

SECTION 02050

DEMOLITION

PART 1 - GENERAL

1.01 DESCRIPTION

Work Included

Demolition includes the complete wrecking of structures and the removal and disposal of demolished materials, as shown on the drawings and/or specified.

1.02 JOB CONDITIONS

A. Condition of Structures

The owner assumes no responsibility for the actual condition of structures to be demolished. Demolition drawings are provided for general information. The contractor shall field verify the conditions to be encountered in the work to be performed.

B. Salvage

Items of salvable value to the Owner shall be removed from the structure as the work progresses. Salvaged items must be transported to the locations as directed by the Owner.

C. Explosives

The use of explosives will not be permitted.

D. Traffic

Conduct demolition operations and the removal of debris to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.

E. Protection

Ensure the safe passage of persons around the area of demolition. Conduct operations to prevent injury to adjacent buildings, structures, other facilities, and persons.

F. Damages

Promptly repair damages caused to adjacent facilities by demolition operations at no cost to the Owner.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.01 DEMOLITION

A. Pollution Controls

1. Use water sprinkling, temporary enclosures, and other suitable methods to limit the amount of dust and dirt rising and scattering the air to the lowest practical level.
2. Comply with governing regulations pertaining to environmental protection.
3. Clean adjacent structures and improvements of dust, dirt, and debris caused by demolition operations, as directed by the Architect/Engineer. Return adjacent areas to condition existing prior to the start of the work.
4. Demolish concrete and masonry in small sections.

3.02 DISPOSAL OF DEMOLISHED MATERIALS

A. General

1. Remove from the site debris, rubbish, and other materials resulting from demolition operations.
2. Burning will not be permitted on the site unless authorized by the Land Owner, the Project Engineer, Fire Marshall and local municipal agencies. It is the Contractor's responsibility to obtain all permits.
3. Concrete from sidewalks, curbs, bulkhead caps etc. suitable for recycling will be transported to a licensed recycling business. The Contractor is to make a good faith effort to recycle all disposed and discarded items.

B. Removal

Transport materials removed from demolished structures and dispose of them offsite.

END OF SECTION

SECTION 02105

SITE CLEARING

PART 1 - GENERAL

1.01 SCOPE OF WORK

This section includes clearing of the site of incidental paving and curbs, debris, grass, trees, and other plant life in preparation for site or building excavation work as shown on the plans and as necessary to prepare the area for the proposed construction.

1.02 SECTION INCLUDES

- A. Remove surface debris.
- B. Remove paving, curbs, and fencing.
- C. Clear site of plant life and grass.
- D. Remove tree and shrubs.
- E. Remove root system of trees and shrubs.
- F. Protection of existing trees and shrubs.

1.03 REGULATORY REQUIREMENTS

- A. Conform to all applicable federal, state, and local codes pertaining to the disposal of materials and debris.
- B. Coordinate clearing work with utility companies.

PART 2 - PRODUCTS - (NOT APPLICABLE)

PART 3 - EXECUTION

3.01 PREPARATION

Verify that existing plant life and features designated to remain are tagged or identified.

3.02 PROTECTION

- A. Protect from damage all utilities that are to remain.
- B. Protect trees, plant growth, understory growth, environmentally sensitive areas, and features designated to remain as final landscaping.
- C. Protect benchmarks and existing structures from damage or displacement.
- D. Traffic: Conduct site clearing operations to ensure minimum interference with

roads, streets, walks and other adjacent occupied or used facilities. Do not close or obstruct streets, walks, or other occupied or used facilities without permission from authorities having jurisdiction.

3.03 CLEARING

- A. Remove and dispose of all trees, stumps, shrubs, grass, roots, and other such protruding objects, and buildings, structures, appurtenances, existing pavement, and other facilities necessary to prepare the area for the proposed construction.
- B. Strip topsoil to whatever depths encountered in a manner to prevent intermingling with underlying subsoil or other objectionable material.
- C. All stumps, roots, and other debris shall be grubbed and removed a minimum of 12 inches below the surface of the ground or as necessary to remove roots ½" in diameter or larger.
- D. Remove such items elsewhere on site or premises as specifically indicated. Relocate items as directed.
- E. Remove and dispose of existing concrete pavement, concrete sidewalk, pavement, curb, and curb and gutter, where shown on plans or directed by the Engineer to be removed. (See Section 02050 - Part 3)
- F. Fill depressions caused by clearing and grubbing operations with topsoil, unless further excavation or earthwork is indicated. Place fill material in horizontal layers not exceeding 12 inches loose depth and thoroughly compact to a density equal to adjacent original ground.

3.04 REMOVAL

- A. Timber, stumps, brush, roots, rubbish, and other objectionable material resulting from clearing and grubbing shall be disposed of by the Contractor in locations and by methods approved by the Engineer. All disposal costs are the Contractor's responsibility.
- B. Removal of Improvements: Remove existing above-grade and below-grade improvements necessary to permit construction and other work as indicated.
- C. Abandonment or removal of certain underground pipe or conduits may be shown on mechanical or electrical drawings, and is included under work of those sections. Removal of abandoned underground piping or conduit interfering with construction is included under this section.
- D. Hazardous Materials including asbestos pipe shall be removed and disposed of in accordance with all applicable codes and regulations.

END OF SECTION

SECTION 02100

SUBSURFACE INVESTIGATION

PART 1 - GENERAL

1.01 DESCRIPTION

The subsurface investigation attached as performed by (Name of Engineering Testing Company and Address) _____, is summarized with findings and recommendations in the attached report. This report is incorporated for the Contractors information in accordance with general conditions.

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

Additional test borings and other exploratory operations may be performed by Contractor, at the Contractor's option; however, no change in the Contract Sum will be authorized for such additional exploration.

END OF SECTION

SECTION 02200
EARTHWORK, GENERAL

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. This section consists of furnishing all labor, materials, tools, equipment, and supplies necessary in connection with all earthwork.
- B. Earthwork shall be interpreted to include clearing the work site, loosening, loading, removing, transporting and disposing of all wet or dry material necessary to be removed for the purpose of construction; the sheeting, bracing, drainage and backfilling of trenches and pits, and the grading and shaping of swales and berms around the finished structures.
- C. Remove topsoil and stockpile for later use or remove from site, as applicable.
- D. Excavate subsoil and remove unsuitable material from site. Save and stockpile for reuse soils of desirable quality for planting.
- E. The extent of earthwork is as shown on the drawings and/or specified.

1.02 RELATED SECTIONS

- A. Section 02105: Site Clearing.
- B. Section 02225: Trenching, Backfilling and Compacting.

1.03 QUALITY ASSURANCE

- A. Perform earthwork in compliance with applicable requirements of governing authorities having jurisdiction.
- B. Protect existing benchmarks, monuments, and other reference points. If disturbed or destroyed, a registered land surveyor in the State of Florida is to replace it in its original condition and location.
- C. Protect existing trees and other landscaping which are to remain. Replace at no cost to owner any landscaping which is damaged or destroyed.
- D. Allow testing service to inspect and approve subgrades and fill layers before further construction work is performed.

1.04 SITE EXAMINATION

- A. The data on indicated subsurface conditions are not intended as representations or warranties of the accuracy of continuity between soil borings. It is expressly understood that neither the Owner nor the Project Engineer will be responsible for interpretations or conclusions drawn there from by the Contractor. The data are made available for the convenience of the Contractor. Additional test borings and other exploratory operations may be made by the Contractor at no cost to the Owner or Project Engineer.
- B. Contractors, before submitting bids, shall familiarize themselves as to location and nature of the work, character of equipment, and facilities needed for the performance of the work, general and local conditions prevailing at the site, and other matters which may in any way affect the work under contract.
- C. Examine sources of information concerning ground water level, whether surface or subsurface. Each bidder is to draw their own conclusion concerning ground water levels and how water affects their own work.
- D. The contractor must assume the risk of meeting quicksand, hard pan, boulders, clay rubbish, unforeseen obstacles, underground water mains, sewers, water service pipes, gas pipes, drain tile, hydrant leads, pavement, etc.

1.05 JOB CONDITIONS

- A. Existing utilities:
 - 1. Locate existing underground utilities in the areas of work before starting earthwork operations. Where utilities are to remain in place, provide adequate means of protection during earthwork operations.
 - 2. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult the utility owner immediately for directions. Cooperate with the Owner, and public and private utility companies in keeping their respective services and facilities in operation. Repair damaged utilities to the satisfaction of the utility owner.
 - 3. Do not interrupt existing utilities serving facilities occupied and used by the Owner or others, except when permitted in writing by the Project Engineer and then only after acceptable temporary utility services have been provided.
 - 4. Demolish and completely remove from the site underground utilities indicated to be removed. Coordinate with local utility companies for shut-off of services if lines are active.
- B. Use of Explosives: The use of explosive is not permitted.
- C. Temporary Protection:
 - 1. Barricade open excavations made as a part of earthwork operations and operate warning lights as required by authorities having jurisdiction, and applicable laws and regulations.

2. Protect structures, utilities, sidewalks, pavements, and other facilities from damages caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
3. Contractor shall take all precautions necessary to prevent soil erosion and provide all embankments with adequate slope protection.

PART 2 - PRODUCTS

2.01 SOIL MATERIALS

A. Backfill and Fill Materials:

1. Soil materials for use as backfill and fill shall be free of rock or gravel larger than two inches in any dimension, debris, waste, vegetable, and other deleterious matter.
2. Use excavated or borrow material that has been sampled, tested and certified as satisfactory soil material.

B. Subbase Material:

1. Properly graded mixture of natural and crushed gravel, crushed stone, crushed slag, natural or processed sand that will readily compact to the required density.
2. Use material complying with Section 120 of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, Latest Edition.

