" loose lifts whenever it is determined that satisfactory results are not being achieved.
- B. Place backfill and fill materials evenly on all sides of structures to required elevations. Place backfill and fill uniformly along the full length of each structure.

- C. Percentage of Maximum Dry Density Requirements: Compact soil to not less than the following percentages of maximum dry density according to ASTM D698 (Standard Proctor):
 - 1. Under structures, building slabs, steps, and concrete pavements, compact each layer of backfill or fill material at 100 percent maximum dry density.
 - 2. Under lawn or unpaved areas, compact each layer of backfill or fill material at 95 percent maximum dry density.

3.12 GRADING

- A. General: Uniformly grade areas to a smooth surface, free from irregular surface changes. Comply with compaction requirements and grade to cross sections, lines, and elevations indicated.
 - 1. Provide a smooth transition between existing adjacent grades and new grades.
 - 2. Cut out soft spots, fill low spots, and trim high spots to conform to required surface tolerances.
- B. Site Grading: Slope grades to direct water away from buildings and to prevent ponding. Finish subgrades to required elevations within the following tolerances:
 - 1. Lawn or Unpaved Areas: Plus or minus 0.10 foot.
 - 2. Walks: Plus or minus 0.10 foot.
 - 3. Pavements: Plus or minus ½ inch.

3.13 STABILIZED SUBGRADE

- A. For stabilized subgrade the type of materials, commercial or local, is at the Contractor's option and no separate payment for stabilizing materials will be made (other than as may be paid for as borrow).
- B. When stabilizing is designated as Type B, compliance with the bearing value requirements will be determined by the Lime rock Bearing Ratio Method. Minimum LBR shall be 40.
- C. It is the Contractor's responsibility that the finished roadbed section meets the bearing value requirements, regardless of the quantity of stabilizing materials necessary to be added. Also, full payment will be made for any areas where the existing subgrade materials meet the design bearing value requirements without the addition of stabilizing additives, as well as areas where the Contractor may elect to place select high-bearing materials from other sources, within the limits of the stabilizing.

- D. After the roadbed grading operations have been substantially completed, the Contractor shall make his own determination as to the quantity (if any) of stabilizing material, of the type selected by him, necessary for compliance with the bearing value requirements. The contractor shall notify the Engineer of the approximate quantity to be added, and the spreading and mixing-in of such quantity of materials shall meet the approval of the Engineer as to uniformity and effectiveness.

3.14 FIELD QUALITY CONTROL

- A. Testing Agency Services: Allow testing agency to inspect and test each subgrade and each fill or backfill layer. Do not proceed until test results for previously completed work verify compliance with requirements.
 - 1. Perform field in-place density tests according to ASTM D 1556 (sand cone method), ASTM D 2167 (rubber balloon method), or ASTM D 2937 (drive cylinder method), as applicable.
 - a. Field in-place density tests may also be performed by the nuclear method according to ASTM D 2922, provided that calibration curves are periodically checked and adjusted to correlate to tests performed using ASTM D 1556. With each density calibration check, check the calibration curves furnished with the moisture gauges according to ASTM D 3017.
 - b. When field in-place density tests are performed using nuclear methods, make calibration checks of both density and moisture gauges at beginning of work, on each different type of material encountered, and at intervals as directed by the Engineer.
 - 2. Paved Areas: Make at least one field density test of subgrade, base, and each compacted fill layer for every 300 linear feet of roadway or equivalent area, but in no case less than three tests. Tests shall be staggered to ensure representative sampling.
 - 3. Unpaved Areas: Make at least one field density test of each compacted fill layer or subgrade for every 1000 square yards of area, but in no case less than three tests.
 - 4. Other tests may be required at Engineer's discretion.
- C. If in the opinion of the Engineer, based on testing service reports and inspection, sub grades, fills, or backfills are below specified density, scarify and moisten or aerate, or remove and replace soil to the depth required, re-compact, and re-test until required density is obtained at no additional expense.

3.15 REPAIR & CORRECTIONS

- A. Protecting Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris. Repair and re-establish grades to specified tolerances where completed or partially completed surfaces become eroded, rutted, settled, or lose compaction due to subsequent construction operations or weather conditions. Scarify or remove and replace material to depth directed by the Engineer; reshape and re-compact at optimum moisture content to the required density.
- B. Settling: Where settling occurs during the warranty period, remove finished surfacing, backfill with additional approved material, compact, and reconstruct surfacing. Restore appearance, quality, and condition of finished surfacing to match adjacent work, and eliminate evidence of restoration to the greatest extent possible.
- C. When traffic must cross open trenches, the contractor shall provide suitable bridges. (See Section 4060 for additional requirements.)
- D. Erosion Control: The Contractor shall be responsible for the prevention of erosion from the site and for maintaining filled and graded surfaces for the duration of the project. This includes, but is not limited to, the erection of a silt fence and hay bale barricade as per Florida Department of Transportation Design Standard indexes 102 and 104, as shown in the construction plans. The Contractor shall take whatever steps necessary to prevent erosion and sedimentation, and will be responsible for any damages which might occur to down-land properties as a result of run-off from the site during site work construction. Provide erosion control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.16 DISPOSAL OF SURPLUS AND WASTE MATERIALS

Surplus excavated material becomes the property of the Contractor unless otherwise noted. Waste materials, including unsatisfactory soils, trash and debris shall be removed and legally disposed of, off the Owner's property.

3.17 CLEAN-UP AND FINAL INSPECTION

Before final inspection and acceptance the Contractor shall clean ditches, shape shoulders and restore all disturbed areas, including street crossings, grassplots, re-grassing if necessary, to as good a condition as existed before work started.

PART 4 - MEASUREMENT/PAYMENT

4.1 METHOD OF MEASUREMENT

A. Excavation and Backfill. Excavation and backfill for pile caps, tie rods, concrete culvert and other structures and operations will be covered under the contract price to which the work pertains.

B. Borrow. The unit of measurement for borrow will be the cubic yard. Yardage of borrow to be paid for will be the number of cubic yards of borrow satisfactorily placed in fills or as otherwise directed, measured in the final in-place compacted position, and computed by the average end-area method.

C. Subsidiary Obligations. The following operations and construction will not be measured for direct payment, but will be considered subsidiary obligations of the Contractor, and will be covered under the contract price per yard as specified below.

1. Excavation for structures and operations required in connection therewith, including bracing or sheeting, drainage, and pumping, will be covered under the contract price to which the work pertains.

2. Backfill for structures below grade, including attendant operations, will be covered under the contract price to which the work pertains.

3. Fill construction including the preparation of ground surface for placement of fill will be covered under the unit prices per cubic yard for borrow.

4. Finishing, including surface dressing, shaping, and compacting of the surface will be covered under the unit price per cubic yard for borrow.

5. Water used for sprinkling and wetting materials during construction in connection with compacting of fills, unless otherwise specified, will be covered under the contract unit price per cubic yard for borrow.

4.2 BASIS OF PAYMENT

A. GENERAL

Prices and payments for the various work items included in this section will be full compensation for all work described herein,

including excavating, dewatering, dredging, hauling, placing, and compacting. Separate pay items will be provided for all devices required to maintain control of erosion.

Payment for Earthwork, Excavation, and Grading are paid for under separate line items. Those line items are "Clearing and Grubbing (including Trees UNDER 12" dia)", "Regular Excavation", and "Earthwork Fill". The price bid shall be full compensation for all material, labor, tools, and equipment necessary to complete the work according to the plans and specifications.

END OF SECTION 02300

SECTION 02400 - GRADED AGGREGATE BASE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of contract, including General and Supplementary Conditions and other Specification Sections, apply to the work of this section.
- B. GENERAL EXCEPTIONS: Any reference to FDOT Standard Specification for Road and Bridge Construction (latest edition) Division I General Requirements & Covenants shall be excluded and not applicable to any specification referred herein, or otherwise listed in this document.

1.2 DESCRIPTION OF WORK

This item shall consist of a base course of graded aggregate base constructed on a subgrade prepared in accordance with the specifications and in conformity with the line, grades and typical cross-section as shown on the drawings.

PART 2 - PRODUCTS

2.1 MATERIALS

Use graded aggregate material, produced from FDOT approved sources, which yields a satisfactory mixture meeting all the requirements of these Specifications after it has been crushed and processed as a part of the mining operations.

The Contractor may furnish the material in two sizes of such gradation that, when combined in a central mix plant pugmill, the resultant mixture meets the required specifications.

Use graded aggregate base material of uniform quality throughout, substantially free from vegetable matter, shale, lumps and clay balls, and having a Limerock Bearing Ratio value of not less than 100. Use material retained on the No. 10 sieve composed of aggregate meeting the following requirements:

Soundness Loss, Sodium, Sulfate: AASHTO T 104.....	15%
Percent Wear: AASHTO T 96 (Grading A)	
Group 1 Aggregates	45%
Group 2 Aggregates	65%

Group 1: This group of aggregates is composed of limestone, marble, or dolomite.

Group 2: This group of aggregates is composed of granite, gneiss, or quartzite.

Use graded aggregate base material meeting the following gradation:

Sieve Size	Percent by Weight Passing
2 inch	100
1 1/2 inch	95 to 100
3/4 inch	65 to 90
3/8 inch	45 to 75
No. 4	35 to 60
No. 10	25 to 45
No. 50	5 to 25
No. 200	0 to 10

For Group 1 aggregates, ensure that the fraction passing the No. 40 sieve has a Plasticity Index (AASHTO T 90) of not more than 4.0 and a Liquid Limit (AASHTO T 89) of not more than 25, and contains not more than 67% of the weight passing the No. 200 sieve.

For Group 2 aggregates, ensure that the material passing the No. 10 sieve has a sand equivalent (AASHTO T 176) value of not less than 28.

The Contractor may use graded aggregate of either Group 1 or Group 2, but only use one group on any Contract. (Graded aggregate may be referred to hereinafter as "aggregate".)

2.2 EQUIPMENT

The aggregate shall be spread by mechanical rock spreaders, equipped with a device which strikes off the aggregate uniformly to laying thickness, and capable of producing an even distribution of the aggregate. For crossovers, intersections and ramp areas; for roadway widths of 20 feet or less; for the main roadway area when forms are used and for any other areas where the use of a mechanical spreader is not practicable; spreading may be done by bulldozers or blade graders. All equipment for proper construction of this project shall be in first-class working condition.

PART 3 - EXECUTION

3.1 TRANSPORTING GRADED AGGREGATE

The graded aggregate shall be transported to the point where it is to be used, over aggregate previously placed if practicable, and dumped on the end of the preceding spread. Hauling over the subgrade and dumping on the subgrade will be permitted when, in the Engineer's opinion, these operations will not be detrimental to the base.

3.2 SPREADING GRADED AGGREGATE

- A. Method of Spreading: The graded aggregate shall be spread uniformly. All segregated areas of fine or coarse aggregate shall be removed and replaced with properly graded aggregate.
- B. Number of Courses: When the specified compacted thickness of the base is greater than six inches, the base shall be constructed in two courses. The thickness of the first course shall be approximately one-half the total thickness of the finished base, or enough additional material added to bear the weight of the construction equipment without disturbing the subgrade. When compacted thickness is six inches or less, graded aggregate shall be placed in one lift.

3.3 COMPACTING AND FINISHING BASE

- A. Single-Course Base: For single-course base, after the spreading is completed, the entire surface shall be scarified and then shaped so as to produce the required grade and cross-section after compaction.
- B. Multiple-Course Base: For multiple-course base, the first course shall be cleaned of foreign material and bladed and brought to a surface cross-section approximately parallel to that of the finished base. Prior to the spreading of any material for the upper course, the density tests for the lower course shall be made and the Engineer shall have determined that the required compaction has been obtained. After the spreading of the material for the second course is completed, its surface shall be finished and shaped so as to produce the required grade and cross-section after compaction, and free of scabs and laminations.
- C. Moisture Content: When the material does not have the proper moisture content to ensure the required density, wetting or drying will be required. When water is added, it shall be uniformly mixed-in by disking to the full depth of the course which is being compacted. Wetting or drying operations shall involve manipulation, as a unit, of the entire width and depth of the course which is being compacted.

3.4 DENSITY REQUIREMENTS

As soon as proper conditions of moisture are attained, the material shall be compacted to a density of not less than 100% of the maximum density as determined by AASHTO T-180.

3.5 TESTING SURFACE, PROTECTION, AND MAINTENANCE

- A. Density Tests: A minimum of at least one field density test on

each course of compacted base shall be performed by the contractor for every 500 square yards, or every 300 linear feet of road pavement, or as directed by the Engineer. Additional tests may be made if deemed necessary by the Engineer.

- B. During final compacting operations, if blading of any areas is necessary to obtain the true grade and cross-section, the compacting operations for such areas shall be completed prior to making the density tests on the finished base.
- C. Correction of Defects: Contamination of Base Material: If, at any time, the subgrade material should become mixed with the base course materials, the Contractor shall, without additional compensation, dig out and remove the mixture, reshape and compact the subgrade and replace the materials removed with clean base material, which shall be shaped and compacted as specified above.

Cracks and Checks: If cracks or checks appear in the base, either before or after priming, which in the opinion of the Engineer would impair the structural efficiency of the base, the Contractor shall remove the cracks or checks by re-scarifying, reshaping, adding base material where necessary, and re-compacting.

- D. Compaction of Widening Strips: Where base construction consists of widening strips and the trench width is not sufficient to permit use of standard base compaction equipment, compaction shall be accomplished by use of vibratory compactors, trench rollers or other special equipment which will achieve the density requirements specified herein.

When multiple-course base construction is required by the plans or specifications, the required compaction shall be achieved in each course prior to spreading material for the overlaying course.

- E. Testing Surface: The finished surface of the base course shall be checked from the required crown and ensure longitudinally a smooth consisted surface for the placement of the asphalt course(s). All irregularities, greater than 1/4 inch, shall be corrected, after which the entire area shall be recompacted and tested as specified herein before. In the testing of the surface, the measurements will not be taken in small holes caused by individual pieces of rock having been pulled out by the grader.

