



BOARD OF COUNTY COMMISSIONERS

BUREAU OF PUBLIC WORKS

Construction Management

Resurfacing

Technical Specifications

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.

County Engineer
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Effective Date: 05/20/08

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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

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.

A. 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 performed 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 county 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 County 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 quality-control items as required under other Sections of the Specifications.

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 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 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 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 County 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 County 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 County 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 include the cost of this pumping equipment and work in the unit price bid for the work.
- D. Establish and maintain temporary drainage ditches and other 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 job 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.

1. Footings and Foundations: Do not disturb bottom of excavation. Excavate by hand to final grade just before placing concrete reinforcement. Trim bottoms to required lines and grades to leave solid base to receive other work.
2. 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.
3. 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.

1. Stockpile soil materials away from edge of excavations. Do not store within drip line of remaining trees.
2. 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.

- 1. Do not place backfill or fill material on surfaces that contain excessive moisture.
- 2. 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 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.
- B. 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 sitework 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, grass plots, 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

When payment for excavation is on a volumetric basis, the quantity to be paid for will be the volume, in cubic yards, calculated by the method of average end areas. The measurement will include the net volume of material between the original ground surface and the surface of completed earthwork. Excavation for swales and channels will be included in the total quantity for Excavation.

Subsoil Excavation will be measured to the lines and grades indicated on the plans or as approved by the Engineer. Backfill material shall either include normal excavation material from within project limits or borrow material supplied by the Contractor.

B. EMBANKMENT

Quantities for Embankment will be calculated by the method of average end areas, and will include material placed above the original ground line, within the lines and grades indicated on the plans or as directed by the Engineer.

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.

B. EXCAVATION

Separate unit prices will be established for required cubic yard volumes of Regular Excavation, Subsoil Excavation, and Borrow Excavation. When subsoil excavation is required to a depth greater than 5' from that shown on the plans, such excavation will be paid for at the contract unit price plus 25 percent. When subsoil operations continue beyond 15' greater than shown on plans, a change order will be submitted to establish a new unit price.

C. EMBANKMENT

Payment shall be made at the unit contract price for Embankment, cubic yard, in place.

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 Department 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, ordolomite.
 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: At least one field density test on each course of compacted base shall be made 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 re-compacted 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 periodically during the placement of the base course, or as otherwise directed by the Engineer.

Areas Requiring Correction: Where the compacted base is deficient by more than 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 02440 - SUPERPAVE ASPHALT BASE COURSE

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 work of this section.
- B. Work shall comply with requirements of these specifications as stated 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 SUBMITTALS

Submit certification of compliance with applicable specifications in accordance with Section 01300, "Submittals".

1.3 DELIVERY AND STORAGE

Inspect materials delivered to the site for damage and store to prevent segregation.

1.4 ENVIRONMENTAL CONDITIONS

Construct bituminous courses when underlying course is dry, and do not construct when atmospheric temperature is 40 degrees F and rising for courses 1 ½" or greater, and 45 degrees F and rising for courses less than 1 ½".

1.5 CONSTRUCTION EQUIPMENT

- A. Spreading Equipment: Self-propelled electronically controlled type, unless other equipment is authorized. Spreading equipment shall be capable of spreading hot bituminous mixtures without tearing, shoving, or gouging and to produce a finished surface of specified grade and smoothness. The use of a spreader that leaves indented areas or other objectionable irregularities in the fresh laid mix during operations will not be permitted.

- B. Rolling Equipment: Self-propelled pneumatic-tired rollers supplemented by three-wheel and tandem type steel wheel rollers. The number, type and weight of rollers shall be sufficient to compact the mixture to the required density without detrimentally affecting the compacted material. All rollers shall be suitable for rolling hot-mix bituminous pavements and capable of reversing without backlash. Pneumatic-tired rollers shall be capable of being operated both forward and backward without turning on the mat, and without loosening the surface being rolled. Equip rollers with suitable devices and apparatus to keep the rolling surfaces wet and prevent adherence of bituminous mixture.

At the Contractor's option, vibratory rollers especially designed for bituminous concrete compaction may be used, provided rollers do not impair stability of pavement structure and any underlying layers. Repair depressions in pavement surfaces resulting from use of vibratory rollers at no cost to the Owner. Rollers shall be self-propelled, single or dual vibrating drums, and steel drive wheels, as applicable; equipped with variable amplitude and separate controls for energy and propulsion.

- C. Hand Tampers: Hand tampers shall weigh not less than 25 pounds and have a tamping face of not more than 50 square inches.
- D. Mechanical Hand Tampers: Commercial type, operated by pneumatic pressure or by internal combustion.

PART 2 - PRODUCTS

2.1 MATERIALS

All materials shall conform to the requirements of these Specifications for the pavement sections as shown on the drawings.