C. Unsuitable materials:

1. Unsuitable materials as determined by the Project Engineer, such as peat, muck, roots, logs, debris, brush, sod, clay, loam or other similar materials, shall not be used.
2. Existing unsuitable materials as determined by the Project Engineer occurring beneath structure foundations shall be removed and replaced with compacted fill in accordance with the applicable compaction criteria.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Examine the areas and conditions under which earthwork is to be performed and notify the Project Engineer in writing of conditions detrimental to the proper and timely completion of the work. Do not proceed with the work until unsatisfactory conditions have been corrected in an acceptable manner.

3.02 GENERAL

- A. Excavation consists of the removal and disposal of materials encountered when establishing the required grade elevations. Where it is necessary to cut roots projecting into an excavation or to trim branches for equipment clearance, all severed root ends or cuts to branches over 1/2-inch diameter shall be treated with an asphalt base pruning paint. Backfill over exposed roots as soon as possible.
- B. Accomplish earthwork in a manner that provides for the safety of the public and workers, as well as for the protection of property.
- C. Conduct operations with minimum interference with road and other facilities.
- D. Perform dewatering as required to achieve results indicated herein.

3.03 EXCAVATION CLASSIFICATIONS

- A. The following classifications of excavation will be made when unanticipated rock excavation is encountered in the work. Do not perform such work until material to be excavated has been cross-sectioned and classified by the Project Engineer. Such excavation is unclassified and includes excavation to subgrade elevations indicated, regardless of character of materials and obstructions encountered.
 - 1. Earth excavation includes the removal and disposal of pavements and other obstructions visible on the ground surface, underground structures and utilities indicated to be demolished and removed, material of any classification indicated in data on subsurface conditions, and all other materials encountered that are not classified as rock excavation or unauthorized excavation.
 - 2. Rock excavation consists of the removal and disposal of materials encountered that cannot be excavated with a 3/4 cubic yard capacity power shovel without drilling and blasting, or continuous use of a ripper or other special equipment, except such materials that are classified as earth excavation.
 - 3. Typical of materials classified as rock are boulders 1/2 cu. yd. or more in volume, solid rock, rock in ledges, and rock-hard cementitious aggregate deposits.
 - 4. Intermittent drilling that may be performed to increase production and is not necessary to permit excavation of the material encountered will be classified as earth excavation.
 - 5. Rock payment lines are limited to the following:
 - a. Two feet outside of concrete work for which forms are required, except footings,
 - b. One foot outside the perimeters of footings,

- c. In pipe trenches, 6" below invert elevation of pipe and 2 feet wider than the inside diameter of pipe, but not less than 3-foot minimum trench width.
 - d. Neat outside dimensions of concrete work where no forms are required, and
 - e. Under slabs on grade, 6" below bottoms of concrete slab.
- B. Unauthorized excavation consists of removal of materials beyond indicated elevations or dimensions without the specific direction of the Project Engineer. Replace unauthorized excavation by backfilling and compacting as specified for authorized excavations of the same classification, unless otherwise directed by the Project Engineer.

3.04 ADDITIONAL EXCAVATION

- A. When excavation has reached required subgrade elevations, notify the Engineer who will make an inspection of conditions.
- B. If unsuitable materials are encountered at the required subgrade elevations, carry excavations deeper and replace the excavated material and its replacement as directed by the Project Engineer.

3.05 DEWATERING

- A. Prevent surface water and subsurface or groundwater from flowing into excavations, and flooding the project site and surrounding area. Do not allow water to accumulate in excavations. Remove water from excavations to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to the stability of subgrades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey the water away from the site.
- B. Convey water removed from excavations and rain water to collecting or run-off areas. Do not use trench excavations for site utilities as temporary drainage ditches.
- C. The Contractor shall do all pumping and bailing, build all drains, and do all other work necessary to keep the excavation clear of groundwater, sewage, storm water or other water during the progress of the work and until the finished work is safe from injury. All water pumped or drained from the work shall be disposed of in a satisfactory manner without damage to adjacent property or to other work under construction, and in accordance with Pollution Prevention Plan (PPP).
- D. The Contractors shall comply with all requirements of South Florida Water Management District Dewatering Permits and shall provide pump logs and Pollution Prevention Plan (PPP) reports to the Project Engineer as applicable.

3.06 CLEARING AND GRUBBING

- A. Within limits of areas designated for grading and site construction work, clear, grub, and remove trees, brush, stumps, wood debris, and other deleterious materials not required to remain as part of the finished work.
- B. Remove grass, plants, vegetation, and organic material from same area.

3.07 EXCAVATION

- A. Excavate after stripping, clearing, and grubbing has been completed. Remove unsuitable materials encountered.
- B. Excavation shall be as required for the construction to the lines and grades shown on the contract drawings.
- C. Stability of Excavations:
 - 1. Slope the sides of excavations to comply with local codes and ordinances having jurisdiction. Shore and brace where sloping is not possible either because of space restrictions or stability of material excavated.
 - 2. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.
- D. Material Storage:
 - 1. Stockpile excavated materials classified as satisfactory soil material where directed, until required for backfill or fill. Place, grade and shape stockpiles for proper drainage.
 - 2. Locate and retain fill materials away from edges of excavations.
 - 3. Dispose of excess soil material and waste materials as needed or directed by Engineer.

3.08 EXCAVATION FOR PAVEMENTS

Cut the surface under pavements to comply with cross-sections, elevations and grades as shown.

3.09 EXCAVATION FOR TRENCHES

- A. Dig trenches to the uniform width required for the particular item to be installed, sufficiently wide to provide ample working room. Excavate trenches to the depth indicated or required. Carry the depth of trenches for piping to establish the indicated flow lines and invert elevations. Trench excavation shall comply with the "Florida Trench Safety Act" (90-96, Laws of Florida).
- B. Where rock is encountered, carry the excavation 6" below the required elevation and backfill with a 6" layer of crushed stone or gravel prior to installing pipe.

- C. Grade bottoms of trenches as indicated, notching under pipe bells to provide solid bearing for the entire body of the pipe.
- D. Do not backfill trenches until tests and inspections have been made and backfilling authorized by the Project Engineer. Use care in backfilling to avoid damage or displacement of pipe systems.

3.10 BACKFILL AND FILL

A. Ground Surface Preparation:

1. Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious materials from ground surface prior to placement of fills. Plow, strip, or break-up sloped surfaces steeper than 1 vertical to 4 horizontal so that fill material will bond with existing surface.
2. When the existing ground surface has a density less than that specified under "Compaction" for the particular area classification, break-up the ground surface, pulverize, moisture-condition to the optimum moisture content, and compact to the required depth and percentage of maximum density.

B. Placement and Compaction:

1. Place backfill and fill materials in layers not more than 12" in loose depth for material compacted by heavy compaction equipment, and not more than 4" loose depth for material compaction by hand-operated equipment.
2. Before compaction, moisten or aerate each layer as necessary to provide the optimum moisture content of the soil material. Compact each layer to the required percentage of maximum dry density or relative dry density for each area classification. Do not place backfill or fill material on surfaces that are muddy.
3. Backfill excavations as promptly as the work permits, but not until completion of inspection, testing, approval, and recording location of underground utilities, as required.

3.11 COMPACTION

A. General:

1. Control soil compaction during construction, providing the minimum percentage of density specified for each area classification.

B. Percentage of Maximum Density Requirements:

1. Miscellaneous slabs: Compact top 12" of subgrade and each layer of backfill or fill material at a minimum of 98% maximum density (optimum moisture) per ASSHTO T-180.
2. Lawn Areas: Compact each layer of backfill or fill material at a minimum of 90% maximum density (optimum moisture) per ASSHTO T-180.

C. Moisture Control:

1. Where the subgrade or layer of soil materials must be moisture conditioned before compaction, uniformly apply water to the surface of subgrade, or layer of soil material, to prevent free water appearing on the surface during or subsequent to compaction operations.
2. Remove and replace, or scarify and air dry, soil material that is too wet to permit compaction to specified density. Soil material that has been removed because it is too wet to permit compaction may be stockpiled or spread and allowed to dry. Assist drying by discing, harrowing or pulverizing, until the moisture content is reduced to a satisfactory value.

3.12 GRADING

- A. General: Uniformly grade areas within limits of grading under this section, including adjacent transition areas. Smooth finished surfaces within specified tolerances, compact with uniform levels or slopes between points where elevations are indicated, or between such points and existing grades.
- B. Grading Outside Building Lines: Grade areas adjacent to building lines to drain away from structures and to prevent ponding.

3.13 FIELD QUALITY CONTROL

- A. Quality Control Testing During Construction:
 1. Testing service must inspect and approve subgrades and fill layers before further construction work is performed thereon. Secure representative samples of the fill material and determine the Standard Density and required moisture content to be maintained by the Moisture-Density Relation Test ASTM D-1557.
 2. Make in-place soil density test during compaction operations in accordance with AASHTO T-180. Make at least one field density test of the subgrade for every 2,000 sq. ft. of paved area, but in no case less than three tests. In each compacted fill layer, make one field density test for every 2,000 sq. ft. of overlaying paved area, but in no case less than three tests.
 3. If, in the opinion of the Project Engineer, based on reports of the testing service and inspection, the subgrade or fills which have been placed are below the specified density, additional compaction and testing will be required until satisfactory results are obtained.

3.14 MAINTENANCE

- A. Protection of Graded Areas: Protect newly graded areas from traffic and erosion. Keep free of trash and debris.
 1. Repair and re-establish grades in settled, eroded and rutted areas to specified tolerances.

- B. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, re-shape, and compact to required density prior to further construction.
- C. Settling: Where settling is measurable or observable at excavated areas during general project warranty period, remove surface (pavement, lawn or other finish), add backfill material, compact, and replace surface treatment. Restore appearance, quality and condition of surface or finish to match adjacent work, and eliminate evidence of restoration to greatest extent possible.