- F. Priming and Maintaining:

Priming: The prime coat shall be applied only when the base meets the specified density requirements and the moisture content in the top half of the base does not exceed 90 percent of the optimum moisture of the base material. At the time of priming, the base shall be firm, unyielding and in such condition that no undue

distortion will occur.

Maintaining: The Contractor will be responsible for assuring that the true crown and template are maintained, with no rutting or other distortions, and that the base meets all the requirements, at the time the surface course is applied.

G. Thickness Requirements:

Measurements: Thickness of the base shall be measured at intervals in such a manner that each test represents 500 square yards, or every 300 linear feet of road pavement, or as otherwise directed by the Engineer. Measurements shall be taken at various points on the cross-section, through holes not less than three inches in diameter.

Areas Requiring Correction: Where the compacted base is deficient by more than $\frac{1}{2}$ inch from the thickness called for in the plans, the Contractor shall correct such areas. The affected areas shall then be brought to the required state of compaction and to the required thickness and cross-section.

PART 4 MEASUREMENT / PAYMENT

4.1 METHOD OF MEASUREMENT:

The quantity to be paid for will be the area, in square yards, completed and accepted.

4.2 BASIS OF PAYMENT:

Price and payment will be full compensation for all work specified in this section, including dust abatement, correcting all defective surfaces and deficient thickness, removing cracks and checks, the additional aggregate required for such crack elimination, and the prime coat.

END OF SECTION 02400

SECTION 02500 - SUPERPAVE ASPHALT CONCRETE PAVEMENT

PART 1 - GENERAL

1.1 GENERAL

- A. Construct a Type SP Asphalt pavement for local agencies using the type of mixture specified in the Contract, or when offered as alternates, as approved.
- B. All references to the Department shall mean the City of Fort Walton Beach. All references to the Engineer shall mean the designated Engineer of City of Fort Walton Beach.
- C. The Engineer will accept the work based on one of the following methods as described in Part 5: 1) Certification, 2) Certification and process control testing by the Contractor, 3) acceptance testing by the City or 4) other method(s) as determined by the Contract.
- D. GENERAL EXCEPTIONS: Any reference to FDOT Standard Specification for Road and Bridge Construction (latest edition) Division I General Requirements & Covenants shall be excluded and not applicable to any specification referred herein, or otherwise listed in this document.

1.2 LAYER THICKNESSES

- A. Use only fine graded Type SP asphalt mixes. Fine graded mixes are defined as having a gradation that passes above the restricted zone when plotted on an FHWA 0.45 Power Gradation Chart.
- B. FINE MIXES: The allowable structural layer thicknesses for fine Type SP Asphalt Concrete mixtures are as follows:

Type SP 9.5... 3/4 - 1 1/4 inches
Type SP 12.5.. 1 1/4 - 2 1/2 inches
Type SP 19.0.. 2- 2 3/4 inches

In addition to the minimum and maximum thickness requirements, the following restrictions are placed on fine mixes when used as a structural course:

Type SP 9.5 - Limited to the final (top) structural layer, one layer only

Type SP 12.5 - May not be used in the first layer of courses over 3 1/2 inches thick, nor in the first layer of courses over 2 3/4 inches thick on limited access facilities.

Minimum thickness shall be 2 inches installed in two layers. The first layer shall be a minimum of 1¼-inches of Type SP 12.5 with asphalt flush with the curb and at curb inlet throat. The thickness of the new pavement may be checked by core samples, where a questionable area is present, as determined by the department. The Contractor shall be required to correct any deficiency either by replacing the full thickness or overlaying the area as directed by the Engineer of Record and accepted by the City Engineer. City inspection shall be performed and all base failures shall be corrected prior to asphalt installation.

Type SP 19.0 - May not be used in the final (top) structural layer.

C. ADDITIONAL REQUIREMENTS: The following requirements also apply to fine Type SP Asphalt Concrete mixtures:

1. A minimum 1 1/2 inch initial lift is required over an Asphalt Rubber Membrane Interlayer (ARMI).
2. When construction includes the paving of adjacent shoulders (5 feet wide or less), the layer thickness for the upper pavement layer and shoulder shall be the same and paved in a single pass, unless shown differently in the plans.
3. Use the minimum and maximum layer thicknesses as specified in 1.2 B above unless shown differently in the plans. On variable thickness overbuild layers, the minimum allowable thickness may be reduced by 1/2 inch, and the maximum allowable thickness may be increased 1/2 inch, unless shown differently in the plans.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

Meet the material requirements specified in FDOT Standard Specifications Division III. Specific references are as follows:

Superpave PG Asphalt Binder or Recycling Agent - Sections 916-1, 916-2
Coarse Aggregate, Stone, Slag or Crushed Gravel - Section 901
Fine Aggregate - Section 902

Aggregates utilized on City of Fort Walton Beach projects must be in accordance with FDOT Qualified Products List

2.2 GRADATION REQUIREMENTS

Combine the coarse and fine aggregate in proportions that will produce an asphalt mixture meeting all of the requirements defined in this

Specification and conform to the gradation requirements at design as defined in Table 2. Aggregates from various sources may be combined.

Table 2 Aggregate Gradation Control Points (Gradation Design Ranges)						
Sieve Size	Type SP Asphalt Mixture (Percent Passing)					
	SP 9.5		SP 12.5		SP 19.0	
	Min.	Max.	Min.	Max.	Min.	Max.
1 inch	-	-	-	-	100	-
¾ inch	-	-	100	-	90	100
½ inch	100	-	90	100	-	90
3/8 inch	90	100	-	90	-	-
No. 4	-	90	-	-	-	-
No. 8	32	67	28	58	23	49
No. 200	2	10	2	10	2	8

2.3 RESTRICTED ZONE

The gradation identified in 2.2 shall pass above the restricted zone specified in Table 3.

Table 3 Aggregate Gradation Restricted Zone (Design Only)						
Sieve Size within Restricted Zone	Boundaries of Restricted Zone Type SP Asphalt Mixture (Percent Passing)					
	SP 9.5		SP 12.5		SP 19.0	
	Min.	Max.	Min.	Max.	Min.	Max.
No. 4	-	-	-	-	-	-
No. 8	47.2	47.2	39.1	39.1	34.6	34.6
No. 16	31.6	37.6	25.6	31.6	22.3	28.3
No. 30	23.5	27.5	19.1	23.1	16.7	20.7

2.4 AGGREGATE CONSENSUS PROPERTIES

- A. Meet the following consensus properties at design for the aggregate blend:
 1. Coarse Aggregate Angularity: When tested in accordance with ASTM D 5821, meet the coarse aggregate angularity requirement defined in Table 4.

Table 4 Coarse Aggregate Angularity Criteria (Minimum Percent Fractured Faces)			
Depth of Top of Pavement Layer From Surface			
≤ 4 inches		> 4 inches	
1 or More Fractured Faces (%)	2 or More Fractured Faces (%)	1 or More Fractured Faces (%)	2 or More Fractured Faces (%)
85	80	60	-

2. Fine Aggregate Angularity: When tested in accordance with AASHTO T-304, meet the fine aggregate angularity requirement defined in Table 5.

Table 5 Fine Aggregate Angularity Criteria (Minimum Percent Fractured Faces)	
Depth of Top of Pavement Layer From Surface	
≤ 4 inches	> 4 inches
Minimum Uncompacted Void Content (%)	Minimum Uncompacted Void Content (%)
45	40

3. Flat and Elongated Particles: When tested in accordance with ASTM D 4791, use a ratio of maximum to minimum dimensions of 5:1 and do not exceed 10% as the maximum amount of flat and elongated particles.
4. Clay Content: When tested in accordance with AASHTO T 176, meet the sand equivalent value for fine aggregate blend defined in 45.

Table 6 Clay Content	
SP Mixes	45

2.5 USE OF RECLAIMED ASPHALT PAVEMENT

- A. General Requirements: Reclaimed Asphalt Pavement (RAP) may be used as a component material of the asphalt mixture subject to the following:

1. The Contractor assumes responsibility for the design of asphalt mixes which incorporate RAP as a component material.
2. For design purposes, the Contractor assumes responsibility for establishing accurate specific gravity values for the RAP

material. This may be accomplished by one of the following methods:

- a) Calculation of the bulk specific gravity value based upon the effective specific gravity of the RAP, determined on the basis of the asphalt binder content and maximum specific gravity. The Engineer will approve the estimated asphalt binder absorption value used in the calculation.
 - b) Testing of the extracted aggregate obtained through a vacuum extraction or ignition oven extraction.
3. The amount of RAP material used in the mix is not to exceed 50% by weight of total aggregate.
 4. Use a grizzly or grid over the RAP cold bin, in-line roller crusher, screen, or other suitable means to prevent oversized RAP material from showing up in the completed recycled mixture.

If oversized RAP material appears in the completed recycled mix, take the appropriate corrective action immediately. If the appropriate corrective actions are not immediately taken, stop plant operations.

5. Provide stockpiled RAP material that is reasonably consistent in characteristics and contains no aggregate particles that are soft or conglomerates of fines.
 6. Provide RAP, having minimum average asphalt content of 4.0% by weight of total mix. The Engineer may sample the stockpile to verify that this requirement is met.
- B. Binder for Mixes with RAP: Select the appropriate binder based on Table 7. The Engineer reserves the right to change binder type and grade at design based on the characteristics of the RAP binder, and reserves the right to make changes during production. Maintain the viscosity of the recycled mixture within the range of 4,000 to 12,000 poises. Obtain a sample of the mixture for the Engineer within the first 1,000 tons and at a frequency of approximately one per 4,000 tons of mix.

Table 7 Binder Grade for Mixes Containing RAP	
% RAP	Asphalt Binder Grade
<20	PG 67-22
20-29	PG 64-22
≥ 30	Recycling Agent
Note: When a PG 76-22 Asphalt Binder is called for in the Contract, limit the amount of RAP material used in the mix to a maximum of 15%.	

PART 3 - GENERAL COMPOSITION OF MIXTURE

3.1 GENERAL

Compose the asphalt mixture using a combination of aggregate (coarse, fine or mixtures thereof), mineral filler, if required, and asphalt binder material. Size, grade and combine the aggregate fractions to meet the grading and physical properties of the approved mix design. Aggregates from various sources may be combined.

3.2 MIX DESIGN

A. Design the Type SP asphalt mixture in accordance with AASHTO PP-28, except as noted herein, to meet the requirements of this Specification. Use only previously approved designs. Prior to the production of any Type SP asphalt mixture, submit the proposed mix design with supporting test data indicating compliance with all Type SP asphalt mix design criteria. The Engineer will consider any marked variations from original test data for a mix design or any evidence of inadequate field performance of a mix design as sufficient evidence that the properties of the mix design have changed, and the Engineer will no longer allow the use of the mix design.

1. Grading Requirements: Meet the gradation design ranges of Table 2.
2. Gyrotory Compaction: Compact the design mixture in accordance with AASHTO TP-4. Use the number of gyrations as defined in Table 8.

Table 8 Type SP Design Gyrotory Compactive Effort			
SP Mixes	N _{initial}	N _{design}	N _{maximum}
	7	75	115

3. Volumetric Criteria: Use an air void content of the mixture at design of 4.0% at the design number of gyrations (N_{design}). Meet the requirements of Table 9.

Table 9 Mixture Densification Criteria			
SP Mixes	% G _{mm}		
	N _{initial}	N _{design}	N _{maximum}
	≥ 89.0	96.0	≤ 98.0

4. VMA Criteria: Meet the requirements of Table 10 for voids in the mineral aggregate (VMA) of the mixture at the design number of gyrations.

Table 10 VMA Criteria	
Type Mix	Minimum VMA (%)
SP 9.5	15.0
SP 12.5	14.0
SP 19.0	13.0

5. VFA Criteria: Meet the requirements of Table 11 for voids filled with asphalt (VFA) of the mixture at the design number of gyrations.

Table 11 VFA Criteria	
	Design VFA (%)
SP Mixes	65 - 75

6. Dust Proportion: Use a dust to effective asphalt binder content by weight.

7. Moisture Susceptibility: Provide a mixture (4 inch specimens) having a retained tensile strength ratio of at least 0.80 and a minimum tensile strength (dry and unconditioned) of 100 psi

8. Additional Information: In addition to the requirements listed above, provide the following information with each proposed mix design submitted for use:

- a. The design number of gyrations (N_{design})
- b. The source and description of the materials to be used.
- c. The FDOT source number product code of the aggregate components furnished from an FDOT approved source.
- d. The gradation and proportions of the raw materials as intended to be combined in the paving mixture. The gradation of the component materials shall be representative of the material at the time of use. Compensate for any change in aggregate gradation in handling and processing as necessary.
- e. A single percentage of the combined mineral aggregate passing each specified sieve. Degradation of the aggregate

- due to processing (particularly -No. 200 [-75 μm]) should be accounted for and identified for the applicable sieves.
- f. The bulk specific gravity value for each individual aggregate (and RAP) component as identified in the FDOT aggregate control program.
 - g. A single percentage of asphalt binder by weight of total mix intended to be incorporated in the completed mixture, shown to the nearest 0.1%.
 - h. A target temperature at which the mixture is to be discharged from the plant and a target roadway temperature (per 330-6.3). Do not exceed a target temperature of 340°F for modified asphalts and 315°F for unmodified asphalts.
 - i. Evidence that the completed mixture conforms to all specified physical requirements.
 - j. The name of the Mix Designer.

3.3 REVISION OF MIX DESIGN

During production, the Contractor may request a target value revision to a mix design, subject to: (1) the target change falls within the limits defined in Table 12, (2) appropriate data exists demonstrating that the mix complies with production air voids specification criteria, and (3) the mixture gradation meets the basic gradation requirements defined in 2.2 and 2.3.