PART 3 - EXECUTION

3.1 TRANSPORTATION OF BITUMINOUS MIXTURES

Deliver mixture to the area to be paved in such a manner that the temperature, at the time of dumping into the spreader, shall be not less than 285 or greater than 345 degrees F or that temperature required to obtain the specified compaction. Reject any load that has become wet

prior to placing or falls outside of the above temperature ranges.

3.2 PLACING

Provide line and grade stakes as necessary for control. Place grade stakes in lanes parallel to centerline of area to be paved, and suitably space for string lines. Place and compact bituminous courses in such thicknesses as to achieve density and smoothness requirements. Maximum lift of bituminous base course shall not exceed 3 inches. Prior to laying the base course, clean underlying course of foreign and objectionable matter with power blowers, power brooms, or hand brooms in places inaccessible to power equipment, and inspect for compaction and smoothness requirements. The range of temperatures of the mixtures at the time of spreading shall be between 285 degrees F and 345 degrees F. Reject bituminous mixture having a temperature outside these limits when dumped into the hopper of the spreader. Adjust mechanical spreader and regulate speed so that the surface of the course is smooth, and when compacted conforms to depth, cross sections, grades and contours indicated. When irregularities of surface or deficiency in depth is more than specified tolerances, remove defective work and replace with new material. Whenever possible, place the mixture in strips not less than 10 feet wide. Overlap rolling to previously placed strip and extend to overlap first strip. Place mixture as continuously as possible. Shovelers and rakers shall follow spreading equipment, adding hot mixture and raking as required to produce a course that, when completed, shall conform to requirements specified. In areas where the use of machine spreading is impractical, mixture may be spread by hand. Distribute mixture into place from dump boards by means of hot shovels and spread with hot rakes in a uniformly loose layer of such thickness that, when completed, it conforms to required grade and thickness. Do not dump loads any faster than they can be handled by shovelers and rakers. Paint contact surfaces of previously constructed curbs, manholes, and similar structures with a thin coat of emulsion or other approved bituminous material prior to placing the bituminous mixture.

3.3 COMPACTION OF MIXTURE

A. Affect compaction by rolling. Begin rolling as soon after placing as the mixture will bear the roller without undue displacement. Delays in rolling freshly spread mixture will not be tolerated. Start rolling longitudinally at extreme sides of lanes and proceed

toward center of pavement, overlapping on successive strips by at least one-half the width of rear wheel of roller. Alternate trips of roller shall be slightly different lengths. Affect initial longitudinal rolling by the use of steel roller. Make tests for conformity with specified crown, grade and smoothness immediately after initial compression. Before continuing rolling, correct any variations by removing or adding materials, then roll course using pneumatic-tired rollers or tandem rollers, while mixture is hot and in condition suitable for proper compaction. Speed of rollers shall not exceed 3 miles per hour and at all times be slow enough to avoid displacement of hot mixture. Correct any displacement of mixture at once by use of rakes and apply fresh mixture or remove mixture as required. Continue rolling until all roller marks are eliminated. During rolling, moisten rollers to prevent adhesion of mixture to rolling surfaces, but do not permit an excess of water. Provide sufficient rollers for each spreading machine in operation on the job and to handle plant output. In places not accessible to rollers, compact mixture with hot pneumatic or manual hand tampers. Skin patching of an area that has been rolled is not permitted. Remove any mixture that becomes mixed with foreign material or is defective, replace with fresh mixture, and compact to density of surrounding area. Roller shall pass over unprotected edge of course only when laying of course is to be discontinued for a length of time to permit mixture to become cold. Contractor shall provide workmen who are capable of performing work incidental to correction of pavement irregularities. After final rolling, permit no traffic of any kind on the pavement until the surface temperature has cooled to at least 120 degrees F. Measure surface temperature with surface thermometers or other satisfactory methods.

B. Testing Base Course:

1. Density: Within the entire limits of the width and depth of the base, obtain a minimum density in all areas of the roadway of 98% of modified Proctor maximum density as determined by AASHTO FM 1-T 180, Method D. Compact the base of any LOT of shoulder pavement to not less than 95% of the modified Proctor maximum density as determined by FM 1-T 180, Method D. The contractor will perform all tests at their expense. Additional tests and cores may be required at the Engineer's discretion.

2. Thickness: Measure thickness throughout the placement of any and all courses. In addition, perform periodic checks on the yield during the placement of any and all courses. The maximum allowable deficiency at any point shall not be more than 1/4 inch less than the indicated thickness for the course. The average thickness of the course shall be not less than the indicated thickness. Where the deficiency is more than the specified tolerances, the contractor shall correct each such representative area or areas by removing the pavement in question and replacing with new pavement.