3.15 DISPOSAL OF EXCESS AND WASTE MATERIALS

- A. Removal To Designated Areas on Owner's Property: Transport excess excavated material classified as satisfactory soil material to designated soil storage areas on the Owner's property. Stockpile soil or spread across the ground, as directed.
- B. Removal from Owner's Property: Remove waste materials, including excavated material classified as unsatisfactory soil material, trash and debris, and dispose of it legally.

END OF SECTION

SECTION 02225

TRENCHING, BACKFILLING AND COMPACTING

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The extent of trenching, backfilling and compacting is shown on the drawings and/or specified. This section includes furnishing equipment, labor and material, and performing all operations necessary and incidental to perform the required work.

1.02 RELATED SECTIONS

- A. Section 02105: Site Clearing
- B. Section 02200: Earthwork, General

1.03 APPLICABLE CODES, STANDARDS AND SPECIFICATIONS

- A. Work under this section shall be in accordance with the following codes and standards:
 - 1. American Association of State Highway and Transportation (AASHTO).
 - 2. Florida Department of Transportation "Standard Specifications for Road and Bridge Construction" Latest Edition.
 - 3. "Trench Safety Act" (90-96, Laws of FL).

PART 2 - PRODUCTS

- A. No material shall be used for backfill which contains stones having dimensions in excess of two inches, debris, vegetation, deleterious material, or earth with an excessive void content.
- B. All material used for backfill shall be of quality acceptable to the Project Engineer and shall be free from large lumps, wood, or other extraneous material.

PART 3 - EXECUTION

3.01 CLEARING OF THE SITE

- A. The site of the work shall be cleared of all trees, shrubs, paving and objectionable material which interferes with the execution of the proposed work. Trees and shrubs which will not interfere with construction shall be protected from damage. Clearing shall be considered as an incidental item of excavation.

3.02 EXCAVATION

A. GENERAL:

1. Perform excavation described of whatever substance encountered to the dimensions and depths specified and/or shown on the drawings or as necessary. Excavation shall be unclassified regardless of material encountered. Undercutting will not be permitted, except when ordered by the Project Engineer. Material suitable for backfill shall be stockpiled near the site. Rock or other material undesirable for backfill shall be spoiled outside the area in a neat manner, and/or as directed by the Project Engineer.
2. Where it is necessary to trim branches for equipment clearance, all severed root ends or cuts to branches over 1/2-inch diameter shall be treated with an asphalt base pruning paint and backfill over exposed roots as soon as possible.
3. Except in rock-and water-bearing earth, mechanical excavation shall be limited to four inches above the elevation of the pipe invert. All additional excavation shall be made manually. Excavation in rock shall be made by a method approved by the Project Engineer.
4. The Contractor shall dispose of the excavated materials not required or suitable for backfill as specified in Section 02200, and shall perform such grading as may be necessary to prevent surface water from flowing into the trenches. Haul or disposal of material will be the responsibility of the Contractor. Sheeting and shoring shall be installed as may be necessary for the protection of the work, for the preservation of adjoining property and structures or for the safety of the employees. Unless otherwise indicated, excavation shall be by open cut.
5. The Contractor shall provide adequate equipment for the removal of storm or subsurface waters which may accumulate in the excavated areas. If subsurface water is encountered, the Contractor shall utilize approved means to adequately dewater the excavation so that it will be dry for working and pipe laying. A wellpoint system or other approved dewatering method shall be utilized if necessary to maintain the excavation in a dry condition for preparation of the trench bottom and for pipe laying. All existing improvements such as pavements, conduits, poles, pipes and other structures shall be carefully supported and fully protected from injury. They shall be restored without compensation in the event damage occurs.
6. All muck below storm drain pipes and structures shall be completely removed to the width of the trenches at the pipe and to the depths where sand or other acceptable material is encountered. After removal of all muck, the trench shall be filled to the invert of the pipe with select fill placed and tamped in eight-inch layers. Each layer shall be compacted to not less than 98% of the maximum density as determined by AASHTO Method T-180.

- B. ROCK: Where encountered in the trench bed, rock shall be excavated to a depth of 1/4 of the pipe diameter but in no case less than 8" below the bottom of the pipe. All undercut trench excavation shall be backfilled and tamped with materials as

specified in the following paragraphs under Unstable Subgrade.

C. UNSTABLE SUBGRADE

1. In the event that unsuitable materials are encountered at or below the excavation depth specified and/or shown on the drawings, the Project Engineer shall be notified. Such material shall be removed and replaced with suitable material. Methods and materials used for replacement shall be one of the following as directed by the Project Engineer in writing.
 - a. Suitable earth or sand compacted in the trench.
 - b. Gravel or crushed lime rock, compacted in the trench.
 - c. Existing materials stabilized after removal and then replaced and compacted in the trench.
2. The Project Engineer shall determine the methods and materials to be used, based upon the condition of the excavation, the pipe or structure to be supported, and the availability and character of stabilizing materials.

D. TRENCHES

1. Keep the pipe laying operation as close to the excavation operation as possible during the prosecution of the work.
2. Pipe trenches shall be excavated to a depth that will insure proper cover and installation for all types of pipe. Trenches shall be only of sufficient width to provide a free working space on each side of the pipe. To prevent excess pressure on the pipe, the maximum width of trench at the top of the pipe and at the bottom of the trench shall not be greater than two feet more than the greatest exterior diameter of the pipe. To protect the pipelines from unusual stresses, all work shall be done in open trenches. Excavation shall be made for bells of all pipes and of sufficient depth to permit access to the joint for construction and inspection. In no case will the bells be used to support the body of the pipe.
3. In order to avoid existing utilities or culverts, at times it may be necessary for the pipe to be installed deeper than the minimum cover specified in the preceding paragraph. At such time the Contractor will not be allowed extra compensation for the additional excavation involved whether or not the utilities or culverts were indicated on the plans.
4. In case excavation has been made deeper than necessary, a layer of concrete, fine gravel or other material satisfactory to the Project Engineer shall be placed, at no extra cost, to secure a firm foundation for the lower third of each pipe. Where possible, excavated material shall be placed so as not to interfere with public travel. Bridging for vehicles or pedestrians shall be provided to afford necessary access to public or private premises. Bridging shall be considered as part of the excavation operation and shall be supplied at no additional cost to the Owner.

- E. REMOVAL OF UNSTABLE MATERIAL: All pipe and other structures shall be provided with a stable foundation; any material which, by reason of kind or condition, is not or cannot be made stable by drainage or compaction shall be

removed or replaced. All unstable material below the grade line of the pipe shall be removed for the full width of the trench and replaced with suitable selected material.

- F. SHEETING AND SHORING: The Contractor shall provide all trench and structural bracing, sheeting or shoring necessary to construct and protect the excavation, existing utilities, structures and private property of all types and as required for the safety of the employees. Sheeting shall be removed or cut off by the Contractor during backfilling operations as approved by the Project Engineer.
- G. BEDDING: The bedding surface for the pipe shall provide a firm foundation of uniform density throughout the entire length of the pipe. The pipe shall be carefully bedded in a soil foundation that has been accurately shaped and rounded to conform to the lowest 1/4 of the outside circular portion of the pipe for its entire length, and when necessary, shall be tamped to secure uniform, firm support. Where bell and spigot pipe is used, the bell holes shall be deep enough to ensure that the bell does not bear on the bottom of the excavation, and shall not be excessively wide in the longitudinal direction of the culvert or storm drain.

3.03 DRAINAGE

- A. Grading shall be controlled in the vicinity of excavations so that the surface of the ground will be properly sloped to prevent water from running into trenches or other excavated areas. Any water which accumulates in the excavations shall be removed promptly by well point or by other means satisfactory to the Project Engineer in such a manner as to not create a nuisance to adjacent property or public thoroughfare. Trenches shall be kept dry while pipe is being laid. Bridging of dewatering pipe shall be provided where necessary. Pumps and engines for well point systems shall be operated with mufflers, at a minimum noise level suitable to a residential area. The Contractor will not be allowed to discharge water into the storm drainage system, environmentally sensitive lands, adjacent private property and public thoroughfares without written approval from the Project Engineer and Property Owner. Approval will be subject to the condition that the storm sewer be returned to its original conditions.
- B. The Contractor is responsible for carrying the water to the nearest ditch or body of water and for obtaining the necessary permission to use same. The Contractor shall be financially responsible for any nuisance created due to carrying off water from their drainage system.

3.04 INSTALLATION OF PIPE

- A. GENERAL: Piping and appurtenances for storm sewers shall be of the type and material called for in these specifications or as shown on the drawings. All pipe, fittings, jointing materials, grates, manholes frames and covers, and other appurtenances and materials shall be new material and if not specifically described herein shall be of the best quality and entirely suitable for the service intended. All such materials shall be approved by the Project Engineer prior to installation.
- B. HANDLING AND STORING: Pipe shall be protected during shipping, storage and handling against impact shocks, free fall or other damage. Any damaged pipe shall be removed from the job site immediately.

C. PIPE LAYING:

1. The trench shall be prepared as specified herein and each pipe section shall be installed in strict conformance to the line and grade shown on the drawings.
2. As pipe laying progresses, the interior of the pipe shall be cleaned of all dirt and superfluous materials. The Contractor shall at all times take whatever measures are necessary to prevent the entrance of dirt and other foreign matter into the system. In the event that it is necessary to clean the pipe before final acceptance, the Contractor shall do so without additional compensation.

D. OPEN TRENCH: No more than 200 linear feet, or the length of trench between consecutive drainage structures, shall be left open behind pipe laying unless directed in writing by the Project Engineer. All trenches and excavations shall be backfilled immediately after all pipe and joints have been inspected and approved by the Project Engineer. In no instance shall any trench be left open for more than 24 hours before backfilling.