Table 12 Limits for Potential Adjustments to Mix Design Target Values	
Characteristic	Limit from Original Mix Design
No. 8 sieve and Coarser	± 5.0%
No. 16 sieve	± 4.0%
No. 30 sieve	± 4.0%
No. 50 sieve	± 3.0%
No. 100 sieve	± 3.0%
No. 200 sieve	± 3.0%
Asphalt Binder Content (1)	± 0.3%
(1) Reductions to the asphalt binder content will not be permitted if the VMA during production is lower than 1.0% below the design criteria.	

Submit all requests for revisions to mix designs, along with supporting documentation, to the Engineer. In order to expedite the revision process, the request for revision or discussions on the possibility of a revision may be made verbally, but must be followed up by a written request. The initial mix design will remain in effect until a change is authorized by the Engineer. In no case may the effective date of the revision be established earlier than the date of the first communication between the Contractor and the Engineer regarding the revision. A new design mix will be required for any substitution of

an aggregate product with a different aggregate code, unless approved by the Engineer.

3.4 PAVING EQUIPMENT

A. Mechanical Spreading and Screeding Equipment:

1. General: Provide mechanical spreading and screeding equipment of an approved type that is self-propelled and can be steered. Equip it with a receiving and distribution hopper and a mechanical screed. Use a mechanical screed capable of adjustment to regulate the depth of material spread and to produce the desired cross-section.
2. Automatic Screed Control: For all asphalt courses, placed with mechanical spreading and finishing equipment, equip the paving machine with automatic longitudinal screed controls of either the skid type, traveling stringline type, or non-contact averaging ski type. Ensure that the length of the skid, traveling stringline, or non-contact averaging ski is at least 25 feet. On the final layer of base, overbuild, and structural courses, and for friction courses, use the joint matcher in lieu of the skid, traveling stringline, or noncontact averaging ski on all passes after the initial pass. Furnish a paving machine equipped with electronic transverse screed controls when required by the Contract Documents.
3. Inflation of Tires: When using paving machines equipped with pneumatic tires, the Engineer may require that the tires be ballasted.
4. Screed Width: Provide paving machines on full width lanes that have a screed width greater than 8 feet. Do not use extendable screed strike-off devices that do not provide preliminary compaction of the mat in place of fixed screed extensions. The Contractor may use a strike-off device on irregular areas that would normally be done by hand and on shoulders 4 feet or less in width. When using the strike-off device on shoulders in lieu of an adjustable screed extension, the Contractor must demonstrate the ability to obtain an acceptable texture, density, and thickness.

When using an extendable screed device to extend the screed's width on the full width lane or shoulder by 24 inches or greater, the Engineer will require an auger extension, paddle, or kicker device unless the Contractor provides written documentation from the manufacturer that these are not necessary.

5. Motor Graders: Provide two motor graders for spreading

widening courses with prior approval from the Engineer only. Use motor graders that are rated at not less than 6 tons and are self-propelled and power-controlled. Mount them on smooth tread or rib-type tires (no lug types allowed) with a wheel base of at least 15 feet. Equip the front motor grader with a spreader box capable of spreading the mix at the required rate.

6. Rollers:

- a. **Steel-Wheeled Rollers:** Provide compaction equipment capable of meeting the density requirements described in these Specifications. In the event that density testing is not required, provide a tandem steel-wheeled roller weighing a minimum of 8 tons for seal rolling, and for the final rolling, use a separate roller with a minimum weight of 8 tons. Variations from these requirements shall be approved by the Engineer.
 - b. **Traffic Rollers:** Provide compaction equipment capable of meeting the density requirements described in these Specifications. In the event that density testing is not required, provide a self-propelled, pneumatic-tired traffic roller equipped with at least seven smooth-tread, low pressure tires, equipped with pads or scrapers on each tire. Maintain the tire pressure between 50 and 55 psi or as specified by the manufacturer. Use rollers with a minimum weight of 6 tons. Do not use wobble-wheeled rollers. Variations from these requirements shall be approved by the Engineer.
 - c. **Prevention of Adhesion:** Do not allow the mixture to adhere to the wheels of any rollers. Do not use fuel oil or other petroleum distillates to prevent adhesion. Do not use any method which results in water being sprinkled directly onto the mixture.
7. **Trucks:** Transport the mix in trucks of tight construction, which prevents the loss of material and the excessive loss of heat. Provide each truck with a tarpaulin or other waterproof cover mounted in such a manner that it can cover the entire load when required. When in place, overlap the waterproof cover on all sides so that it can be tied down.
 8. **Coring Equipment:** Furnish a suitable saw or drill for obtaining the required density cores.
 9. **Hand Tools:** Provide the necessary hand tools such as rakes, shovels, etc., and a suitable means for keeping them clean.

4.4 CONTRACTOR'S PROCESS CONTROL

- A. Personnel: Provide qualified personnel for sampling, testing and inspection of materials and construction activities. Ensure that qualifications are maintained during the course of sampling, testing and inspection. Construction operations that require a qualified technician must not begin until the Department verifies that the technician is on the CTQP (Construction Training Qualification Program) list of qualified technicians. The CTQP lists are subject to satisfactory results from periodic Independent Assurance evaluations.
- B. Calibration of the Gyratory Compactor: Calibrate the Gyratory Compactor in accordance with the manufacturer's recommendations prior to producing the mixture for any project. Check the height calibration, the speed of rotation, ram pressure and angle of gyration.
- C. Plant Testing Requirements: During the initial production of a mix design, test mix to ensure proper performance and provide results to the department.
- D. Roadway Testing Requirements: Areas that demonstrate concerns of the mix design quality or poor/improper compaction efforts, may be subject to coring and testing as seen fit by the department representative. All tests will be performed at the contractor's expense.
- E. Extraction Gradation Analysis: Sample the asphalt mixture at the plant and perform extraction test prior to asphalt being delivered to project. The percent asphalt binder content of the mixture will be determined in accordance with FM 5-563 (ignition oven). The gradation of the extracted mixture will be determined in accordance with FM 1-T 030. All test results will be shown to the nearest 0.01. All calculations will be carried to the nearest 0.001 and rounded to the nearest 0.01. All results to be provide to the department prior to placement of asphalt on any project.

Run an extraction gradation analysis on the mixture at a minimum frequency of once per 1,000 tons or a maximum of four consecutive days of paving, whichever comes first.

The target gradation and asphalt content will be as shown on the mix design. Any changes in target will require a change in the mix design in accordance with 4.3. If the percentage of asphalt binder deviates from the optimum asphalt binder content by more than 0.55%, or the percentage passing any sieve falls outside the limits in Table 13, immediately resample the mix and test to validate the previous test result, and if needed, make the

necessary correction. If the results for two consecutive tests deviate from the optimum asphalt binder content by more than 0.55%, or exceed the limits in Table 13 for any sieve, notify the Engineer and take immediate steps to identify and correct the problem, then resample the mix. If the results from this test deviate from the optimum asphalt binder content by more than 0.55%, or exceed the limits in Table 13 for any sieve, stop plant operations until the problem has been corrected.

Table 13 Tolerances for Quality Control Tests (Extraction Gradation Analysis)	
Size	Percent Passing
1 inch	7.0
$\frac{3}{4}$ inch	7.0
$\frac{1}{2}$ inch	7.0
No. 4	7.0
No. 8	5.5
No. 16	5.0
No. 30	4.5
No. 50	4.5
No. 100	3.0
No. 200	2.0

- F. Volumetric Control: During production of the mix, monitor the volumetric properties of the Type SP asphalt mix with a Type SP Gyratory Compactor to determine the air voids, VMA, VFA, and dust-to effective asphalt binder ratio (dust proportion) at N_{design} .

Take appropriate corrective actions in order to maintain an air void content at N_{design} between 3.0 and 5.0% during production. When the air void content at N_{design} drops below 2.5 or exceeds 5.5%, stop plant operations until the appropriate corrective actions are made and the problem is resolved to the satisfaction of the Engineer. Evaluate any failing material in accordance with 6.

Determine the volumetric properties of the mixture at a minimum frequency of once per production day when the daily production is less than 1,000 tons. If the daily production exceeds 1,000 tons, monitor the volumetric properties two times per production day.

During normal production, volumetric properties of the mixture will not be required on days when mix production is less than 100 tons. However, when mix production is less than 100 tons per day on successive days, run the test when the accumulative tonnage on such days exceeds 100 tons.

Testing required for volumetric property determination includes AASHTO TP-4, FM 1-T 209, FM 5-563 and FM 1-T 030. Prior to testing samples in accordance with AASHTO TP-4 and FM 1-T 209, condition the test-sized sample for one hour at the compaction temperature in a covered container.

- G. Plant Calibration: At or before the start of mix production, perform an extraction gradation analysis of the mix to verify calibration of the plant. The sample tested at the start of any project may be utilized for this requirement.

- H. Process Control of In-Place Compaction: Develop and implement a method to control the compaction of the pavement and ensure its compliance with the minimum specified density requirements. The department may require the use of a nuclear gauge to test areas suspected of not having proper compaction. Testing will be performed at the contractor's expense. Other density measuring devices may be used in lieu of the nuclear density gauge, provided that it is demonstrated to the satisfaction of the Engineer that the device can accurately measure the relative level of density in the pavement on a consistent basis.

PART 5 - ACCEPTANCE OF THE MIXTURE

5.1 GENERAL

The asphalt mixture will be accepted based on one of the following methods as determined by the Engineer and/or Contract Documents:

- 1) Certification by the Contractor
- 2) Certification and Process Control Testing by the Contractor
- 3) Acceptance testing by the Engineer
- 4) Other method(s) as determined by the Contract

5.2 CERTIFICATION BY THE CONTRACTOR

Submit a Notarized Certification of Specification Compliance letter on company letterhead to the Engineer that all material produced and placed on the project was in substantial compliance with these specifications.

5.3 CERTIFICATION AND PROCESS CONTROL TESTING BY THE CONTRACTOR

Submit a Notarized Certification of Specification Compliance letter on company letterhead to the Engineer that all material produced and placed on the project was in substantial compliance with these specifications, along with supporting test data documenting all process control testing. If so required by the Contract, utilize an Independent Laboratory as approved by the Engineer for the Process

Control testing.

5.4 ACCEPTANCE TESTING BY THE ENGINEER

A. Acceptance at the Plant: The asphalt mixture will be accepted, with respect to gradation and asphalt binder content, based on the results from the start up test. However, any load or loads of mixture which, in the opinion of the Engineer, are unacceptable for reasons of excessive segregation, aggregates improperly coated, or of excessively high or low temperature will be rejected for use in the work.

1. Acceptance Procedures: Control all operations in the handling, preparation, and production of the asphalt mix so that the percent asphalt binder content and the percents passing the No. 8 and No. 200 sieves will meet the targets from the mix design within the tolerances shown in Table 14.

Characteristic	Tolerance*
Asphalt Binder Content	± 0.55%
Passing No. 8 Sieve	± 5.50%
Passing No. 200 Sieve	± 2.0%

*Tolerances for sample size of n=1. See Table 15 for other sample sizes n=2 through n=6.

Calculations for the acceptance test results for asphalt binder content and gradation (percentages passing the No. 8 and No. 200 sieves) will be shown to the nearest 0.01. Calculations for arithmetic averages will be carried to the 0.001 and rounded to the nearest 0.01 in accordance with the Department's rules of rounding. Payment will be based on the acceptance of the project by the Engineer.

B. Acceptance on the Roadway:

1. Density Control: The in-place density of any questionable section of a course of asphalt mix will be evaluated by the use of a nuclear gauge and/or by the testing of 6 inch diameter roadway cores. All tests to be performed at the contractor's expense. The Engineer will not perform density testing on leveling courses, open-graded friction courses, or any course which does not show signs of poor/improper compaction efforts. In addition, density testing will not be performed on the following areas when they are less than 1,000 feet in length: crossovers, intersections, turning

lanes, acceleration lanes or deceleration lanes. Compact these courses (with the exception of open-graded friction courses) in accordance with the rolling procedure as approved by the Engineer.

2. **Acceptance:** The completed pavement will be accepted with respect to overall ride, overall appearance, and overall yield. Areas of question may be tested with a nuclear gauge or by the testing of the density of the cores, as determined by the engineer.
3. **Additional Density Requirement:**
 - a. On shoulders with a width of 5 feet or less, the Engineer will not require density. Compact the pavement in accordance with the rolling procedure (equipment and pattern) approved by the Engineer. Stop the production of the mix if the rolling procedure deviates from the approved procedure.
4. **Surface Tolerance:** The asphalt mixture will be accepted on the roadway with respect to surface tolerance by the use of a 15ft rolling straight edge. The department will determine if the use of a straight edge is warranted. Unevenness of the course shall not vary more than plus or minus 3/16 inch in 15 feet.

5.5 ADDITIONAL TESTS

The Department reserves the right to run any test at any time for informational purposes and for determining the effectiveness of the Contractor's quality control.

PART 6 - DISPOSITION OF FAILING MATERIAL

Any material that is represented by failing test results will be evaluated to determine if removal and replacement is necessary. Remove and replace any material, if required, at no cost to the Department. The evaluation will be conducted by the Engineer. If so directed, obtain an engineering analysis, as directed by the Engineer, by an independent laboratory (as approved by the Engineer) to determine if the material can (a) remain in place, for this case the appropriate pay factor will be applied, or (b) be removed and replaced at no cost to the Department. The analysis will be a signed and sealed report by a Professional Engineer licensed in the State of Florida.

PART 7 - METHOD OF MEASUREMENT

For the work specified under this Section the quantity to be paid for will be the in-place measurement of the area in sy unless otherwise

stated in the project plan details. The bid price for the asphalt mix will include the cost of the liquid asphalt or the asphalt recycling agent. There will be no separate payment or unit price adjustment for the asphalt binder material in the asphalt mix.

PART 8 - BASIS OF PAYMENT

Price and payment will be full compensation for all the work specified under this section.