3. Smoothness: Straightedge the compacted surface of the course, utilizing a 15' rolling straightedge, as deemed necessary by the Engineer. Apply straightedge parallel with and at right angles to the centerline after final rolling. Unevenness of the course shall not vary more than plus or minus 3/16 inch in 15 feet. Correct any portion of the pavement showing irregularities greater than that specified.

PART 4 - Measurement / Payment

4.1 METHOD OF MEASUREMENT

ASPHALT BASE COURSE:

The quantity to be paid for will be the area, in square yards, of asphalt base course after adjustment to the equivalent area of specified thickness.

4.2 BASIS OF PAYMENT

ASPHALT BASE COURSE:

Prices and payments will be full compensation for all work specified in this Section 2500.

END OF SECTION 02440

Section 02500 - TYPE SP 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 Escambia County. All references to the Engineer shall mean the designated Engineer of Escambia County.
- 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 County 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 here in, or otherwise listed in this document.
- E. Asphalt mixes to be referred to as:
 - Type SP 12.5Type I
 - Type SP 19.0Type III
 - Type SP 9.5Type II

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 9.53/4 - 1 1/4 inches
 - Type SP 12.51 1/4 - 2 1/2 inches
 - Type SP 19.02- 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 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 County Engineer. County 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 1.3.1 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 Escambia County projects must be in accordance with FDOT Qualified Products List

Crushed Reclaimed Portland-Cement Concrete Pavement may be used as a coarse aggregate or screenings component subject to meeting all applicable specifications.

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)						
	Type SP Asphalt Mixture (Percent Passing)					
	SP 9.5		SP 12.5		SP 19.0	
Sieve Size	Min.	Max.	Min.	Max.	Min.	Max.
1 inch	-	-	-	-	100	-
3/4 inch	-	-	100	-	90	100
1/2 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)			
	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		
	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 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			
	$N_{initial}$	N_{design}	$N_{maximum}$
SP Mixes	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			
	% G _{mm}		
	$N_{initial}$	N_{design}	$N_{maximum}$
SP Mixes	•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:
- The design number of gyrations (N_{design}).
 - The source and description of the materials to be used.
 - 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	± 1.0%
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 non-contact 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 the necessary quality control personnel to comply with the requirements of this section.
- 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, which ever 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.

Size	Percent Passing
1 inch	7.0
3/4 inch	7.0
1/2 inch	7.0
3/8 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.

Table 14 Tolerances for Acceptance Tests	
Characteristic	Tolerance*
Asphalt Binder Content	±0.55%
Passing No. 8 Sieve	±5.50%
Passing No. 200 Sieve	±2.00%
*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 02510 - ASPHALT RUBBER MEMBRANE INTERLAYER (CRACK RELIEF)

PART 1 - GENERAL

DESCRIPTION

- A. Construct an asphalt rubber membrane interlayer composed of a separate application of asphalt rubber binder covered with a single application of aggregate.
- 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.

2.1 MATERIALS

- A. Asphalt Rubber Binder: Use ARB-20 meeting the requirements of Section 336.
- B. Cover Material: Use Size No. 6 stone, slag, or gravel meeting the requirements of Section 901.

3.1 EQUIPMENT

- A. Power Broom: Provide a power broom for cleaning the existing pavement capable of removing all loose material from the surface.
- B. Spreading Equipment: Provide a self-propelled aggregate spreader that can be adjusted to accurately apply the cover material at the specified rate and that spreads the material uniformly.
- C. Rollers: Provide self-propelled, pneumatic-tired traffic type rollers equipped with at least 7 smooth-tread, low-pressure tires, and capable of carrying a gross load of at least 8 tons. Maintain a minimum tire inflation pressure of 90 psi, or as specified by the manufacturer, such that in no two tires the air pressure varies more than 5 psi. Load the traffic roller as directed by the Engineer.
- D. Mixing Equipment: Use mixing equipment for asphalt rubber binder designed for that purpose and capable of producing and maintaining a homogeneous mixture of rubber and asphalt cement at the specified temperature.
- E. Pressure Distributor: Use a pressure type distributor to apply asphalt rubber binder capable of maintaining a homogeneous mixture of rubber and asphalt cement at the

specified temperature and consistently apply the material in a uniform manner.

4.1 CONTRACTOR'S QUALITY CONTROL

Provide the necessary quality control of the asphalt rubber binder and construction in accordance with the Contract requirements. Provide in the Quality Control Plan procedures for monitoring and controlling of rate of application. If the rate of application varies by more than 5% from the rate set by the Engineer in accordance with 4.6, immediately make all corrections necessary to bring the spread rate into the acceptable range. The Engineer may take additional measurements at any time. The Engineer will randomly check the Contractor's measurement to verify the spread rate.