3.05 BACKFILLING

A. TRENCHES

1. Trenches shall be backfilled immediately after the pipe is laid unless other protection for the pipeline is provided. Clean earth, sand, crushed limerock or other material approved by the Project Engineer shall be used for backfill. Backfill materials shall be selected, deposited and compacted so as to eliminate the possibility of lateral displacement of the pipe.
2. Under Pipe: Trenches shall be backfilled from the bottom of the trench to the centerline of the pipe with predominantly sandy material free from rocks or stones, placed in six inch layers and compacted to 100 percent of the maximum density, as determined by AASHTO T-180 using the appropriate equipment, under and on each side of the pipe and between the pipe and wall of trench. Backfilling material shall be deposited in the trench for its full width on each side of the pipe and appurtenances.
3. Over Pipe: From the centerline of the pipe, fittings and appurtenances, to an elevation two feet above the top of the pipe, the trench shall be backfilled by hand or by approved mechanical methods. The backfill material shall be as specified in 1, above, and shall be consolidated by use of tampers.
4. The remainder of the backfill shall be compacted by means of mechanical tampers. The backfill shall be deposited and compacted in 12" layers when mechanical tampers are used to achieve compaction. Compaction shall be carried by AASHTO Method T-180 for the entire depth.
5. In areas to be paved, the entire depth of backfill shall be deposited in 12" layers and compacted by mechanical tampers to achieve a density of at least 98% of the maximum density as determined by AASHTO Method

T-180 for the entire depth.

6. Density tests for determination of the specified compaction shall be made by a testing laboratory approved by the Project Engineer. The location of the tests shall be as selected by the Project Engineer.

3.06 PAVEMENT RESTORATION

- A. The pavement replacement of all paved areas damaged during the construction of the off-site utilities shall be done by the Contractor. The pavement replacement shall be completed according to the replacement detail shown in the detail drawings.

3.07 SIDEWALK REPLACEMENT

- A. Concrete sidewalk removal and replacement required in the construction of this work shall be done by the Contractor. Reasonable care shall be exercised in removing sidewalk and the Contractor shall dispose of this material as directed by the Project Engineer. Sidewalks shall be replaced on a compacted subgrade and shall be 4 inches thickness in residential areas and 6 inch thickness in the right-of-way within commercial area.
- B. Where any portion of the sidewalk is removed due to construction, the full width of the sidewalk shall be replaced.

3.08 DRIVEWAY REMOVAL AND REPLACEMENT

- A. Driveways and off-street parking areas that are paved with concrete or asphalt and cut by the construction shall have a minimum of 8 inches of base for all driveways. The thickness of base from the property back and in all easements shall be equal to the thickness of the original base. The base course for asphalt driveways shall be compacted to a minimum of 98 percent of the maximum density as determined a AASHTO Method T-180. Lime rock for pavement base shall conform to the Florida Department of Transportation Standard Specifications.
- B. The wearing surface for all driveways within right of ways shall be 1 inch of Type "S-III" asphalt.
- C. Concrete for driveways shall be 3,000 psi. The concrete shall be a minimum of 4" thick from the property line back and 6" thick from the property line to the edge of pavement. The concrete driveway replacement shall be no less than the thickness removed, but not less than that specified above. Concrete shall be cut with a saw.
- D. All driveways other than paved or concrete within right-of-way shall be restored with a minimum depth of 8 inches of shell, lime rock or gravel. Driveways shall be replaced with like materials. The cost of driveway replacement shall be included in the cost of the various applicable items of work as no separate payment will be made, unless a separate bid item is provided.

3.09 RESTORATION OF SURFACE IMPROVEMENTS

- A. All surface improvements on public or private property which have been damaged or removed during excavation or any of the other Contractor's operation or other various construction activities shall be restored to conditions equal to or better than conditions existing prior to beginning work. These surface improvements include but are not limited to grass plots, sod, shrubbery, ornamental trees, signs, fences, mailboxes, and other improvements on public or private property.
- B. Road shoulders, alleys and driveways of shell, lime rock, stabilized soil or gravel where disturbed shall be restored with like materials as removed. There shall be no mixing of unlike materials. The disturbed area shall be replaced with the appropriate materials to a minimum depth to restore it to a condition equal to or better than conditions existing prior to beginning work.
- C. Roadways other than paved streets where disturbed shall be replaced with like materials to a minimum compacted thickness of 12". There shall be no mixing of unlike materials. These roadways shall be compacted to a minimum of 98% of the maximum density as determined by AASHTO Method T-180. No additional cost for replacement of roadways other than paved streets will be allowed by the Owner.

3.10 FINE GRADING

- A. Finished areas around structures shall be graded smooth and hand raked and shall meet the elevations and contours as existed prior to beginning construction or as shown on the drawings. Lumber, earth clods, rocks and other undesirable materials shall be removed from the site.

3.11 DISPOSAL OF MATERIALS

- A. Such portions of the excavated materials as needed shall be used for backfilling and graded about the completed work to the elevations shown on the drawings or as directed. Excavated material in excess of the quantity required for this purpose shall be disposed of by the Contractor at a legal disposal site. Disposal cost is Contractors responsibility, or as designated in the contract documents.

3.12 MAINTENANCE OF AREA UNDER CONSTRUCTION

- A. As specified in this section, the Contractor shall keep the pipe laying operation as close to the excavation operation as possible during the execution of the work. The Contractor shall maintain their construction activity for each main pipeline installation crew to one location not exceeding 800 feet in length. Construction activity within this 800 foot section shall include all phases of the pipe laying operations including dewatering equipment, excavation, pipe laying, backfilling of trenches, and the completion of the restored base construction as specified.
- B. The Contractor shall perform their construction activities within the following time periods. Within 10 days after acceptance of the trench backfill, the base shall be restored including priming and/or sealing and shall be open for traffic. The asphalt

wearing surface shall be replaced no earlier than 3 weeks after completion of the base course with complete surface restoration including grassing, sodding and all concrete work within 6 weeks after completion of restoration of the base course.

3.13 STABILIZED SHOULDER RESTORATION

- A. The following repair procedure applies to all roads. All construction, maintenance of traffic, materials, and restoration of surface improvements shall comply with the specifications required by the Florida Department of Transportation Standard Specifications.
- B. It is the intent of these specifications to provide a stabilized shoulder to a thickness and width indicated on the drawings and having a minimum bearing value of LBR-40.
- C. Compaction shall be by rolling with a combination of steel wheel and rubber tire rollers until a minimum density of 98 percent of the maximum density is reached as tested under AASHTO Method T-180. Compaction and finishing shall be in accord with the Department of Transportation Standard Specifications. All passing density tests for stabilization will be paid for by the Owner and all failing density tests for stabilization will be paid for by the Contractor.

3.14 DETOUR FACILITIES

Contractor shall comply with the approved Maintenance of Traffic Plan.

END OF SECTION

SECTION 02227

TRENCH SAFETY REQUIREMENTS

PART 1 GENERAL

1.01 INTENT

- A. The purpose and intent is to provide for increased worker safety by requiring compliance with sufficient standards for trench safety ("Florida Trench Safety Act", 90-96, Laws of FL, effective October 1, 1990).

1.02 CONTRACT BID ITEMS

- A. The contract bid submitted by the contractor who will perform such excavation shall include:
 - 1. A reference to the trench safety standards that will be in effect during the period of construction of the project.
 - 2. Written assurance by the contractor performing the trench excavation that such contractor will comply with the applicable trench safety standards.
 - 3. A separate item identifying the cost of compliance with the applicable trench safety standards.

1.03 CONTRACTOR'S RESPONSIBILITIES

- A. A contractor performing trench excavation shall:
 - 1. As a minimum, comply with the excavation safety standards which are applicable.
 - 2. Adhere to any special shoring requirements, if any, of the state or other political subdivision which may be applicable to such a Project.
 - 3. If any geotechnical information is available from the owner, the contractor, or otherwise, the contractor performing trench excavation shall consider this information in the contractor's design of the trench safety system which it will employ on the project. This paragraph shall not require the owner to obtain geotechnical information.

END OF SECTION

SECTION 02231

AGGREGATE BASE COURSE

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. The work covered by this section of the specifications consists of furnishing all plant, labor, materials, equipment and supplies and performing all operations in connection with the construction of the paving base, in strict accordance with this section of the specifications and the applicable drawings, and subject to the terms and conditions of the contract.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. The base shall consist of either lime rock, Grade No. 2, or local shell rock, constructed in courses as shown, all as specified in Sections 200, 250, 911 and 913 of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition.

2.02 REFERENCE STANDARD

- A. The following standards listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the reference thereto.

1. Florida Department of Transportation (FDOT) "Standard Specifications for Road and Bridge Construction", latest edition.

Where reference is made herein to the FDOT specifications, delete the section referencing the basis of payment and other pay measurement requirements.

2. American Association of State Highway and Transportation Officials (AASHTO) Standard:

PART 3 - EXECUTION

3.01 COMPACTING AND FINISHING BASE

- A. In accordance with Section 200-6 of the FDOT Specifications.

3.02 DENSITY TESTS:

- A. In accordance with Section 200-6 and 200-7 of the FDOT Specifications.

3.03 CORRECTION OF DEFECTS

- A. If at any time the subgrade material should become mixed with the base course material, 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.
- B. 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 course, the Contractor shall remove such cracks or checks by rescarifying, reshaping, adding base material where necessary and recompacting.