END OF SECTION 02500

SECTION 02600 - STORMWATER SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Specification Sections and Design Standard Indexes, apply to this Section.
- B. Florida Department of Transportation, Standard Specifications for Road and Bridge Construction, Sections 425, 430 and 530, latest edition. Work shall comply with requirements of FDOT Specs as modified herein.
- C. GENERAL EXCEPTIONS: Any reference to FDOT Standard Specifications for Road and Bridge Construction (latest edition) Division I General Requirements & Covenants shall be excluded and not applicable to any specification referred here in, or otherwise listed in this document

1.2 SUMMARY

This Section includes stormwater system piping and appurtenances. All labor, material, equipment, appurtenances, services, and other work or costs necessary to construct the facilities and place them into operation shall be furnished by the Contractor.

1.3 SUBMITTALS

- A. General: Submit the following in accordance with Conditions of Contract.
- B. Shop drawings for pre-cast concrete storm drainage manholes and catch basins, including frames, covers, and grates.
- C. Shop drawings for cast-in-place concrete or field-erected masonry storm drainage manholes and catch basins, including frames and covers.

1.4 QUALITY ASSURANCE

- A. Environmental Compliance: Comply with applicable portions of local environmental agency regulations pertaining to stormwater systems.
- B. Utility Compliance: Comply with local utility regulations and standards pertaining to stormwater systems.

1.5 PROJECT CONDITIONS

Site Information: Perform site inspection, research public utility records, and verify existing utility locations. Verify that stormwater system piping may be installed in compliance with design plans and referenced standards. Locate existing stormwater system piping and structures that are to be abandoned and closed.

1.6 SEQUENCING AND SCHEDULING

- A. Notify the City Inspector assigned to the subdivision prior to pouring form work and for inspection of subbase prior to installing base. Also provide the inspector copies of field density tests when they are received (if required by design).
- B. Coordinate connection to existing drainage system with Owner.
- C. Coordinate with other utility work.

PART 2 - PRODUCTS

2.1 MATERIALS

Pipe: Meet the following requirements of FDOT Specifications, latest edition:

Concrete Pipe	Section 449
Round Rubber Gaskets	Section 942
Corrugated Steel Pipe & Pipe Arch	Section 943
Corrugated Aluminum Pipe & Pipe Arch	Section 945
Cast Iron Pipe	Section 946
Corrugated Polyethylene Pipe	Section 948
Polyvinyle Chloride (PVC)	Section 948

Only conventional steel RCP - Class III or elliptical equivalent (excludes fiber reinforced concrete pipe) shall be allowed under dedicated City roads. The minimum RCP diameter shall be 18 inches or elliptical equivalent, all joints shall be filter wrapped, and the minimum cover shall be one foot including over bell joints. The pipe system shall be grouted/sealed *water-tight* prior to acceptance by the City and at the end of the 2-Year Warranty period.

2.2 MANHOLES

- A. Precast Concrete Manholes: Per FDOT Standard Specification 425-5 and ASTM C 478, precast reinforced concrete, of depth indicated with provision for rubber gasket joints.

- B. Cast-in-Place Manholes: Per FDOT Standard Specification 425 Cast reinforced concrete of dimensions and with appurtenances indicated.
- C. Manhole Frames and Covers: Construct Per FDOT Standard Specification 425-3.2 and Standard Indexes. All units shall bear the lettering "STORM SEWER" cast into cover. All proposed substitutes must have equal or greater opening sizes and weights.

2.3 INLETS

- A. Precast Concrete Catch Basins Inlets: Construct per FDOT Standard Specification 425-5.
- B. Cast-in-Place Inlets: Construct per FDOT Standard Specification 425 to dimensions and with appurtenances indicated.
 - 1. Bottom, Walls, and Top: Reinforced concrete.
 - 2. Channel and Bench: Concrete.
- C. Inlet Frames and Grates: Per FDOT Standard Specification 425-3.2 & Standard Indexes. All units shall bear the lettering "STORM SEWER" cast into cover.
- D. Modified A curb inlets are not acceptable for City dedicated roads.

2.4 OUTFALL STRUCTURES

- A. Pipe systems shall be utilized for primary outfall of retention/detention areas.
- B. Weirs and flumes will not be acceptable for use as primary pond outfall structures or to primarily route stormwater to retention/detention areas at the end of down gradient roadways.

2.5 END TREATMENT

General: Construct pipe, head wall, apron, tapered sides, per FDOT Standard Specification 430-4.6.

2.6 CONCRETE AND REINFORCEMENT

- A. Concrete: Portland cement mix, 3,000 psi.
 - 1. Cement: ASTM C 150, Type II.

2. Fine Aggregate: ASTM C 33, sand.
3. Coarse Aggregate: ASTM C 33, crushed gravel.
4. Water: Potable.

B. Reinforcement: Steel conforming to the following:

1. Fabric: ASTM A 185, welded wire fabric, plain.
2. Reinforcement Bars: ASTM A 615, Grade 60, deformed.

C. Forms:

1. Form Materials: Plywood, metal, metal-framed plywood, or other acceptable panel-type materials to provide full-depth, continuous, straight, smooth exposed surfaces without distortion or defects. Material shall be of size and strength to resist movement during concrete placement and to retain horizontal and vertical alignment until removal.
2. Form Release Agent: Provide commercial formulation form-release agent with a maximum of 350 mg/l volatile organic compounds (VOCs) that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces. Release agent to be within allowable volatile limits according to applicable local, state and federal codes.

2.7 MASONRY

Materials for accessories shall be per FDOT Standard Specification 949. Mortar shall be one part Portland cement and three parts masonry sand to which shall be added lime putty in the amount of 50% of the volume of cement. Special commercial mortar mixes may be used if approved by the Engineer. All masonry materials shall conform to the latest applicable ASTM specifications. Set all masonry units in full beds of mortar, with full joints and strike all joints flush. Masonry reinforcements shall be galvanized Dur-O-Wal, or approved equal, and shall be installed at every other bed joint. Hollow block poured with re-bar.

2.8 CURING MATERIALS

Conform to FDOT Standard Specification 520-8.

2.9 BEDDING STONE

Subbase or base materials meeting requirements of FDOT Standard Specification 530.

PART 3 - EXECUTION

3.1 EXCAVATIONS FOR MANHOLES, INLETS, AND PIPE

Excavation shall be sufficient enough to leave at least 12 inches clear between their outer surfaces and the embankment. Excavation for all structures shall be made to the dimensions and elevations indicated on the drawings. Where the excavation is made below the indicated elevations, the excavation shall be restored to the proper elevation with suitable material approved by the engineer and without extra compensation.

3.2 PREPARATION OF FOUNDATION FOR BURIED STORMWATER SYSTEMS

- A. Grade trench bottom to provide a smooth, firm, stable, and rock-free foundation, throughout the length of the pipe.
- B. Remove unstable, soft, and unsuitable materials at the surface upon which pipes are to be laid, and backfill with bedding stone per FDOT Standard Specification 530 to indicated level.
- C. Shape bottom of trench to fit bottom of pipe. Fill unevenness with tamped sand backfill. Dig bell holes at each pipe joint to relieve the bells of all loads and to ensure continuous bearing of the pipe barrel on the foundation.

3.3 PIPE INSTALLATION

- A. Drawings (plans and details) indicate the general location and arrangement of the underground stormwater system piping. Location and arrangement of piping layout takes into account many design considerations. Install the piping as indicated, to the extent practical.
- B. Install piping beginning at low point of systems, true to grades and alignment indicated with unbroken continuity of invert, unless approved otherwise by the Engineer. Place bell ends of piping facing upstream. Install gaskets, seals, sleeves, and couplings in accordance with manufacturer's recommendations for use of lubricants, cements, and other installation requirements. Maintain swab or drag in line and pull past each joint as it is completed.

The pipe shall be carefully examined for defects and the inside cleaned. After placing pipe in the ditch, the ends shall be wiped free from all dirt, sand and foreign material. All pipe and joints shall be made, handled, and installed in strict accordance with the manufacturer's recommendations. Install pipe in accordance with FDOT Standard Specification 430.

- C. Install piping pitched down in direction of flow, at minimum slope per plans and in accordance with manufacturer's recommendations and specifications.
- D. Tunneling: Install pipe under streets or other obstructions that cannot be disturbed, by tunneling, jacking, or a combination of both. These methods of installation are not allowed for roadways under the 2 year warranty period.
- E. All RCP joints shall be sock/filter wrapped prior to backfilling unless a manufacturer recommended coupling is used.
- F. Field repairs of pipeline shall be in strict accordance with manufacturer's recommendations and specifications.

3.4 MANHOLES

- A. General: Install manholes complete with accessories as indicated. Form continuous concrete or split pipe section channel and benches between inlets and outlet. Set tops of frames and covers flush with finish surface where manholes occur in pavements. Elsewhere, set tops 3 inches above finished grade, unless otherwise indicated.
- B. Place precast concrete manhole sections as indicated, and install in accordance with ASTM C 891.
- C. Construct cast-in-place manholes as indicated.
- D. Provide rubber joint gasket complying with ASTM C 443 at joints of sections.
- E. Apply bituminous mastic coating at joints of sections.

3.5 INLETS

- A. Construct inlets to sizes and shapes indicated per FDOT Standard Specification 425-6, or City detail.
- B. Set frames and grates to elevations indicated.

3.6 END TREATMENT

Construct End Treatment per FDOT Standard Specification 430-4.6.

- 3.7 STORMWATER SYSTEM BACKFILL Place and compact backfill material in accordance with FDOT specification 125-8.

3.8 CLOSING ABANDONED STORMWATER SYSTEMS

- A. Abandoned Piping: Close open ends of abandoned underground piping that is indicated to remain in place. Provide sufficiently strong closures to withstand hydrostatic or earth pressure that may result after ends of abandoned utilities have been closed.
 - 1. Close open ends of concrete pipe or structures with not less than 8-inch-thick brick masonry bulkheads.
 - 2. Close open ends of other piping with plastic plugs, or other acceptable methods suitable for size and type of material being closed. Wood plugs are not acceptable.
- B. Abandoned Structures: Remove structure and close open ends of the remaining piping or remove top of structure down to not less than 3 feet below final grade; fill structure with stone, rubble, gravel, or compacted dirt, to within 1 foot of top of structure remaining, and fill with concrete.

3.9 FIELD QUALITY CONTROL

- A. Testing: Perform testing of completed piping in accordance with local authorities having jurisdiction. All sampling and testing shall be conducted by a testing laboratory under the direction of a Professional Engineer, licensed in the State of Florida. Submit test results directly to the Engineer. The following tests shall be taken:
 - 1. 28-day compressive test of concrete, minimum of three test cylinders, for each day's pour and every 50 cubic yards of concrete poured thereafter.
 - 2. Air content, minimum one test for each day's pour.
 - 3. Slump test, minimum one test for each day's pour.
 - 4. Contractor shall replace materials removed for testing purposes.
 - 5. Should any work or materials fail to meet the requirements set forth in the plans and specifications, contractor shall pay for retesting of same.
- B. Cleaning: Clear interior of piping and structures of dirt and other superfluous material as work progresses. Maintain swab or drag in piping and pull past each joint as it is completed.
 - 1. In large, accessible piping, brushes and brooms may be used for cleaning.
 - 2. Place plugs in ends of uncompleted pipe at end of day or whenever work stops.

3. Flush piping between manholes, to remove collected debris.
- C. Interior Inspection: Inspect piping to determine whether line displacement or other damage has occurred.
1. Make inspections after pipe between manholes has been installed, cleaned and approximately 2 feet of backfill is in place, and again at completion of project. Each section of pipe between structures is to show from either end on examination, a full circle of light. Each appurtenance to the system shall be of the specified size and form, to be neatly and substantially constructed, with the top set permanently to exact position and grade.
 2. If inspection indicates poor alignment, debris, displaced pipe, infiltration, or other defects, correct such defects and re-inspect. All repairs shown necessary by the inspections are to be made, broken or cracked pipe replaced, all deposits removed and the pipe left true to line and grade as herein specified, or shown on the plans, entirely clean and free from abnormalities and ready for use at no additional expense to the City.
- D. Trench Backfill atop Pipe:
1. In each compacted backfill layer, perform at least one field in place density test for each 100 feet or less of trench, but no fewer than two tests.
 2. Other tests may be required at Engineer's discretion.
- E. Clean Up: Before final inspection and acceptance, the Contractor shall clean ditches, shape shoulders and restore all disturbed areas, including street crossings, grass plots, to as good as condition as existed before work started. All trenches shall be leveled and loose material removed from pavement gutters, sidewalks, pipelines, and inlet sediment traps, employing hand labor, if necessary.

PART 4 MEASUREMENT / PAYMENT

A. Method of Measurement

The quantities to be paid for will be (1) the number of inlets, manholes, end walls, mitered end sections, flared end sections, junction boxes, and yard drains, including fittings and appurtenances, completed and accepted; (2) length of pipe to the nearest foot of type specified; and (3) the number of structures of these types (including also valve boxes and monument boxes) satisfactorily adjusted.

B. Basis of Payment

Price and payment will be full compensation for finishing all materials and completing all work described herein or shown in the plans, including all clearing and grubbing outside the limits of clearing and grubbing as shown in the plans, all excavation except the volume included in the measurement designated to be paid for under the items for the grading work on the project, all backfilling around the structures, the disposal of surplus material, and the furnishing and placing of all the gratings, frames, covers, and any other necessary fittings.

END OF SECTION 02600

SECTION 02800 - FENCING

PART 1: GENERAL

1.1 Related Documents

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.
- B. Florida Department of Transportation, Standard Specifications for Road and Bridge Construction (FDOT Specs), Section 550, latest edition and design standard index 801 & 802. Work shall comply with requirements of FDOT Specs as modified herein.
- C. GENERAL EXCEPTIONS: Any reference to FDOT Standard Specifications for Road and Bridge Construction (latest edition) Division I General Requirements & Covenants shall be excluded and not applicable to any specification referred here in, or otherwise listed in this document.

1.2 SUMMARY

- A. This Section includes, but is not limited to, the following:
 - 1. Chain link fence
 - 2. Farm Fence
- B. Where existing fences are to be relocated, but existing materials are deteriorated or damaged, fencing shall be replaced in kind or as specified by the Engineer.