4.5 PREPARATION OF ASPHALT RUBBER BINDER

Combine the materials as rapidly as possible for such a time and at such a temperature that the consistency of the binder approaches that of a semi-fluid material. Use the time and temperature for blending of the asphalt rubber binder as specified in Table 336-1. The Engineer will be the sole judge of when the material has reached application consistency and will determine if an extender oil or diluent is needed for that purpose. After reaching the proper consistency, proceed with application immediately. Never hold the mixture at temperatures over 350°F for more than six hours after reaching that temperature.

4.6 CONSTRUCTION PROCEDURE

- A. Preparation of Surface: Prior to application of the asphalt rubber binder, clean the existing pavement as specified in 300-5.
- B. Application of Asphalt Rubber Binder: Apply the asphalt rubber binder only under the following conditions:
 - 1. The air temperature is above 50°F and rising.
 - 2. The pavement is absolutely dry.
 - 3. The wind conditions are such that cooling of the asphalt rubber binder will not be so rapid as to prevent good bonding of the aggregate.

Uniformly apply the asphalt rubber binder, at the rate of 0.6 to 0.8 gal/yd² as directed by the Engineer. Use an application rate based on the unit weight as shown in Table 336-1. For conversions to standard 60°F, refer to 300-9. Determine the rate of application after each application operation.

- C. Application of Cover Material: Immediately after application of the asphalt rubber binder, uniformly spread the cover material at a rate of 0.26 and 0.33 ft³/yd². The Engineer will set the exact rate.

Determine the application rate at the beginning of each day's production, and as needed to control the operation, a minimum of twice per day. Maintain an application rate such that the pavement is covered uniformly with aggregate, and is one aggregate layer thick. For the cover material, use aggregate that is reasonably free of any adherent coatings and that does not contain excessive moisture. Immediately after the application of cover material, check the surface to ensure a uniform distribution of cover material and a smooth surface.

Do not separate the application of the asphalt rubber binder and the application of the cover material by more than 300 feet, unless approved by the Engineer.

- D. Rolling: In order to ensure maximum embedment of the aggregate, cover the entire width of the mat immediately by traffic rollers. For the first coverage, provide a minimum of three traffic rollers in order to accomplish simultaneous rolling in echelon of the entire width of the spread.

After initial rolling, immediately correct all portions of the completed surface that the Engineer deems are defective (not properly covered by aggregates, fat spots, excessive free aggregate, etc.).

Following the first coverage, make additional coverages with traffic rollers as directed by the Engineer.

- E. Traffic Control: For the normal sequence of construction operations, place the first course of asphalt concrete overlay over the membrane prior to opening to traffic.

4.7 UNACCEPTABLE ASPHALT RUBBER MEMBRANE INTERLAYER

If the asphalt rubber membrane interlayer is unacceptable due to incorrect blending, application rate, or not meeting the requirements of this Section, or damaged prior to placement of the asphalt concrete layer, remove and replace it as directed by the Engineer at no additional cost to the Department. Do not apply excessive amounts of asphalt rubber binder.

4.8 PLACEMENT OF ASPHALT CONCRETE OVERLAY

Ensure that the thickness and temperature of the initial layer of asphalt concrete placed on top of the asphalt rubber membrane interlayer are such that the overlay bonds to the interlayer and the underlying layer without voids or excessive binder. Core the asphalt overlay as directed by the Engineer to evaluate the binder and aggregate spread

rates, as well as the effectiveness of the asphalt concrete overlay in producing a well-bonded interlayer.

4.9 METHOD OF MEASUREMENT

- A. Asphalt Rubber Membrane Interlayer: The quantity to be paid for will be plan quantity, in square yards, completed and accepted.
- B. Bituminous Material (Asphalt Rubber Binder-Interlayer): The quantity will be the volume, in gallons, determined as provided in 300-8.
- C. Submittal of Certification of Quantities for Bituminous Material: Prepare a Certification of Quantities, using the Department's current approved form, for the quantity of bituminous material placed and accepted. Submit this certification to the Engineer no later than Twelve O'clock noon Monday after the monthly estimate cutoff date or as directed by the Engineer. The certification must include the Contract Number, FPID Number, State Project Number, Certification Number and period represented by the Certification.

4.10 BASIS OF PAYMENT

- A. Asphalt Rubber Membrane Interlayer: Price and payment will be full compensation for all work specified in this Section, including furnishing cover materials, handling, spreading, rolling, bituminous material, and other incidental work necessary to complete this item.
- B. Bituminous Material (Asphalt Rubber Binder-Interlayer): Payment will be included in the price of the asphalt rubber membrane interlayer and will be full compensation for furnishing asphalt cement, ground tire rubber, blending and handling.
- C. Payment Items: Payment will be made determined by the square yards of in-place product accepted.

END OF SECTION 02510

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 re-inspected 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