3.04 MEASUREMENT AND PAYMENT

- A. Where separate payment for the paving base is provided, the quantities to be paid for under this item shall be the actual in place measurements between the neat lines indicated for base width. The quantities of paving base, determined as provided above, shall be paid for at the contract unit prices for this item, completed and accepted. Where payment for the paving base is grouped with the prime coat, tack coat, and wearing surface, the quantities to be paid for under this item shall be the actual measurements of completed wearing surface between the neat lines indicated on the construction drawings, regardless of the base width indicated. The quantities determined as provided above, shall be paid for at the contract unit prices for this item, complete and accepted. Payment shall not be based on FDOT payment methods.

END OF SECTION

SECTION 02368

PRESTRESSED CONCRETE PILES

PART 1 - GENERAL

1.01 DESCRIPTION

Work Included

1. Furnishing all plant, labor, materials, tools, equipment and all else required to perform all operations necessary to furnish and install prestressed concrete piles. Included are drilling of holes (for piles) through compacted fill, pile driving, cutting-off, splicing of piling, and of test loading piles. All work shall be performed in strict accordance with Specifications and applicable drawings and subject to terms and conditions of the Contract.

1.02 APPLICABLE STANDARDS

The following specifications, standards and publications are part of this specification:

- * Florida Department of Transportation, Standard Specifications for Road and Bridge Construction, Latest Edition.
- * State of Florida Department of Transportation Structures, Bridge Design Standards, Latest Edition, Structures Standards, Index No. 3400, Drawing 1 of 1, Titled "12, 14 and 18 Prestressed Concrete Piles".
- * AASHTO Standard Specifications for Highway Bridges, Latest Edition.

1.03 QUALITY ASSURANCE

- A. Avoidance of excessive stresses during handling and installing of the piles.
- B. Prestressed Concrete Piles
 1. The Contractor shall prepare the design and shop drawings of the prestressed concrete piles for the specified design load. The design shall be prepared by a Professional Engineer licensed in the State of Florida. The design shall conform to (1) the standards contained in Florida Department of Transportation, Standard Specifications for Road and Construction, Latest Edition, Section 455-PILING (2) State of Florida Department of Transportation, Structures Standards, Latest Edition, Drawings 3400 and 10289F and (3) AASHTO - Standard Specifications for Highway Bridges, Latest Edition, Division 1 - Design, Section 4 - FOUNDATIONS, paragraph 4.3.14 - Prestressed Concrete Piles.

2. The stresses during the piles installation shall be investigated by wave equation. The analyses shall be made for the driving equipment that the Contractor proposes to use. The effects of the cushion and driving block shall be included in the analysis.

B. Quality assurance of Pile installation

The Contractor shall employ a State of Florida Licensed Professional Engineer with a minimum of five years experience in pile foundations (referred to hereinafter as the Pile Engineer), who will witness the placing and driving of each pile. The Pile Engineer shall not be a regular employee of the Contractor and during the pile driving period shall be retained by the Contractor only for the purpose of supervision and inspection of the pile driving operations. No driving of any pile shall be performed unless witnessed in its entirety by the Pile Engineer.

C. Pile Load Testing

1. The piles shall be tested for axial compressive load in accordance with procedures specified in Florida Department of Transportation Standard Specification for Road and Bridge Construction, Latest Edition, Section 455.7.5.2 Test Loads except that the test load shall be applied by hydraulic jack acting against weighted box or platform. Jacking against anchored reaction piles will not be permitted.
2. Pile testing procedures shall be approved by the Project Engineer.
3. The Contractor shall engage a licensed Professional Engineer experienced in pile load testing to direct their pile load testing operations and report the results of load testing to the Project Engineer.

D. Allowable Tolerance

1. Piles shall be driven with a variation of not more than 1/4 inch per foot from the vertical line indicated, with a maximum variation of the butt from the position shown on the plans of not more than 3 inches. Final elevation of cut-off shall be as shown on the plans plus or minus 1/2 inch.

1.04 SUBMITTALS

A. Design Computations and Shop Drawings

1. Design computations (including wave equation analysis) and shop drawings for fabrication of piling shall be submitted. Pile load testing procedure and load settlement curve shall be submitted.

B. Certificates

1. The Contractor shall submit certificates and will report attesting to compliance with the material specifications and properties referred to herein.

- C. Description of Equipment and Procedures
 - 1. Proposed drilling and pile driving equipment.
 - 2. Load testing procedures and equipment.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Concrete, reinforcing steel and prestressing tendons for piles shall conform to the requirements of the Florida Department of Transportation Standard Specifications for Road Bridge Construction, Latest Edition, Section 455.2 Materials:
 - 1. Concrete: Class III, 5000 psi.
 - 2. Reinforcing Steel: Grade 40 or 60.
 - 3. Spiral Ties: Grade 40 reinforcing steel.
 - 4. Prestressing Tendons: Florida Department of Transportation Standard Specifications Section 933, Accessory Materials for Prestressed Concretes and other applicable sections.

2.02 EQUIPMENT

The diameter of drills and the equipment for pile driving shall conform to the requirements of Florida Department of Transportation Standard Specifications for Road and Bridge Construction.

PART 3 - EXECUTION

- A. Each pile shall be driven to such penetration that the resultant resistance to driving prevents the pile from advancing, as determined by the formula in the DOT Specs 455-3.3 and load test.
- B. The Pile Engineer shall make a written report, bearing his/her seal, of the placing and driving of each pile. The report shall contain all pertinent data for each pile including: pile number, date, time and weather. The drill diameter, length of the drilled hole (from the top of the fill or the bottom of the footing to the natural ground level, hammer weight, model and speed during entire driving interval; all pile dimensions, pile deviation, if any, from the designed location; number and location of splice and type (description) of splice; whether and to what extent water jets were used; remarks and observations and a complete record of driving plus the average penetration (blows per inch) of the pile during the last foot of driving.
- C. The requirements of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction shall apply, except that no piles shall be driven before the adjoining embankment fill (and surcharging of the fill where specified) has been completed.

- D. The test piles shall be located at the locations shown on the drawings or designated by the Project Engineer.
- E. The complete log of each test pile loading and unloading shall be kept with settlements, time intervals, and all other pertinent information recorded. A load-settlement curve shall be plotted and submitted.

END OF SECTION

SECTION 02513

TYPE "S" ASPHALTIC CONCRETE PAVEMENT

PART 1 - GENERAL

1.01 SCOPE OF WORK

- A. Work Included: Type "S" Asphaltic Concrete Paving (prime coat, tack coat, and surface course).
- B. Extent of asphaltic concrete paving work is shown on the drawings.
- C. Aggregate base course is specified in Section 02231.

1.02 REFERENCE STANDARDS

- A. The following standards listed below, but referred to thereafter by basic designation only, form a part of this specification to the extent indicated by the reference thereto:
 - 1. Florida Department of Transportation (FDOT) Standard Specifications for Road and Bridge Construction, latest edition.
 - a. Where reference is made herein to the FDOT Specifications delete there from the basis of payment and other pay measurement requirements.

1.03 DESIGN REQUIREMENTS

- A. Require tests of asphaltic concrete mix to comply with the requirements of Sections 331 and 332 of the FDOT Standard Specifications for Road and Bridge Construction, Latest Edition. Use of untested asphaltic concrete mix shall not be permitted.

1.04 SUBMITTALS

- A. Submit the following for approval:
 - 1. Asphaltic concrete design mix in accordance with Section 331.4 of the FDOT Specifications.

1.05 QUALITY ASSURANCE

- A. Perform tests in accordance with Section 331.5 of the FDOT Standards except for Method of Payment.
- B. Perform work in accordance with contract document in a neat and accurate manner.
- C. Mixing Plant: Conform to FDOT Standards.
- D. Obtain materials from same source throughout.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Primer: Provide cut-back asphalt, RC-70 or RC-250 meeting the requirements of Section 916-3 and Section 300 of the FDOT Specifications.
- B. Tack Coat: Emulsified RS-2 asphalt tack coat per Section 300 FDOT Specifications.
- C. Asphalt Concrete: Asphaltic concrete mix in accordance with the requirements of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition, Section 331 and/or 332 using type and thickness as shown on the plans.
- D. Base Course: Provide aggregate base courses in accordance with requirements of Section 02231 "Aggregate Base Course" and Section 911 and 913 of the FDOT Specifications.
- E. Subgrade: Construct subgrade in accordance with Sections 160, 161, 162 and 171 of the FDOT Specifications.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that subgrade and base are dry and ready to support paving and imposed loads.
- B. Verify gradients and elevations of base are correct.
- C. Do not begin paving installation without Project Engineer acceptance of the substrate.

3.02 PREPARATION

- A. PRIMER:
 - 1. Apply prime coat in accordance with manufacturer's published instructions and FDOT Specifications, Section 300.
- B. TACK COAT
 - 1. Apply tack coat in accordance with manufacturer's published instructions and FDOT Specifications, Section 300.

3.03 PLACING ASPHALT PAVEMENT

- A. Place in accordance with Section 330-9 of the FDOT Specifications.
- B. Place each course to compacted thickness as shown on the plans.

- C. Compact pavement by rolling in accordance with Section 330-10 of the FDOT Specifications.
- D. Prepare joints in accordance with Section 330-12 of the FDOT Specifications.
- E. Protect finished surface in accordance with Section 330-14 of the FDOT Specification.

3.04 TESTING

- A. Asphaltic Concrete: Provide certified laboratory tests as specified by FDOT Section 331 and 332.

3.05 PROTECTION

- A. Immediately after placement, protect pavement from mechanical or chemical damage for as long as required until accepted by Project Engineer.

END OF SECTION

SECTION 02514

MILLING OF EXISTING ASPHALT PAVEMENT

PART 1 - GENERAL

1.01 DESCRIPTION

A. WORK INCLUDED

The work specified in this Section consists of removing existing asphaltic concrete pavement by milling to improve the ride-ability of the finished pavement, to lower the finished grade adjacent to existing or proposed curb prior to resurfacing, or to completely remove existing pavement.