1.3 PROJECT CONDITIONS

- A. Traffic: Conduct fencing operations to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities and to minimize disturbance of the activities of adjacent property owners. Do not close or obstruct streets, walks, or other occupied or used facilities without prior approval.
- B. Security: Do not leave any fence uncompleted which might allow the escape of livestock or household pets.

1.4 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. Deliver material in manufacturer's original packaging with all tags and labels intact and legible.
- B. Handle and store material in such a manner as to avoid damage.

PART 2: PRODUCTS

PART 2A: CHAIN LINK FENCING

2A.1 GENERAL: Chain link fence shall meet the requirements of FDOT Standard Index 802.

2A.2 GATES

- A. Swing Gates: Per FDOT standard index 802 as modified herein construct of 1.625" o.d. steel pipe galvanized in accord with ASTM A-53 and weighing 2.27 pounds per lineal foot. Provide gates more than 8 feet wide with either intermediate members or diagonal truss rods. Provide gates less than 8 feet wide with truss rods or intermediate braces. Arrange latches for padlocking to provide accessibility from both sides of the gate. Where a double swing gate is called out, Construct Concrete Anchor rod Base 8" in diameter and 4" deep flush with top of ground. Opening in base for rod shall accommodate standard size in accordance with manufacturer and shall be PVC or galvanized steel pipe.
- B. Slide Gates: shall be constructed per FDOT Index 803.

2A.3 ACCESSORIES

Post Tops: pressed steel, or malleable iron. Where top rail is used, provide tops to permit passage of top rail.

PART 2B: FARM FENCING

2B.1 GENERAL

Farm Fencing shall meet the requirements of FDOT Index 801.

PART 3: EXECUTION

PART 3A: CHAIN LINK FENCING

3A.1 GENERAL

- A. Drill holes for post footings in firm, undisturbed or compacted soil.
- B. Place concrete around posts in a continuous pour, tamp for consolidation. Check each post for vertical and top alignment.
- C. Set Keepers, stops, sleeves and other accessories into concrete as required.

- D. Topping of the fence with barbed wire shall not be included unless specifically shown on the plans.

3A.2 INSTALLATION:

- A. Brace Assemblies: install braces so posts are plumb when diagonal rod is under proper tension.
- B. Tension Wire: install tension wires before stretching fabric and tie to each post with ties or clips.
- C. Fabric: pull fabric taut 2 inches above grade level and tie to posts, rails, and tension wires. Attach fabric to terminal or gateposts by a stretcher bar and clip to other framework so that fabric remains in tension after pulling force is released.
- D. Hinge gates to swing through 180 degrees from closed to open.

PART 3B: FARM FENCING

3B.1 GENERAL

- A. General installation shall be in accordance with FDOT Index 801 as modified herein.
- B. Fence shall be installed with wire side to the private property side.
- C. Topping of the fence with barbed wire shall not be included unless existing farm fence includes barbed wire topping.

PART 4 MEASUREMENT / PAYMENT

4.1 METHOD OF MEASUREMENT

A. GENERAL

The quantities to be paid for will be the number of gates, the length of each type of fence, the number of corner post assemblies, constructed and accepted. In addition, extra payment will be made, for additional lengths of post approved by the Engineer.

B. MEASUREMENT OF FENCE LENGTH

The length of fence to be paid for will be measured along the bottom of the fabric, out-to-out of end posts, in the completed and accepted fence. Measurement for Resetting Fence will be the actual length of existing fence reset, including gates when applicable.

C. CORNER POST ASSEMBLIES, AND PULL AND END POST ASSEMBLIES

The number of corner post assemblies and of pull and end post assemblies to be paid for will be the number of such post assemblies constructed and accepted.

4.2 BASIS OF PAYMENT

A. BASIC ITEMS OF FENCING

The contract unit price will be full compensation for all work and materials necessary for the complete installation, including line posts, but not including the corner, end, and pull posts and the assemblies thereof.

B. ITEMS OF POST ASSEMBLIES

The Contract unit prices for the items of Corner Post Assemblies and Pull and End Post Assemblies will include the posts and the complete assemblies therewith for each such item. Approach posts and brace posts will be considered as part of the assembly of the corner, end, or pull post serves as a brace in more than one horizontal line.

C. PAYMENT RATES FOR EXTRA-LENGTH POSTS

For any length of posts in excess of the standard length for each particular type of post, approved by the Engineer as provided above, payment will be made for each foot in excess of the standard length at the percentage of the Contract unit price per foot for the item of Fencing, as shown in the following schedule. Additional Payment for Each Foot of Post in Excess of the Standard Length (in percent of Contract Unit Price for Fencing):

<u>Total Length of Post</u>	<u>Steel and Aluminum Posts</u>	<u>Recycled Plastic & Timber Posts</u>
Standard up to 14 ft.	50%	60%
Over 14 ft., up to 20 feet	60%	80%
Over 20 ft.*	*	*

*When the length of post exceeds 20 feet, the work of finishing and installing such posts and the costs incidental thereto will be paid for as unforeseeable through a change order.

The standard length of steel, recycled plastic and aluminum posts will be the required length as indicated in the plans for each type and case. The above provisions for extra length payment will apply to end, corner and pull posts.

The payment for additional length of post will include the cost of additional concrete to extend concrete bases, as applicable.

D. GATE PAYMENT

The quantities to be paid for will be full compensation for all labor, materials, posts and associated hardware for the complete installation of the type gate specified in the plans, and accepted by the Engineer.

END OF SECTION 02800

SECTION 02900 - GRASSING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of Contract, including General and Supplementary Conditions and other Specifications Sections apply to this Section.
- B. GENERAL EXCEPTIONS: Any reference to FDOT Standard Specification for Road and Bridge Construction (latest edition) Division I General Requirements & Covenants shall be excluded and not applicable to any specification referred here in, or otherwise listed in this document.

1.2 SUMMARY

Extent of grassing work is as specified or shown on the construction plans. Sodded areas disturbed during construction shall be re-sodded to match existing.

1.3 SUBMITTALS

See paragraph 1.9 B Quality Assurance Submittals, Section 1300.

1.4 DELIVERY AND STORAGE

All seed shall be labeled in accordance with U.S. Department of Agriculture Rules and Regulations under the Federal Seed Act in effect on the date of invitation for bids. All seed shall be furnished in sealed standard containers, unless exception is granted in writing. Seed, which has become wet, moldy, or otherwise damaged in transit or in storage, shall not be used. Fertilizer shall be delivered to the site in the original, unopened containers, each bearing the manufacturer's guaranteed analysis. Any fertilizer, which becomes caked or otherwise damaged, making it unsuitable for use, shall not be used. Seed, fertilizer and other grassing materials shall be stored under cover and protected from damaged which would make them unacceptable for use.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Lime: Lime shall be ground limestone (Dolomite) containing not less than 85 percent of total carbonates, and shall be ground to such a fineness that 50-percent will pass a 100-mesh sieve and 90-percent will pass a 20-mesh sieve.

B. Fertilizer: Apply fertilizer at the following rates:

10-10-10	1000 lbs/acre=0.2 lbs/sq yd
13-13-13	770 lbs/acre=0.16 lbs/sq yd

C. Seed: Apply seed at the rate as specified in the plan details.

D. Mulch: The mulch material shall be dry straw or hay, consisting of oat, rye, or wheat straw, or of pangola, peanut, coastal Bermuda or Bahia grass, hay or compost; and shall be free from noxious weeds and plants. Any plant officially listed, as being noxious or undesirable by any Federal Agency, any agency of the State of Florida or any local jurisdiction in which the project is being constructed shall not be used. Furnish to the engineer, prior to incorporation onto the project, a certification from the Florida Department of Agriculture and Consumer Services, Division of Plant Industry, stating that the Mulch materials are free of noxious weeds. Any such noxious plant or plant part found to be delivered, as the Contractor at his expense and in accordance with the law will remove mulch. Only undeteriorated mulch, which can readily be cut into the soil, shall be used. The "air-dry" weight (as defined by the Technical Association of the Pulp and Paper Industry, for wood cellulose) shall be marked on each package by the producer. Apply at the following rate:

Mulch: 2 ton/acre= 1.0 lbs/sq yds

E. Sod: All sod shall be healthy Centipede Sod unless otherwise required. Sod shall be strongly rooted, free of weeds and undesirable grasses and capable of providing vigorous growth and development when planted. Sod shall match existing species where restoration is required as a result of the Contractor's work.

PART 3 - EXECUTION

3.1 REQUIREMENTS

All areas disturbed by the Contractor's operations, shall be seeded and mulched, unless otherwise noted.

3.2 PLANTING SEED

- A. Grading: Areas to be grassed shall be graded to remove depressions, undulations, and irregularities in the surface before grassing. Adhere to grades as shown on plans.
- B. Tillage: The area to be grassed shall be thoroughly tilled to a depth of four inches using a plow and disc harrow or rotary tilling machinery until a suitable bed has been prepared and no clods or

clumps remain larger than 1-1/2 inches in diameter. Remove sticks, roots, and rubbish.

- C. Applying Lime: The pH of the soil shall be determined. If the pH is below 5.0, sufficient lime shall be added to provide a pH between 5.5 and 6.5. The lime shall be thoroughly incorporated into the top three to four inches of the soil. Lime and fertilizer may be applied in one operation.
- D. Applying Fertilizer: Fertilizer shall be applied in accordance with the rates specified in Part 2, and shall be thoroughly incorporated into the top three to four inches of soil before sod is installed.
- E. Seed and Mulch: Apply in accordance with the rates specified in Part 2.
- F. Maintenance: Maintenance shall begin immediately following the last operation of grassing and continue until final acceptance. Maintenance shall include watering, mowing, replanting, and all other work necessary to produce a uniform stand of grass, all at the contractor's expense.

3.3 PLANTING SOD:

- A. Use Centipede sod (*Eremochloa ophiuroides*) unless otherwise required. The sod shall be live, fresh, and uninjured at the time of planting and shall have a thick mat of roots with enough adhering soil to assure growth. Apply sod within 24 hours of stripping. Do not plant dormant sod or if ground is frozen. Protect sod against drying and breaking of rolled strips.
- B. Placement: Prepare the ground by loosening the soil. Place sod on the prepared soil to form a solid mass with tightly fitted joints. Ensure the butt ends and sides of sod strips do not overlap. Stagger strips to avoid a continuous downhill seam. Tamp or roll lightly to ensure contact with subgrade. Tamp the outer edges of the sodded area to produce a smooth contour. Work sifted soil into minor cracks between pieces of sod; remove excess to avoid smothering of adjacent grass. Water sod thoroughly with a fine spray immediately after planting.
- C. Watering: Keep sod continuously moist to a depth below the root zone for three weeks after placement. If there is no water available to the site, the Contractor shall provide the water for the sod.
- D. Clean-Up: All excess soil, excess grass materials, stones, pallets and other waste shall be removed from the site daily and

not allowed to accumulate. All paved areas shall be kept clean at all times.

- E. Maintenance: Maintain sod by watering, fertilizing, weeding, mowing, trimming and other operations such as rolling, re-grading, and re-planting as required to establish a lawn free of eroded or bare areas and acceptable to the Engineer. Where inspected work and materials do not comply with requirements, replace rejected work and continue maintenance until reinspected by Engineer and found to be acceptable. Remove rejected materials promptly from the project site.

PART 4 MEASUREMENT / PAYMENT

4.1 Method Measurement

The quantities to be paid for will be for the following items, completed and accepted: square yards of seeding, square yards of seeding and mulching, cubic yards of mulch material, square yards of wildflower seeds, acres of mowing and square yards of sodding.

4.2 Basis of Payment

Prices and payments will be full compensation for all work and materials specified in this Section.

END OF SECTION 02900

SECTION 02910 - EROSION CONTROL

PART 1 - GENERAL

This section designates the requirements for erosion control of the project site.

PART 2 - PRODUCTS

All materials used for erosion control shall meet federal, state and local requirements and shall conform with the requirements of FDOT Specification Section 104.

PART 3 - EXECUTION

- 3.1 The Contractor shall take steps and make suitable provisions to prevent or minimize siltation and erosion which may result from, or be as a result of, his operations during the course of construction of these projects.
- 3.2 The Contractor shall maintain silt fence barriers, and turbidity screens at all times during construction where siltation and erosion may occur and as shown on the project drawings.
- 3.3 The Contractor shall submit to the engineer, for written approval prior to construction, the methods to be used to control siltation and erosion. The Engineer's approval of the method to be used in no way relieves the Contractor of liability in case of a citation by federal, state, or local regulatory agency having jurisdiction thereof.

END OF SECTION 02910

SECTION 02920 - LANDSCAPE INSTALLATION

PART 1 - GENERAL

Install, establish and maintain landscaping as indicated in the contract documents.

PART 2 - MATERIALS.

2.1 Plants

- 2.1.1 Grade Standards and Conformity with Type and Species: Only use nursery grown plant materials purchased from Florida based Nurseryman Stock that comply with all required inspection, grading standards, and plant regulations in accordance with the latest edition of the Florida Department of Agriculture's "Grades and Standards for Nursery Plants."

Unless otherwise specified, minimum grade for all plants is Florida No. 1 or better. All plants must be the specified size and grade at the time of delivery to the site and the minimum grade maintained throughout the project construction period and plant establishment period.

Use only plants that are true to type and species and ensure that the plants not specifically covered by Florida Department of Agriculture's "Grades and Standards for Nursery Plants" conform in type and species with the standards and designations in general acceptance by Florida nurseries. Prior to planting, furnish certification to the Engineer that all plant materials have been purchased from Florida based Nurseryman Stock.

A minimum of two plants of each species on each shipment must be shipped with tags stating the botanical nomenclature and common name of the plant. Should discrepancies between botanical nomenclature and common name arise, the botanical name will take precedence.

- 2.1.2 Inspection and Transporting: Move nursery stock in accordance with all federal and state regulations and accompany each shipment with the required inspection certificates for filing with the Engineer.