B. The finish grade, after resurfacing, will be specified in the plans.

C. Unless otherwise specified, the milled material becomes the property of the Contractor.

1.02 REFERENCE

A. Florida Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition.

PART 2 - EQUIPMENT

2.01 DESCRIPTION

A. In accordance with Section 327-2 (Equipment) FDOT Specifications.

PART 3 - EXECUTION

3.01 CONSTRUCTION

A. In accordance with Section 327-3 (Construction) FDOT Specifications.

4.01 FINAL SURFACE CONDITIONS

A. In accordance with Section 327-4 (Milled Surface) FDOT Specifications.

5.01 BASIS OF PAYMENT

A. In accordance with Section 327-5 (Method of Payment) FDOT Specifications.

B. The quantity shall be paid for at the contract unit price for the milling existing asphalt pavement in accordance with the bid documents.

- C. The price and payment will be full compensation for all work specified in this Section, including hauling off and stockpiling or otherwise disposing of the milled material.

END OF SECTION

SECTION 02515

CONCRETE CURBS, HEADERS, SIDEWALKS AND DRIVEWAYS

PART 1 - GENERAL

1.01 SCOPE OF WORK

The work covered by this section of the specifications consists of furnishing all plant, labor, equipment, appliances and materials and performing all operations in connection with the construction of concrete curbs, headers, sidewalks, driveways, complete and in place, in strict accordance with these specifications and the applicable drawings and subject to the terms and conditions of this contract.

1.02 RELATED SECTIONS

Section 03010: Concrete

1.03 REFERENCES

- A. ACI 304 "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete".
- B. ACI 318 "Building Code Requirements for Reinforced Concrete".
- C. ACI 347 "Recommended Practice for Concrete Formwork".
- D. Florida Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition.

1.04 SUBMITTALS

Submit copies of laboratory test reports for concrete materials and mix design test as specified.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. The materials used shall conform to the requirements specified in the sections of these specifications for the several items which constitute the complete structure.
- B. Concrete shall be minimum of 3,000 PSI concrete.

PART 3 - EXECUTION

3.01 FORMS

- A. Construct forms complying with ACI 347.
- B. Construction and dummy joints shall be placed where indicated and may be either formed or sawed.

3.02 CONSTRUCTION

- A. Excavation shall be made to the required depth; and the sub-grade or base upon which the curb or header is placed shall be properly compacted as specified.
- B. Finish the edges as indicated on the drawing. Block out the work in 20' maximum length sections and install each section in one continuous operation so that the curb and gutter will be monolithic.

3.03 CONCRETE PLACEMENT

The concrete shall be placed in the forms to the depth specified, in layers four to five inches thick, and tamped and spaded until mortar entirely covers its surface. The top of the structure shall be floated smooth and the edges rounded to the radius shown.

3.04 EXPANSION JOINTS

- A. Curb and Gutters

Provide expansion joints with filler as specified hereinbefore, on 20 ft. maximum centers, and at other locations indicated.

- B. Driveway Aprons

Provide expansion joints with filler as specified hereinbefore, at each end of all aprons where they abut the curb and gutter.

- C. Concrete Sidewalk

Provide expansion joints with filler as specified hereinbefore, where sidewalk abuts curb and gutter, driveway and other locations.

3.05 FINISH OF FORMED SURFACES

The curb top, face and header top shall be given a surface finish while the concrete is still green. A brush finish will be required unless noted otherwise; however, additional finishing may be required in areas considered too rough or with minor defects.

3.06 CURBING AND PROTECTION

When completed, the curb, or headers shall be covered with suitable material and kept moist for a period of three (3) days or longer if necessary, and shall be protected in a satisfactory manner from damage by the elements or other cause until acceptance of the work.

3.07 REMOVAL OF FORMS

- A. The forms may be removed twenty-four hours after the concrete has been placed, and minor defects then filled with mortar composed of one part of Portland Cement and two parts of fine aggregate. All rejected curb, or header shall be removed and replaced without additional compensation.

- B. After concrete has set sufficiently, the spaces in front and back of the curb shall be refilled to the required elevation with suitable material, which shall be placed and thoroughly compacted in layers of not more than six inches in thickness.

END OF SECTION

SECTION 02618
PAVEMENT MARKING

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. Work Included:

1. Thermoplastic and paints for traffic striping and markings
2. Signs
3. Arrows
4. Letters
5. Raised retro-reflective paint markers (RPM's)

B. Related Work:

1. Asphaltic Concrete Pavement
2. Surface Coating
3. Fire Lanes

1.02 REFERENCE

Florida Department of Transportation Standard Specifications for Road and Bridge Construction, Latest Edition.

1.03 SUBMITTALS

Submit paint tests, as indicated in Sections 706, 710, 711, and 971 of FDOT Specifications and as applicable to hereinafter-indicated material.

1.04 QUALITY ASSURANCE

- A. Perform work in accordance with the Contract Documents in a neat and accurate manner.
- B. Equipment shall be of a type and design which will readily obtain the required uniformity of application of the pavement markings both as to thickness of coating and as to alignment.

1.05 STANDARDS

Where reference is made herein to the FDOT Specifications delete therefrom the basis of payment and other pay measurement requirements.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Traffic Paint and Thermoplastic Traffic Markings: In accord with requirements as indicated in Sections 971-12 and 711-2 of the FDOT Specifications.
- B. Paint Color: White and yellow. As shown on the drawings. All handicapped related markings are to be painted blue.

PART 3 - EXECUTION

3.01 APPLICATION

- A. In accordance with Sections 706, 710 and 711 of the FDOT Specifications.

3.02 PROTECTION OF PAINTED MARKINGS

- A. Protection of Stripes: Newly-painted stripes, or other markings, shall be protected until the paint is sufficiently dry to permit vehicles to cross the marking without damage from the tires. While the stripes are being painted all traffic shall be routed to the opposite side of the painting operations and the newly-painted stripe.
- B. Protection of Traffic: Warning signs shall be set up before the beginning of each operation and extra signs shall be kept well ahead of the painting equipment. The painting equipment shall be so operated that traffic may pass safely. Warning signs are to be placed only where operations are in progress and are to be relocated as often as is necessary.
- C. Protective Devices: Erect adequate warning signs, and take necessary precautions for the protection of the wet paint and the safety of the public. Cones, rubber "Z" guards, or similar protective devices, shall be placed along the newly-painted stripe to prevent traffic from crossing the wet paint. Any such devices used shall be of a type that will not cause damage to vehicular traffic in the event that these objects are accidentally passed over.
- D. Repair of damaged Areas: Any portions of the stripes damaged by passing traffic or from any other cause shall be repainted at no cost to the Owner.

3.03 CORRECTIVE MEASURES

- A. Painting markings which fail to meet the guidelines, including the permissible tolerances and the appearance requirements, or are marred or damaged by traffic or from any other cause shall be corrected at no cost to the Owner. Drips and spattered paint shall be removed. Whenever it is necessary to remove paint it shall be done by means which will not damage the underlying surface of the pavement. When necessary to correct a deviation which exceeds the permissible tolerance in alignment, that portion of the stripe affected shall be removed and repainted in accordance with these guidelines.

- C. Corrective Devices: Misalignment, defective surfaces, and the like, shall be corrected by sandblasting or by any other type of mechanical device which will effectively remove the paint without damage to the pavement surface.

END OF SECTION

SECTION 02720
STORM DRAINAGE

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Storm drainage piping, fittings, structures, and accessories.
- B. The extent of the storm drainage system is shown on the drawings.

1.02 RELATED SECTIONS

- A. Section 02105 - Site Clearing.
- B. Section 02200 - Earthwork, General.
- C. Section 02225 - Trenching, Backfilling, and Compacting.

1.03 REFERENCES

- A. ANSI/ASTM A74 - Cast Iron Soil Pipe and Fittings.
- B. ANSI/ASTM C14 - Concrete Sewer, Storm Drain, and Culvert Pipe.
- C. ANSI/ASTM C76 - Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe.
- D. ASTM F405, F667, D2321; AASHTO M294, M252 - High density polyethylene, corrugated, smooth wall culvert (ADS N-12 or approved equal).
- E. FDOT Standard Specifications for Road and Bridge Construction, Latest Edition, Sections 125, 430, 941, 942, 943, 945 and 948.2.

1.04 REGULATORY REQUIREMENTS

- A. Conform to all applicable federal, state, and local codes for materials and installation of the work of this section.

1.05 SUBMITTALS

- A. Submit shop drawings for pipe, catch basins, manholes, and accessories.

1.06 PROJECT RECORD DOCUMENTS

- A. Accurately record location of pipe runs, connections, catch basins, manholes, cleanouts, and invert elevations. These shall be submitted to the Project Engineer on reproducible media, signed by a Professional Land Surveyor and also electronically per Section III, E., 2.

PART 2 - PRODUCTS

2.01 DRAINAGE PIPE MATERIALS

- A. Reinforced concrete pipe: ANSI/ASTM C76, CLASS III, with wall type B, mesh reinforcement, unless otherwise indicated on the drawings.
- B. Corrugated aluminum pipe: AASHTO M196.
- C. Corrugated steel pipe and pipe arch: AASHTO M 36.
- D. Corrugated steel pipe and arch.
- E. High density polyethylene, corrugated, smooth wall storm sewer culvert.
- F. All pipe, fittings, jointing, materials, grates, manhole frames and covers, and other appurtenances shall be new material; and, if not specifically described in these specifications, shall be of the best quality and entirely suitable for the service intended. The Project Engineer prior to installation shall approve all such material.

2.02 MANHOLES AND CATCH BASINS

- A. Provide precast reinforced concrete manholes and catch basins, unless otherwise indicated on the drawings.

2.03 FILL MATERIAL

- A. Fill material shall meet the requirements of Sections 02200 and 02225.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify that excavation base is ready to receive work, and excavations, dimensions, and elevations are as indicated on the drawings.

3.02 PREPARATION

- A. Hand trim excavations to required elevations. Correct over excavation with fill material of lean concrete or other approved material.
- B. Remove large stones or other hard matter which could damage pipe or impede consistent backfilling or compaction.
- C. Excavation of trenches, preparation, preparation of trench bottoms, backfilling, and other earthwork in connection with installation of storm sewers shall be in accordance with the other applicable sections of these specifications.
- D. Inspect piping before installation to detect apparent defects. Mark defective materials with white paint and promptly remove from site.

3.03 INSTALLATION - PIPE

- A. Pipe shall be protected during storage and handling against impact shocks and free fall. Pipe shall be kept clean at all times.
- B. Lay pipe to slope gradients noted on the drawings with a maximum variation from true slope of 1/8 inch in 10 feet.
- C. All pipe shall be carefully installed starting at the lowest end, with hubs upgrade and tongue end fully entered into the hub.
- D. Any pipe that is not in true alignment or which shows any settlement after installment shall be taken up and re-installed without additional compensation. All pipe joints irrespective of pipe material are to be wrapped using filter fabric. The filter fabric is to extend a minimum of 1.0' beyond the joint and to be wrapped completely around the pipe with a minimum of one (1) foot of overlap.
- E. Place plugs in ends of uncompleted conduit at end of day or whenever work stops.
- F. SPECIFIC REQUIREMENTS FOR CONCRETE PIPE:
 - 1. When rubber gaskets are used the pipe joints shall meet the requirement of the latest edition of FDOT Standard Specifications for Road and Bridge Construction Section 941-1.5. The gasket and the surface of the pipe joint, including the gasket recess, shall be clean and free from grit, dirt, and other foreign matter at the time the joints are made.
 - 2. Pipe shall be set firmly, according to the lines and grade; and preparatory to making joints for concrete pipe, all surfaces of the portion of the pipe to be jointed shall be thoroughly cleaned. The pipe shall be laid with the groove upstream. A shallow excavation shall be made underneath the pipe at the joint.
 - 3. Immediately prior to installation, the entire interior of the groove of the pipe already installed, and the rubber gasket of the pipe to be installed shall be coated with an approved vegetable soap lubricant. The groove and spigot ends shall be cleaned prior to application of the lubricant. The pipe shall then be aligned with the previously installed pipe and the joint pulled together. The joint shall be pulled by the use of interior or exterior pull jacks or winches, anchored by suitable means. The choice of method and type of equipment will depend on trench conditions, type and size of pipe, and its ability to properly seat the gasket. If, while making the joint, the gasket becomes loose and can be seen through the exterior joint recess, when the joint is pulled up to within one inch (1") of closure, the pipe shall be removed and the joint remade to the satisfaction of the Engineer.

3.04 INSTALLATION - CATCH BASINS, MANHOLES

- A. Form bottom of excavation clean and smooth to correct elevation.
- B. Form and place cast-in-place base pad, with provisions for storm sewer pipe end sections.

- C. The contractor may substitute precast inlets, manholes, and junction boxes in lieu of cast-in place units unless otherwise shown on the plans.
- D. Establish elevations and pipe inverts for inlets and outlets as indicated.
- E. Mount lid and frame level in grout, secured to top cone and set to elevation indicated.
- F. Where unsuitable material for foundations is encountered, the contractor shall excavate the unsuitable material and backfill with suitable material prior to constructing or setting inlets, manholes, and junction boxes.
- G. Rap all joints with filter fabric per plan, irrespective of pipe material.

3.05 BACKFILLING

- A. Backfilling operations will closely follow the laying, jointing, and bedding of pipe and are to be in accordance with the applicable divisions of Section 02225.

3.06 TESTS

- A. After completion of construction of the storm drainage system, or sections thereof, the Project Engineer may make tests of the completed work for correct grade and alignment. When completed, the interior surface of the piping shall conform accurately to the grade and alignment fixed by the Project Engineer.
- B. It is the intent of these specifications to secure construction of a storm drainage system with a minimum amount of leakage.

3.07 RESPONSIBILITY

- A. The contractor shall be held strictly responsible for all parts of the work that bear the load of the backfill. If structural failures in the storm drainage piping or appurtenances develop within one (1) year from the date of final acceptance of the work, the contractor shall be required to replace all faulty material at his full expense. To this end, the contractor is advised to purchase material under a guarantee from the manufacturer, guaranteeing proper service under conditions which are established by the drawings, specifications and local conditions.

END OF SECTION

SECTION 02831

CHAIN LINK FENCES AND GATES

PART 1 - GENERAL

1.01 SECTION INCLUDES

- A. Fence framework, fabric, and accessories.
- B. Excavation for post bases.
- C. Manual gates and related hardware.
- D. Concrete anchorage for posts.

1.02 SCOPE OF WORK

- A. Provide permanent fence, gates, footings, and accessories as shown on the drawings.

1.03 REFERENCES

- A. ASTM A121-86 - Zinc Coated Steel barbed Wire.
- B. ASTM A123-89 – Zinc (Hot-Dipped Galvanized) Coatings on Iron and Steel Products.
- C. ASTM A307-91 - Carbon Steel Bolts and Studs, 60000 psi Tensile.
- D. ASTM A392-91 – Zinc-Coated Steel Chain-Link Fence Fabric.
- E. ASTM A563-91 – Carbon and Alloy Steep Nuts.
- F. ASTM A569-91 – Steel, Carbon (0.15 Maximum, Percent), Hot-Rolled Sheet and Strip Commercial Quality.
- G. ASTM B6-87 – Zinc.
- H. ASTM C94-91 – Ready-Mixed Concrete.
- I. ASTM F552-88 – Definitions of Terms Relating to Chain Link Fencing.
- J. ASTM F567-91 – Practice for Installation of Chain-Link Fence.
- K. ASTM F626-91 – Fence Fittings.
- L. ASTM F668-91 – Poly (Vinyl Chloride) (PVC) – Coated Steel Chain-Link Fence Fabric.
- M. ASTM F900-84 – Industrial and Commercial Swing Gates.

- N. ASTM A120 – Pipe, Steel, Black and Hot-Dipped Zinc Coated (Galvanized) Welded and Seamless

1.04 SUBMITTALS

- A. Manufacturer's catalog cuts with printed specifications.
- B. Shop Drawings with complete details of fence and gate construction, fence height, post spacing, dimensions and unit weights of framework, and concrete footing details.

1.5 QUALITY ASSURANCE

- A. Manufacturer: Company specializing in commercial quality chain link fencing with a minimum of two (2) years experience.
- B. Installation: ANSI/ASTM F567 and manufacturer's instructions.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Framing (Steel): ASTM A569, Schedule 40 steel pipe, one piece without joints.
- B. Fabric Wire (Steel): ASTM A392.
- C. Bolts: ASTM A307, Grade A.
- D. Nuts: ASTM A563, Grade A.
- E. Concrete: ASTM C94; Normal Portland Cement, 2000 psi minimum compressive strength at 28 days, 3 inch slump, 1 inch nominal sized coarse aggregate.

2.02 COMPONENTS

- A. Line Posts: 2.38 inch outside diameter.
- B. Corner and End Posts: 2.88 inch outside diameter.
- C. Gate Posts: 2.88 inch outside diameter.
- D. Top and Brace Rails: 1.66 inch outside diameter, plain end, sleeve coupled.
- E. Gate Frame: 2.38 inch outside diameter.
- F. Fabric: 2 inch diamond mesh interwoven wire, 9 gage steel core, top selvage twisted tight, bottom selvage knuckle end closed.
- G. Brace and Tension Bands: 1/8 inch thick steel.
- H. Tension Bar: 1/4 inch thick steel.
- I. Tension Wire: 6 gage steel core, single strand.

- J. Tie Wire: 13 gage core, aluminum alloy steel.
- K. Caps: Malleable iron, galvanized, sized to post diameter, stainless steel set screw retainer.

2.03 ACCESSORIES

- A. Extension Arms: Cast steel to accommodate 3 strands of barbed wire, single arm sloped to 45 degrees. Withstand a weight of 200 pounds.
- B. Gate Hardware: Fork latch for single swing gate, center gate stop and drop rod for double swing gates, keeper for double swing gates, hardware for padlock, and two 180 degree hinges per leaf.

2.03 FINISHES

- A. Zinc Coating
 - 1. Components and Framing: ASTM A123
 - 2. Fabric: ASTM A392, 1.2 oz./sq. ft.
 - 3. Hardware: ASTM A153
 - 4. Extension Arms: ASTM A153
- B. Vinyl Coating
 - 1. General: Factory coated (unless noted otherwise), fusion bonded PVC.
 - 2. Components and Framing: 10-14 mils vinyl coating over galvanizing per ASTM A123.
 - 3. Fabric: 7-12 mils vinyl coating per ASTM F668, Class 2B over 0.3 oz./sq. ft. of galvanizing per ASTM A641.
 - 4. Hardware: Spray paint hardware in the field to match vinyl coating.
 - 5. Extension Arms: 10-14 mils vinyl coating over galvanizing per ASTM A153.

PART 3 - EXECUTION

3.01 SITE PREPARATION

- A. Before installing chain-link fence, all necessary site clearing and grading is to be completed.
- B. Where the clearing and grubbing for the Project does not include the area occupied by the fence, clearing is to be done to a width of at least two feet on each side of the fence line, except that the Project Engineer may direct that valuable trees to be left in place. Do not extend clearing beyond the right-of-way.