2.2 Water: Meet the requirements of Section 983.

2.3 Mulching: Use of Cypress Mulch prohibited.

PART 3 - PLANTING REQUIREMENTS.

- 3.1 Delivery: All materials must be available for inspection before installation and will be subject to approval or rejection.
- 3.2 Layout: Mark proposed planting beds and individual locations of trees and palms as shown in the Contract Documents for Engineer's review, prior to excavation or planting. The Engineer may request to review all proposed construction and maintenance practices before the start of the operations.

Make no changes to the layout, materials or any variations of plant materials from the Contract Documents without the Engineer's written approval.

- 3.3 Soil Drainage: All planting holes and beds must drain sufficiently prior to installing any plants. Immediately notify the Engineer of drainage or percolation problems before plant installation.
- 3.4 Installation of Plants: For installation of the plants as identified in the Contract Documents, comply with the requirements of the Design Standards, Index No. 544.

Personnel performing these services are under the sole responsibility and supervision of the Contractor and must be competent, experienced, and skilled in all aspects of the required landscape installation and establishment practices.

- 3.5 Contractor's Responsibility for Condition of the Plantings: Begin maintenance of all plants immediately after each planting.

Keep all plants watered, fertilized, mulched, pruned, and staked and guyed as necessary to assure specified minimum grade of Florida No. 1 throughout the duration of the project construction period and establishment period. During the establishment period, keep the individual planting locations and planting beds free of litter and undesirable vegetation. Ensure that the plants are maintained so that they are healthy, vigorous, and undamaged throughout the duration of the project construction period and establishment period. For the duration of the establishment period, operate and maintain in good operating condition, all components of any irrigation system installed in compliance with the Contract Documents.

During the establishment period, replace any plants that fall below specified minimum grade. Use replacement plants of the same species, size and planting medium as the plant being replaced and as specified in the Contract Documents.

- 3.6 Inspection Requirements. Certify monthly on a form provided by the City that the plants have been installed and are being maintained

per Contract Documents. A Registered Landscape Architect acting as the Contractor's Landscape Quality Control representative will oversee the establishment period.

The Contractor's Landscape Quality Control representative must perform quarterly inspections of planting areas and submit findings in report form to the Department. Information to be included in inspection report from the Contractor's Quality Control representative must include as a minimum the following:

- Date of inspection
- Description of project
- Location of inspection
- Weather conditions
- Condition of plants - identify by species, location, and number of plants that are no longer the specified minimum.
- Condition of planting beds (including mulching, mowing, weeding, fertilizing, watering, and staking and guying), if applicable
- Other comments
- Signature and seal of Contractor's Landscape QC representative

Submit the certified inspection report to the Engineer within seven calendar days after performing the inspection. Any corrections to the inspection report must be revised/corrected and resubmitted within three calendar days after notification by the Engineer. Any deficiencies noted on the inspection report must be corrected within ten days of notification from the Department.

Periodic, random verifications will be performed by the Department to ensure the quality of the plants and correctness of the certified landscape inspection report. Any unresolved disputes that arise between the QC reporting and the verifications performed by the Department will be referred to the Statewide Disputes Review Board.

PART 4 - DISPOSAL OF SURPLUS MATERIALS AND DEBRIS.

Remove from the jobsite any surplus excavated material from plant holes unless otherwise directed by the Engineer. Surplus is defined as material not needed after installation of plants per Contract Documents. Upon commencement of the plant installation, remove daily all landscape installation debris from the landscape locations described in the Contract Documents. Remove all excess staking and guying materials from the jobsite.

PART 5 - PLANT ESTABLISHMENT PERIOD AND CONTRACTOR'S WARRANTY.

Take responsibility for the proper maintenance, survival and condition of all plants for a period of one year after final acceptance in

accordance with 5-11. Notify the Engineer upon completion of installation of all plants.

Mowing as part of the landscape work will be identified in the Contract Documents. Continue any mowing of the landscape areas specified in the Contract Documents throughout the establishment period.

Provide a Warranty/Maintenance Bond to the City in the amount of the total sums bid for all landscape items as evidence of warranty during this plant establishment period. The cost of the bond will not be paid separately, but will be included in the costs of other bid items.

In addition to satisfying the provisions of Section 287.0935, Florida Statutes, the bonding company is required to have an A.M. Best rating of "A" or better. If the bonding company drops below the "A" rating during the Warranty/Maintenance Bond period, provide a new Warranty/Maintenance Bond for the balance of the establishment period from a bonding company with an "A" or better rating. In such event, all costs of the premium for the new Warranty/Maintenance Bond will be at the Contractor's expense.

The Engineer may conduct interim inspections of all landscape items during the plant establishment period, as well as at the end of the plant establishment period. As part of the warranty to the Department, and at no cost to the Department, replace all plants found not to meet minimum specifications as shown in 580-2.1.1 and 580-3.5 within ten days after each inspection.

Prior to the end of the establishment period, remove all staking and guying from the project.

At the end of the establishment period, the Engineer will release the Contractor from further warranty work and responsibility provided all plants are established and all previous warranty and remedial work, if any, has been completed to the satisfaction of the Engineer.

PART 6 - METHOD OF MEASUREMENT.

The quantities to be paid will be the items shown in the Contract Documents, completed and accepted.

PART 7 - BASIS OF PAYMENT.

Prices and payments will be full compensation for all work and materials specified in this Section.

END OF SECTION 02920

SECTION 03300 - PORTLAND CEMENT CONCRETE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and other Specification Sections, apply to this Section.
- B. Florida Department of Transportation, Standard Specifications for Road and Bridge Construction (FDOT Specs), Section 346 & 350 latest edition.
- C. GENERAL EXCEPTIONS: Any reference to FDOT Standard Specifications for Road and Bridge Construction (latest edition) Division I General Requirements & Covenants shall be excluded and not applicable to any specification referred here in, or otherwise listed in this document.

1.2 SUMMARY

This Section includes concrete work for the following:

- 1. Roadways.
- 2. Parking lots.
- 3. Curbs and gutters.
- 4. Walkways.
- 5. Pads.
- 6. Ditches/Flumes.

1.3 SUBMITTALS

- A. Product data for proprietary materials and items, including reinforcement and forming accessories, admixtures, joint systems, curing compounds, dry-shake finish materials, and others if requested by Engineer.
- B. Design mixes for each class of concrete. Include revised mix proportions when characteristics of materials, project conditions, weather, test results, or other circumstances warrant adjustments.
- C. Material certificates in lieu of material laboratory test reports when permitted by Engineer. Material certificates shall be signed by manufacturer and Contractor certifying that each material item complies with or exceeds requirements. Provide certification from admixture manufacturers that chloride content complies with requirements.

1.4 PROJECT CONDITIONS

- A. Traffic Control: Comply with requirements of Section 04060, "Maintenance of Traffic."
- B. Utilize flagmen, barricades, warning signs and warning lights as required, as shown on plans, or as directed by the Engineer.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. Concrete shall conform to requirements of FDOT Specs, Section 346 for curbs, gutters, walks, structures and miscellaneous concrete.
- B. Concrete for pavement shall conform to requirements of FDOT Specs, Section 350.
- C. Curb Ramps shall conform to FDOT Standard Index 304.

2.2 REINFORCING MATERIALS

- A. Reinforcing Bars and Tie Bars: ASTM A 615, Grade 60, deformed.
- B. Welded Steel Wire Fabric: ASTM A 185.
 - 1. Furnish in flat sheets, not rolls, unless otherwise acceptable to Engineer.
- C. Deformed-Steel Welded Wire Fabric: ASTM A 497.
- D. Fabricated Bar Mats: Welded or clip-assembled steel bar mats, ASTM A 184. Use ASTM A 615, Grade 60 steel bars, unless otherwise indicated.
- E. Joint Dowel Bars: Plain steel bars, ASTM A 615, Grade 60. Cut bars true to length with ends square and free of burrs.
- F. Hook Bolts: ASTM A 307, Grade A bolts, internally and externally threaded. Design hook bolt joint assembly to hold coupling against pavement form and in position during concreting operations, and to permit removal without damage to concrete or hook bolt.
- G. Supports for Reinforcement: Chairs, spacers, dowel bar supports and other devices for spacing, supporting, and fastening reinforcing bars, welded wire fabric, and dowels in place. Use wire bar-type supports complying with CRSI specifications. Use

supports with sand plates or horizontal runners where base material will not support chair legs.

2.3 CONCRETE MATERIALS

- A. Portland Cement: ASTM C 150, Type I.
 - 1. Use one brand of cement throughout Project unless otherwise acceptable to Engineer.
 - 2. All concrete shall develop a 28-day compressive strength of 3000 psi. If any concrete should fail to meet the strength requirement the structure shall be removed as necessary to remove the defective concrete and shall then be rebuilt at the contractor's expense.
- B. Fly Ash: ASTM C 618, Type F.
- C. Normal-Weight Aggregates: ASTM C 33, Class 4, and as follows. Provide aggregates from a single source unless otherwise approved by the Engineer.
 - 1. Maximum Aggregate Size: 1-1/2 inches.
 - 2. Do not use fine or coarse aggregates that contain substances that cause spalling.
 - 3. Local aggregates not complying with ASTM C 33 that have been shown to produce concrete of adequate strength and durability by special tests or actual service may be used when acceptable to Engineer.
- D. Water: Potable.
- E. Fiber Reinforcement: Synthetic fibers engineered and designed for secondary reinforcement of concrete slabs, complying with ASTM C 1116, Type III.

2.4 ADMIXTURES

- A. Provide concrete admixtures that contain not more than 0.1 percent chloride ions.
- B. Air-Entraining Admixture: ASTM C 260, certified by manufacturer to be compatible with other required admixtures.
- C. Water-Reducing Admixture: ASTM C 494, Type A.
- D. High-Range Water-Reducing Admixture: ASTM C 494, Type F or Type G.

- E. Water-Reducing and Accelerating Admixture: ASTM C 494, Type E.
- F. Water-Reducing and Retarding Admixture: ASTM C 494, Type D.

2.5 CONCRETE MIX

- A. Prepare design mixes for each type and strength of normal-weight concrete per FDOT Standard Specification 346-6.2. Use a qualified independent testing laboratory for preparing and reporting proposed mix designs. Do not use the Contractor's field quality-control testing laboratory as the independent testing laboratory.
- B. Fiber Reinforcement: Add to mix at rate of 1.5 lb percu. yd., unless manufacturer recommends otherwise.
- C. Adjustment to Concrete Mixes: Mix design adjustments may be requested by Contractor when characteristics of materials, project conditions, weather, test results, or other circumstances warrant.

2.6 CONCRETE MIXING

Ready-Mixed Concrete: Comply with requirements of FDOT Standard Specifications 346-8.

PART 3 - EXECUTION

3.1 SURFACE PREPARATION

- A. Proof-roll prepared base or subgrade surface to check for unstable areas and verify need for additional compaction. Do not begin concrete work until such conditions have been corrected and are ready to receive paving.
- B. Remove loose material from compacted subbase surface immediately before placing concrete.

3.2 EDGE FORMS AND SCREED CONSTRUCTION

- A. Set, brace, and secure edge forms, bulkheads, and intermediate screed guides for paving to required lines, grades, and elevations. Install sufficient forms to allow continuous progress of work and so that forms can remain in place at least 24 hours after concrete placement.

- B. Check completed formwork and screeds for grade and alignment to following tolerances:
 - 1. Top of Forms: Not more than 1/8 inch in 10 feet.
 - 2. Vertical Face on Longitudinal Axis: Not more than 1/4 inch in 10 feet.
- C. Clean forms after each use and coat with form release agent as required to ensure separation from concrete without damage.

3.3 PLACING REINFORCEMENT

- A. General: Comply with Concrete Reinforcing Steel Institute's recommended practice for "Placing Reinforcing Bars" for placing and supporting reinforcement.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, or other bond-reducing materials.
- C. Arrange, space, and securely tie bars and bar supports to hold reinforcement in position during concrete placement. Secure reinforcement against displacement by formwork, construction, or concrete placement operations. Locate and support reinforcing by metal chairs, runners, bolsters, spacers and hangers, as required. Set wire ties so ends are directed into concrete, not toward exposed concrete surfaces. Maintain minimum cover to reinforcement.
- D. Install welded wire fabric in lengths as long as practicable. Lap adjoining pieces at least one full mesh and lace splices with wire. Offset laps of adjoining widths to prevent continuous laps in either direction.
- E. Install fabricated bar mats in lengths as long as practicable. Handle units to keep them flat and free of distortions. Straighten bends, kinks, and other irregularities or replace units as required before placement. Set mats for a minimum 2-inch overlap to adjacent mats.

3.4 JOINTS

- A. General: Construct contraction, construction, and isolation joints true to line with faces perpendicular to surface plane of concrete. Construct transverse joints at right angles to the centerline, unless indicated otherwise. When joining existing paving, place transverse joints to align with previously placed joints, unless indicated otherwise.

- B. Contraction Joints: Provide weakened-plane contraction joints, sectioning concrete into areas as shown on Drawings. If not specified on drawings intervals shall be not greater than 10 feet or less than 5 feet. Construct contraction joints for a depth equal to at least 1/4 of the concrete thickness, as follows:
1. Tooled Joints: Form contraction joints in fresh concrete by grooving and finishing each edge of joint with a radiused jointer tool.
 2. Sawed Joints: Form contraction joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into hardened concrete when cutting action will not tear, abrade, or otherwise damage surface and before development of random contraction cracks.
 3. Inserts: Form contraction joints by inserting remolded plastic, hardboard, or fiberboard strips into fresh concrete until top surface of strip is flush with paving surface. Radius each joint edge with a jointer tool. Carefully remove strips or caps of two-piece assemblies after concrete has hardened. Clean groove of loose debris.
- C. Construction Joints: Set construction joints at sideband end terminations of paving and at locations where paving operations are stopped for more than ½ hour, unless paving terminates at isolation joints.
1. Provide preformed galvanized steel or plastic keyway-section forms or bulkhead forms with keys, unless indicated otherwise. Embed keys at least 1-1/2 inches into concrete.
 2. Continue reinforcement across construction joints unless indicated otherwise.
- D. Expansion Joints: Form expansion joints of preformed joint filler strips abutting concrete curbs, catch basins, manholes, inlets, structures, walks, other fixed objects, and where indicated.
1. Locate expansion joints at intervals of 30 feet, unless indicated otherwise.
 2. Extend joint fillers full width and depth of joint, not less than ½ inch or more than 1 inch below finished surface where joint sealant is indicated. Place top of joint filler flush with finished concrete surface when no joint sealant is required.
 3. Furnish joint fillers in one-piece lengths for full width being placed wherever possible. Where more than one length is required, lace or clip joint filler sections together.

4. Protect top edge of joint filler during concrete placement with a metal, plastic, or other temporary preformed cap. Remove protective cap after concrete has been placed on both sides.
- E. Filler and Sealants: Submit specifications to Engineer for approval.
- F. Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt-coat one half of dowel length to prevent concrete bonding to outside of joint.

3.5 CONCRETE PLACEMENT

- A. Comply with requirements of FDOT Standard Specification 350-8 placing concrete.
- B. Deposit and spread concrete in a continuous operation between transverse joints. Do not push or drag concrete into place or use vibrators to move concrete into place. No concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. Deposit concrete as nearly as practical to its final location to avoid segregation. When concrete placing is interrupted for more than $\frac{1}{2}$ hour, place a construction joint.
- C. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
- D. Consolidate concrete by mechanical vibrating equipment supplemented by hand-spading, rodding, or tamping. Use equipment and procedures to consolidate concrete complying with FDOT Standard Specifications 350-10.
- E. Screed paved surfaces with a straightedge and strike off. Use bull floats or darbies to form a smooth surface plane before excess moisture or bleed water appears on the surface. Do not further disturb concrete surfaces prior to beginning finishing operations.
- F. Place concrete in two operations; strike off initial pour for entire width of placement and to the required depth below finish surface. Lay welded wire fabric or fabricated bar mats immediately in final position. Place top layer of concrete, strike off, and screed. Remove and replace portions of bottom layer of concrete that have been placed more than 15 minutes without being covered by top layer or use bonding agent if acceptable to Engineer.

- G. Curbs and Gutters: Shall be constructed in accordance with FDOT Specs. When automatic machine placement is used for curb and gutter placement, submit revised mix design and laboratory test results that meet or exceed requirements. Produce curbs and gutters to required cross section, lines, grades, finish, and jointing as specified for formed concrete. If results are not acceptable, remove and replace with formed concrete.
- H. Slip-Form Pavers: When automatic machine placement is used for paving, submit revised mix design and laboratory test results that meet or exceed requirements. Produce paving to required thickness, lines, grades, finish, and jointing as required for formed paving. Compact subgrade of sufficient width to prevent displacement of paver machine during operations.
- I. When adjoining pavement lanes are placed in separate pours, do not operate equipment on concrete until pavement has attained 85 percent of its 28-day compressive strength, or sufficient strength to carry loads without damage or injury.
- J. Cold-Weather Placement: Comply with provisions of FDOT Standard Specifications 346.8.6. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
- K. Hot-Weather Placement: Place concrete complying with FDOT Standard Specification 346.8.7 and as specified when hot weather conditions exist.

3.6 CONCRETE FINISHING

- A. Float Finish: Begin floating when bleed water sheen has disappeared and the concrete surface has stiffened sufficiently to permit operations. Float surface with power-driven floats, or by hand-floating if area is small or inaccessible to power units. Finish surfaces to true planes within a tolerance of 1/8 inch in 10 feet as determined by a 10-foot-long straight edge placed anywhere on the surface in any direction. Cut down high spots and fill low spots. Refloat surface immediately to a uniform granular texture.
 - 1. Medium-to-Fine-Textured Broom Finish: Draw a soft bristle broom across concrete surface perpendicular to line of traffic to provide a uniform fine line texture finish **UNLESS OTHERWISE NOTED IN THE CONSTRUCTION PLANS. COST OF TEXTURED FINISH TO BE INCLUDED IN THE COST OF THE CONCRETE.**
 - 2. Tine Finish: Apply to curb cut ramps and other areas as noted on the drawings. Finish shall be applied by an approved hand

method and shall consist of transverse grooves which are 0.03 to 0.12 inch in width and 0.10 to 0.15 inch in depth, spaced at approximately ½ inch center to center.

- B. Final Tooling: Tool edges of paving, gutters, curbs, and joints formed in fresh concrete with a jointing tool to ½ inch radius. Repeat tooling of edges and joints after applying surface finishes. Eliminate tool marks on concrete surfaces.

3.7 CONCRETE PROTECTION AND CURING

General: Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Comply with the recommendations of FDOT Standard Specification 350-13 curing.

3.8 FIELD QUALITY CONTROL TESTING

- A. A qualified independent testing and inspection laboratory, under the direction of a Professional Engineer, licensed in the State of Florida, shall sample materials, perform tests, and submit test reports during concrete placement as follows:
 - 1. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
 - a. Slump: ASTM C 143; one test at point of placement for each compressive-strength test but no less than one test for each day's pour of each type of concrete. Additional tests will be required when concrete consistency changes.
 - b. Air Content: ASTM C 231, pressure method; one test for each compressive-strength test but no less than one test for each day's pour of each type of air-entrained concrete.
 - c. Concrete Temperature: ASTM C 1064; one test hourly when air temperature is 40 deg F (4 deg C) and below and when 80 deg F (27 deg C) and above, and one test for each set of compressive-strength specimens.
 - d. Compression Test Specimens: ASTM C 31; one set of three standard cylinders for each compressive-strength test, unless directed otherwise. Mold and store cylinders for laboratory-cured test specimens except when field-cured test specimens are required.
 - e. Compressive-Strength Tests: ASTM C 39; one set for each day's pour of each concrete class, plus one set for each additional 50 cu. yd. Test two specimens at 28 days, and retain one specimen in reserve for earlier or later testing if required.

- f. Contractor shall replace materials removed for testing purposes. Should any work or materials fail to meet the requirements set forth in the plans and specifications, contractor shall pay for retesting of same.
2. Basis for acceptance of concrete will be per FDOT Section 346-10 and 346-11.
- B. Test results will be reported in writing to Engineer, concrete manufacturer, and Contractor within 24 hours of testing. Reports of compressive strength tests shall contain the Project identification name and number, date of concrete placement, name of concrete testing laboratory, concrete type and class, location of concrete batch in the work, design compressive strength at 28 days, concrete mix proportions and materials, compressive breaking strength, and type of break for both 7-day and 28-day tests.
 - C. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted but shall not be used as the sole basis for acceptance or rejection.
 - D. Additional Tests: The testing laboratory will make additional tests of the concrete when test results indicate slump, air entrainment, concrete strengths, or other requirements have not been met, as directed by Engineer. Testing laboratory may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C 42, or by other methods as directed.

3.9 REPAIRS AND PROTECTION

- A. Remove and replace concrete work that is broken, damaged, or defective, or does not meet the requirements of this Section.
- B. Drill test cores where directed by Engineer when necessary to determine magnitude of cracks or defective areas. Fill drilled core holes in satisfactory concrete areas with Portland cement concrete bonded to paving with epoxy adhesive.
- C. Protect concrete from damage. Exclude traffic from concrete pavement for at least 14 days after placement. When construction traffic is permitted, maintain concrete as clean as possible by removing surface stains and spillage of materials as they occur.

- D. Maintain concrete work free of stains, discoloration, dirt, and other foreign materials. Sweep concrete paving not more than 2 days prior to date scheduled for Substantial Completion inspections.

PART 4 MEASUREMENT/PAYMENT

4.1 METHOD OF MEASUREMENT

The quantities to be paid for will be the plan quantity, in square yards, of Plain Cement Concrete Pavement, Reinforced Cement Concrete Pavement, square yards of sidewalk, and linear feet of curb and gutter.

4.2 JOINTS AND CRACKS

The Contractor shall include the cost for Cleaning and Sealing Joints in the cost of the newly constructed pavement for: (1) transverse and longitudinal joint construction for new pavement; and (2) abutting joints between existing pavement and new pavement. For replacing joints seals and sealing random cracks in existing Portland cement concrete pavement, the quantity to be paid for will be as specified below:

4.3 BASIS OF PAYMENT

Prices and payment will be full compensation for all work specified in this Section, including any preparation of the subgrade not included in the work to be paid for under another Contract item; all transverse and longitudinal joint construction, including tie-bars and dowel bars; the furnishing of test specimens; repair of core holes; **TEXTURED FINISHES**; and all incidentals necessary to complete the work.

END SECTION 03300

SECTION 04000 - TRAFFIC CONTROL SIGNS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and other Specifications Sections, apply to work of this section.
- B. Unless otherwise specified on the work orders, plan sheets, or in other sections of this contract, all materials and work shall conform to the applicable requirements in the following document:
 - (1) USDOT, Federal Highway Administration Manual on Uniform Traffic Control Devices for Streets and Highways, latest edition.
 - (2) USDOT, Federal Highway Administration Standard Alphabets for Highway Signs and Pavement Markings, latest edition.
 - (3) Florida Department of Transportation, Design Standards for Design, Construction, Maintenance and Utility Operations on the State Highway System, latest edition.
 - (4) Florida Department of Transportation, Standard Specifications for Road and Bridge Construction, Section 700, latest edition.
- C. GENERAL EXCEPTIONS: Any reference to FDOT Standard Specifications for Road and Bridge Construction (latest edition) Division I General Requirements & Covenants shall be excluded and not applicable to any specification referred here in, or otherwise listed in this document.

1.2 DESCRIPTION OF WORK

The work under this section includes the fabrication and installation of standard and special traffic control signs (warning, regulatory, and guide). The Contractor shall furnish all labor, materials, tools, supplies, equipment, and machinery necessary to fully complete the work shown in the plans and in these specifications.

PART 2 - PRODUCTS

2.1 MATERIALS

All materials shall be new and of good quality unless otherwise specified. The Contractor shall, if requested by Engineer, furnish

samples of material and/or shall certify that the material meets all FDOT requirements. All material or work that has been rejected shall be remedied by the Contractor at his own expense and without delay. If the Contractor fails to promptly remove and/or dispose of rejected material and replace the same, the Engineer may remove and replace the same and deduct the cost of the work from the contract amount.

If the Contractor chooses to use material other than specified herein, a sample of the material with supporting manufacturer's literature and specifications must be submitted to the Engineer for approval

PART 3 - EXECUTION

3.1 UTILITY SPOTS

Contractor shall contact utilities at least 48 hours before digging.

3.2 SIGN INSTALLATION

- A. Signs shall be placed at the locations illustrated and/or specified in the plans or related documents. The soil around the post shall be solidly tamped so that the sign will stand vertically.
- B. If a sign cannot be placed where indicated due to a conflict, the Contractor shall immediately notify the Engineer. The Engineer will specify an alternate location.
- C. The date when each sign is installed shall be marked in permanent ink on the rear side of each sign.

PART 4 MEASUREMENT / PAYMENT

4.1 METHOD OF MEASUREMENT

The quantity to be paid for will be plan quantity, unless otherwise provided.

- 4.2 BASIS OF PAYMENT Price and payment will constitute full compensation for all work specified in this section. Payment for all items relating to traffic control signs will be included in the lump sum Maintenance of Traffic pay item.

END OF SECTION 04000

SECTION 04020 - POST MOUNTED SIGNS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and other Specifications Sections, apply to work of this section.
- B. Unless otherwise specified on the plan sheets or in other sections of this contract, all materials and work shall conform to the applicable requirements in the following document:
 - (1) USDOT, Federal Highway Administration *Manual on Uniform Traffic Control Devices for Streets and Highways*, latest edition.
 - (2) USDOT, Federal Highway Administration *Standard Alphabets for Highway Signs and Pavement Markings*, latest edition.
 - (3) Florida Department of Transportation, Standard Specifications for Road and Bridge Construction, Section 700, latest edition.
 - (4) FDOT Design Standards for design, Construction, Maintenance, and utility operations on the State Highway System, latest Edition.
- C. GENERAL EXCEPTIONS: Any reference to FDOT Standard Specifications for Road and Bridge Construction (latest edition) Division I General Requirements & Covenants shall be excluded and not applicable to any specification referred here in, or otherwise listed in this document.

1.2 DESCRIPTION OF WORK

The work under this section includes the fabrication and installation of post mounted street name signs as shown or noted on plans. The Contractor shall furnish all labor, materials, tools, supplies, equipment, and machinery necessary to fully complete the work shown in the plans and in these specifications.

PART 2 - PRODUCTS

2.1 MATERIALS

All materials shall be new and of good quality unless

otherwise specified. The Contractor shall, if requested by Engineer, furnish samples of material and/or shall certify that the material meets all FDOT requirements. All material or work that has been rejected shall be remedied by the Contractor at his own expense and without delay. If the Contractor fails to promptly remove and/or dispose of rejected material and replace the same, the Engineer may remove and replace the same and deduct the cost of the work from the contract amount.

If the Contractor chooses to use material other than specified herein, a sample of the material with supporting manufacturer's literature and specifications must be submitted to the Engineer for approval.

Sign-blades reflective sheeting and posts shall conform to the City's standard details for street name signs.

PART 3 - EXECUTION

3.1 GENERAL

All street name signs shall be fabricated and installed in accordance with the plans and related documents.

3.2 SIGN LAYOUT AND LEGEND

Letter shape and width of stroke shall comply with HAW & FDOT standards. For street name signs, lettering, border and blade dimensions shall be consistent with the City's standard detail for street name signs.

3.3 SIGN INSTALLATION

- A. Signs shall be placed at the typical locations shown in the plans. The soil around the post shall be solidly tamped so that the sign will stand vertically.
- B. If a sign cannot be placed where indicated on the plans due to a conflict, the Contractor shall immediately notify the Engineer. The Engineer will specify an alternate location.

3.4 REMOVAL OF SIGNS AND MARKERS

- A. Existing metal street name signs and painted concrete street name markers specified for removal shall be removed from the site, delivered, and unloaded, as directed by the Engineer
- B. Holes created by the removal of the signs and markers shall be filled with clean soil, which shall be firmly hand tamped to match the level of the surrounding ground.

PART 4 - MEASUREMENT \ PAYMENT

4.1 METHOD OF MEASUREMENT

The quantities to be paid for will be:

1. The number of roadside traffic signs of each designated class of assembly, complete.
2. The number of existing signs removed, relocated, modified, placed on breakaway or non-breakaway supports, of each designated class of assembly complete.
3. The number of each existing sign refurbished, existing sign panel removed, pole installed, exit numbering panel, and mile post, complete.

For the purpose of payment, a sign assembly consists of all the signs mounted on a single structure (one, two, or three posts).

4.2 BASIS OF PAYMENT

Price and payment will be full compensation for furnishing and installation of all materials necessary to complete the signs in accordance with the details shown in the plans; including sign panels complete with sheeting, painting, and message; sign posts and supports, footings, excavation, etc.; and all other work specified in this Section, including all incidentals necessary for the complete item.

END OF SECTION 04020

SECTION 04040 - PAVEMENT MARKINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and other Specifications Sections, apply to work of this section.
- B. Unless otherwise specified on the plan sheets or in other sections of this contract, all materials and work shall conform to the applicable requirements in the following documents:
 - 1. Florida Department of Transportation Roadway and Traffic Design Standards, Indices 17344 through 17359, latest edition.
 - 2. Florida Department of Transportation Standard Specifications for Road and Bridge Construction, Sections 705, 706, 710, 711, 971, and 993, latest edition.
 - 3. USDOT, Federal Highway Administration Manual on Uniform Traffic Control Devices for Streets and Highways, latest edition.
- C. GENERAL EXCEPTIONS: Any reference to FDOT Standard Specifications for Road and Bridge Construction (latest edition) Division I General Requirements & Covenants shall be excluded and not applicable to any specification referred here in, or otherwise listed in this document.

1.2 DESCRIPTION OF WORK

The work under this section includes the installation of temporary and permanent pavement markings. The Contractor shall furnish all labor, materials, tools, supplies, equipment, and machinery necessary to fully complete the work shown in the plans and in these specifications. Pavement marking notes on plan sheets shall take precedence over and modify conflicting Technical Specifications.

PART 2 - PRODUCTS

2.1 MATERIALS

All materials shall be new and of good quality unless otherwise specified. The Contractor shall, if requested by the Engineer, furnish samples of material and/or shall certify that the material meets all FDOT requirements. All material or work that has been rejected shall

be remedied by the Contractor at his own expense and without delay. If the Contractor fails to promptly remove and/or dispose of rejected material and replace the same, the Engineer may remove and replace the same and deduct the cost of the work from the contract amount.

2.2 TEMPORARY PAVEMENT MARKINGS

Materials for temporary pavement marking shall meet all requirements of FDOT Specs, Section 710, latest edition.

2.3 PERMANENT PAVEMENT MARKINGS

Materials for permanent pavement markings shall meet all requirements of FDOT Specs, Section 710, latest edition. Paint shall be Standard Waterbourne Fast Dry Traffic Paint. Use of solvent bourne paints shall not be permitted.

PART 3 - EXECUTION

3.1 GENERAL

All pavement markings shall be applied in accordance with FDOT Specs requirements.

3.2 TEMPORARY PAVEMENT MARKINGS

Temporary pavement markings shall be installed at the end of each day on new pavement surfaces and shall be maintained until permanent markings are installed.

3.3 PERMANENT PAVEMENT MARKINGS

Permanent pavement markings, including painted stripes, thermoplastic stripes, and reflective pavement markers, shall be installed as shown in the plans. Materials and installation shall conform to applicable standards in the documents referenced in Section 1.1. Installation of permanent markings on all final asphaltic concrete surfaces shall not be accomplished prior to 14 calendar days, nor later than 30 calendar days, after placement of the final surfaces.

PART 4 - MEASUREMENT / PAYMENT

4.1 METHOD OF MEASUREMENT

The quantities to be paid for under this Section will be the length in feet of Skip Traffic Stripes, the length in feet of Solid Traffic Stripes, the number of directional arrows and pavement messages, painted, the area in square feet of Reflective Paint (Island Nose), and the area in square feet to Remove Existing Markings. Measurement will be taken as the distance from the beginning of the first painted

stripe to the end of the last painted stripe with proper deductions made for unpainted intervals will not be included in pay quantity.

4.2 BASIS OF PAYMENT

Prices and payment will be full compensation for all work specified in this Section, including, all cleaning and preparing of surfaces, furnishings of all materials, application, curing and protection of all items, protection of traffic, furnishing of all tools, machines and equipment, and all incidentals necessary to complete the work. Final payment will be withheld until all deficiencies are corrected.

END OF SECTION - 04040

SECTION 04060 - MAINTENANCE OF TRAFFIC

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Specifications Sections, apply to work of this section.
- B. Unless otherwise specified on the plan sheets or in other sections of this contract, all materials and work shall conform to the applicable requirements in the following documents:
 - (1) Florida Department of Transportation Design Standards, latest edition.
 - (2) Florida Department of Transportation Standard Specifications for Road and Bridge Construction, Section 102, latest edition.
 - (3) USDOT, Federal Highway Administration Manual on Uniform Traffic Control Devices for Streets and Highways, latest edition, Part 6 Temporary Traffic Controls.
 - (4) FDOT Minimum Specifications for Traffic control and Devices, latest edition.
- C. GENERAL EXCEPTIONS: Any reference to FDOT Standard Specifications for Road and Bridge Construction (latest edition) Division I General Requirements & Covenants shall be excluded and not applicable to any specification referred here in, or otherwise listed in this document.

1.2 SUMMARY OF WORK

The work under this section includes the maintenance of traffic within the limits of the project for the duration of construction.

PART 2 - PRODUCTS

Not Used.

PART 3 - EXECUTION

3.1 RESPONSIBILITIES OF CONTRACTOR

- A. Control and maintain traffic and provide for the safety of the work in accordance with Maintenance and Traffic Plan included in the contract documents. Conduct operations in a manner that will not interrupt pedestrian and vehicle traffic except as approved by the Engineer. Confine the work area to the

smallest area practical to allow the maximum use of the street and sidewalk and to reduce any hazard to vehicles and pedestrians to a minimum.

- B. Maintain access to properties that adjoin the work. Contact property owners and assure that access is coordinated prior to commencing work that may block access.
- C. Furnish all labor, materials, tools, supplies, equipment, and machinery needed to fully comply with the specifications described on the plan sheets and in this Section. At all times, the Contractor shall use workers and traffic control devices necessary to comply with all applicable provisions contained in the reference documents listed in Section 1.1.
- D. The Contractor shall notify the agencies and the City Engineer in writing, 48 hours in advance, of any work within the road right-of-way that may interfere with vehicle and/or pedestrian traffic.

3.2 PENALTIES AND SUSPENSION OF WORK

The Engineer may verbally direct the Contractor to immediately suspend work if violation of safety regulations is found. In such an event, Contractor shall immediately stop work and secure any potential hazards from the public until the violation is corrected to satisfaction of the Engineer. Law enforcement officers may be called to assist the Engineer in suspending work if the Contractor is not responsive. Suspension of work for violation of safety regulations shall not be grounds for a contract time extension.

PART 4 MEASUREMENT / PAYMENT

4.1 METHOD OF MEASUREMENT

- A. Maintenance of Traffic (General Work): The quantity to be paid for will be at the Contract lump sum price for Maintenance of Traffic. Where the plans require the use of trucks and truck mounted impact attenuators, these items will not be paid for separately but shall be included in the cost of Maintenance of Traffic. Only use those attenuators that have been tested by a facility approved by the Engineer and certified as meeting the requirements as specified in NCHRP 350 and that have been properly maintained.
- B. Law Enforcement Services: The quantity to be paid for will be at the Contract unit price per hour for the actual number of officers

on the project site. Payment will be made only for those off-duty law enforcement officers specified in the TCP and authorized by the Engineer.

- C. Special Detours: When a detour facility is specially detailed in the plans, or is otherwise described or detailed as a special item, and an item for separate payment is included in the proposal, the work of constructing, maintaining and subsequently removing such detour facilities will be paid for separately. Traffic control devices, warning devices, barriers, signing, and pavement markings for Special Detours will be included in such item. When the plans show more than one detour facility is included in the proposal, payment will be made under Special Detour.
- D. Materials for Driveway Maintenance: The quantity to be paid for will be the volume, in cubic yards, of all materials authorized by the Engineer, acceptably placed and maintained for driveway maintenance. The quantity will be determined by truck measurement, loose volume after loading and striking off the material to uniform depth. The quantity which is authorized to be reused and which is acceptably salvaged, placed, and maintained in other designated driveways will be measured in truck bodies and included again for payment.
- E. Calcium Chloride for Dust Control: The quantity to be paid for will be the weight, in tons, of calcium chloride authorized and acceptably spread on the road, within the limits specified by the Engineer. The quantity will be determined from scales, certified freight bills, or other sources, the accuracy of which can be authenticated.

4.2 BASIS OF PAYMENT

- A. MAINTENANCE OF TRAFFIC (GENERAL WORK): Price and payment will be full compensation for all work and costs specified under this Section except as may be specifically covered for payment under other items.
- B. LAW ENFORCEMENT: Prices and payment will be considered full compensation for the services of the off-duty law enforcement officer, including a marked law enforcement vehicle and all other direct and indirect costs.
- C. SPECIAL DETOURS: Price and payment will be full compensation for providing all detour facilities shown on the plans and all costs incurred in carrying out all requirements of this Section for general maintenance of traffic within the limits of the detour, as shown on the plans.

- D. Calcium Chloride for Dust Control: Price and payment will be full compensation for all work and materials specified for this item, including specifically all required shaping and maintenance of the treated area and all water furnished and applied to the area.

END OF SECTION 04060

SECTION 05000 - DEWATERING

SCOPE OF WORK

This Section includes side slope stabilization and stormwater system and appurtenances. All labor, material, equipment, appurtenances, services, permits and other work or costs necessary to construct the facilities and place them into operation shall be furnished by the Contractor.

All materials used in storm or sanitary sewer construction shall conform to the specifications indicated. Any materials not specifically called for below, or indicated on the plans, shall conform to the current Standard Specifications for Road and Bridge Construction of the Florida Department of Transportation, which are hereby made a part of these specifications. In the event of conflict between the Florida Department of Transportation specifications and the City specifications, the latter shall govern.

SHEETING, SHORING, AND BRACING

The Contractor shall provide and install such sheeting, shoring and bracing as may be required to properly and safely support the sides of any excavation to prevent earth movement that could endanger the work or workmen, or any existing structures, or to confine the construction within a specified area such as an easement, street right of way or City property. It shall be the Contractor's responsibility to place this sheeting, shoring and bracing utilizing sound, safe and practical means/methods without the City Engineer's instructions. Sheeting shall not be installed by vibratory hammer, impact methods or any other method that may cause damage to surrounding structures without prior approval by the City Engineer. Such sheeting, shoring and bracing will be considered as being for the Contractor's convenience and benefit and all costs of furnishing, installing and removing same shall be borne by him unless listed as a separate item in the bid proposal.

All sheeting, shoring and bracing shall be carefully removed when sufficient backfill has been placed to prevent damage to the work and/or existing structures. All voids shall be immediately backfilled with approved materials and compacted.

Steel drag shields, slip joints/bracing or trench boxes may be used at the option of the Contractor, as approved by the City Engineer. Voids left by the advancement of the shield shall be carefully backfilled and compacted in accordance with trench backfill requirements.

DEWATERING

Ample means shall be provided during construction to remove and dispose all water entering trench and structure excavations. Said dewatering shall continue during construction to keep the ground water below the level of backfill at all times.

The Contractor may use any dewatering method he deems feasible to comply with the above conditions.

Discharge from the dewatering system shall be such that it will not endanger public health, damage property, or adversely affect any portion of the work under construction. Care should be taken to prevent the washing of soil into watercourses or storm sewers during discharge. The contractor shall be financially responsible for the sampling and testing of up to 5 samples in an effort to obtain an FDEP approved "clean" sample. If after 5 samples a contaminant is still present in the groundwater, the contractor and the City Engineer will develop a plan of action for discharging the groundwater in a method acceptable to FDEP.

Cost for dewatering shall be included in the price for the related items.

BACKFILLING

Backfilling shall be carefully done so as to prevent undue strains on the sediment chamber. No wood, stumps, roots, construction debris, or other deleterious substances shall be incorporated in the backfill.

A. General

The Contractor shall obtain a well compacted bed, and fill and compact along the sides of the pipe to a point one (1) foot above the top of the pipe. Backfill shall be placed in six (6) inch layers (compacted thickness) and shall be compacted to 95% of maximum density as determined by AASHTO T-180 (modified proctor).

Compaction shall be accomplished by the use of mechanical tampers. The working face of the tampers shall not exceed 30 square inches in area. The width of the trench that is to be compacted is the width of the natural ground that is disturbed by excavation.

B. Backfill in areas subject to traffic

Backfill and compaction between the haunches of the pipe and one (1) foot above the top of the pipe shall be accomplished as discussed in Section 2.8.A above.

Above the one (1) foot point, the contractor shall backfill the remainder of the trench in six (6) inch layers (compacted thickness). Each layer shall be compacted to 95% of maximum density as determined by AASHTO T-180 (modified proctor).

C. Backfill in areas not subject to traffic

Backfill and compaction between the haunches of the pipe and one (1) foot above the top of the pipe shall be accomplished as discussed in Section 2.8.A above.

Above the one (1) foot point, the contractor may fill the remainder of the trench in three (3) layers and compact by pounding or other means to a compaction at least equal to the surrounding undisturbed material. The amount of this compaction will be controlled by the City Inspector.