3.02 INSTALLATION

A. General

1. Install framework, fabric, accessories, and gates in accordance with ASTM F567.
2. Install all fasteners with the nuts on the inside face of the fence.

B. Posts

1. Space at intervals not exceeding 10 feet on center. Measure the interval parallel to the grade of the fence and in the line of fence from center to center of the post.
2. Set line posts in concrete foundations of not less than 10 inches in diameter +2 feet deep below grade.
3. Set terminal and gate posts in concrete foundations not less than 18 inches in diameter and/or 4 feet deep below grade.
4. Recess foundations 1/8" to 1/4" below finished grade. Slope concrete away from the posts to provide for proper water drainage.
5. Install corner posts whenever the fence alignment changes 10 degrees or more.
6. Fence height shall be 4'-0" unless otherwise shown on the Drawings.

C. Terminal Post Bracing

1. Brace each gate and terminal post to adjacent line post with horizontal center rail.
2. Braces are not required on fences 6 feet high or less.

D. Top Rail

1. Provide a top rail so that a continuous brace from end to end of each stretch of fence is formed.
2. Support at each line post.
3. Securely fasten to terminal posts and join with sleeves or coupling to allow for expansion and contraction.
4. Top rail to be installed straight and level. Significant grade changes shall be discussed with superintendent prior to installation of fence.

E. Fabric

1. Place chain-link fabric on the outside of the area to be enclosed or as directed by the Project Engineer.
2. Stretch fabric between terminal posts or at intervals of 100 feet maximum, whichever is less.
3. Position bottom of fabric at grade.
4. Fasten fabric to line posts at intervals not exceeding 15 inches and to top rail at intervals not exceeding 24 inches with wire ties.
5. Provide bands or clips of adequate strength to attach fabric to tension bars at all corners, end, and gateposts at intervals not exceeding 12 inches.
6. Do not place fabric until posts have been permanently positioned and concrete foundations have attained adequate strength.
7. Fabric to be 9 Gauge 2" x 2".

F. Gates

1. Provide 2-12' swing gates at each location shown on the Drawings (total opening width 24').
2. Install gates with self-closing mechanism. Install three hinges per leaf, latch catches, drop bolt, boot bolts and sockets, torsion spring retainer, retainer and locking clamp.

G. Electrical Grounds

1. Wherever a power line passes over the fence, a ground must be installed directly below the point of crossing. The ground rod is to consist of an aluminum or galvanized rod, with connection of similar metal if required, or of other appropriate material, eight feet in length and at least 5/8 inch in diameter. Drive the rod vertically until the tip of the rod is approximately six inches below the ground surface. Use a No. 6 conductor to connect the rod and all fence elements. Connect the conductor to each fence element and the ground rod by means of electrical clamps which will prevent corrosion.

3.03 PROJECT CLEAN UP

- A. At completion of the fence work, remove from the site and premises, debris, and surplus material, not wanted by the Owner. Remove construction chain link and wood fence and footings from site and restore all damaged areas to original condition.

END OF SECTION

SECTION 02840

GUARDRAIL

PART 1 - GENERAL

1.01 DESCRIPTION

Work Included: The work specified in this section consists of the construction of metal guardrail on posts of concrete, timber, steel, or aluminum, as specified. The work shall be constructed in accordance with these specifications and in conformity with the lines, grades, dimensions, and notes shown on the plans.

PART 2 - PRODUCTS

2.01 GUARDRAIL

The materials used shall conform to the standard requirements specified in Section 536 of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, (Latest Edition).

PART 3 - EXECUTION

3.01 INSTALLATION

All work shall be constructed as detailed on the plans and shall conform to the standard construction methods outlined in Section 536 of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, (Latest Edition).

END OF SECTION

SECTION 02930

RIPRAP

PART 1 - GENERAL

1.01 DESCRIPTION

The work shall consist of the placing of all riprap, including filter layer or bedding where indicated on the Drawings.

1.02 WORK INCLUDED

The Contractor shall furnish all materials, equipment, tools and labor necessary for the placing of the riprap including filter layer or bedding as shown on the Drawings.

1.03 REFERENCE SPECIFICATION

Florida Department of Transportation "Standard Specifications for Road and Bridge Construction", latest edition, Section 530 "Riprap".

PART 2 - PRODUCTS

2.01 GENERAL

See section 530-2.3 of the reference specifications.

PART 3 - EXECUTION

3.01 GENERAL

Construction methods shall be in accordance with the details shown on all the Drawings, and the reference specifications, Section 530-3.3 FDOT Standard Specifications.

PART 4 - MEASUREMENT AND PAYMENT

4.01 GENERAL

Measurement and payment shall be in accordance with the reference specification. Cost to be included in the lineal foot price of the bulkhead.

END OF SECTION

SECTION 02938

SODDING

PART 1 - GENERAL

1.01 SCOPE OF WORK

The work covered by these specifications consist of furnishing all plant, labor, equipment, appliances and materials, and performing all operations in connection with furnishing and placing grass sod, all complete and in place, in strict accordance with these specifications, the engineering drawings, and subject to the terms and conditions of the contract.

PART 2 - PRODUCTS

2.01 GENERAL

Materials and construction methods in connection with furnishing and placing sod shall be in accordance with the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition, Section 575, except as herein specified. Sod shall be Centipede or Bahia grass, unless otherwise noted on the construction drawings.

PART 3 - EXECUTION

3.01 INSPECTION

- A. Verify that prepared soil base is ready to receive the work of this section.
- B. Beginning of installation means acceptance of existing site conditions.

3.02 PREPARATION OF SUBSOIL

Prepare subsoil to eliminate uneven areas and low spots. Maintain lines, levels, profiles, and contours. Make changes in grade gradual. Blend slopes into level areas.

3.03 GRADING AND SODDING SWALES

Where sodding is indicated within drainage swales, the soil shall be evenly graded to a line two inches below the elevation indicated on the plans. The sodding, having a minimum thickness of two inches, shall then be placed and firmly embedded by light tamping, bringing the contour of the swale to the elevation shown on the plans.

3.04 LAYING SOD

- A. Moisten prepared surface immediately prior to laying sod.
- B. Lay sod immediately upon delivery to site to prevent deterioration.
- C. Lay sod tight with no open joints visible, and no overlapping; stagger joints 12 inches minimum. Do not stretch or overlap sod pieces.

**END OF SECTION
SECTION 02940**

GRASSING (BY SEEDING) & HYDRO-SEEDING

GRASSING (BY SEEDING)

PART 1 - GENERAL

1.01 SECTION INCLUDES

The work specified in this Section consists of the establishing of a stand of grass called for, by seeding and mulching. The work of grassing under this Section shall include seeding and fertilizing, mulching as required and maintaining the grassed areas until the completion of the project.

Any of the items of work covered by this Section may be eliminated from the contract, at the discretion of the Engineer.

Work to conform with Section 570 Grassing (by Seeding), F.D.O.T. Standard Specifications for Road and Bridge Construction, latest edition.

1.02 QUALITY ASSURANCE

A. Provide seed mixture in containers showing percentage of seed mix, year of production, net weight, date of packaging, and location where packaged.

1.03 REGULATORY REQUIREMENTS

A. Comply with regulatory agencies for fertilizer and herbicide composition.
B. Section 570, 981,982 and 983 of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition.

1.04 DELIVERY, STORAGE AND HANDLING

A. Deliver seed mixture in sealed containers. Seed in damaged packaging is not acceptable.
B. Deliver fertilizer in waterproof bags showing weight, chemical analysis and name of manufacturer.

1.05 EXISTING CONDITIONS

A. All existing grass areas that are damaged or destroyed during construction are to be repaired with new grass. Contractor is responsible for the restoration of the grass to the conditions that existed prior to construction.

1.06 FIELD MEASUREMENTS

A. Seeded areas will be measured based on areas shown on the Drawings. Seed required to be placed in excess of the areas detailed on the Drawings will be at no additional cost to the Owner.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Topsoil: Muck; free of plants, weeds and roots. PH level between 5.0 and 7.0. Organic content of at least 1.5 percent.
- B. Fertilizer: Use fertilizer Type I to conform with Section 982 of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition.
- C. Seed: Section 981-1 of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition.
- D. Mulching: When mulching is called for, approximately two inches, loose thickness, or the mulch material shall then be applied uniformly over the seeded area, and the mulch material cut into the soil with the equipment specified, so as to produce a loose mulched thickness of three to four inches. Care shall be exercised that the materials are not cut too deeply into the soil. When green mulch is used the green mulch shall be incorporated into the soil not later than two days after being cut, and not artificial watering of the mulch shall be done before it is applied.
- E. Water: Per Section 983 of the Florida Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition.

PART 3 - EXECUTION

3.01 PREPARATION OF SUBSOIL

- A. Prepare sub-soil to eliminate uneven areas and low spots. Maintain lines, levels, profiles and contours. Make changes in grade gradual. Blend slopes into level areas.
- B. Remove foreign materials, weeds and undesirable plants and their roots.

3.02 PLACING TOPSOIL

Application of Fertilizer: The fertilizer and/or limestone shall be spread uniformly in one or more applications as specified below:

- A. Spread topsoil to a minimum thickness of 2 inches over the entire area to be seeded.
- B. Place topsoil during dry weather.
- C. Roto-till to a depth of 6 inches.
- D. Fine grade the area to be seeded to eliminate ridges, depressions and other irregularities, and to ensure positive drainage.

3.03 FERTILIZING

- A. Fertilizing operations will not be permitted when wind velocities exceed 15 miles per hour.
- B. Apply fertilizer uniformly at a rate of 400-500 pounds per acre.
- C. Apply after smooth raking of topsoil and prior to seeding.
- D. Apply fertilizer no more than 48 hours before seeding. When hydro-seeding, mix fertilizer with seed and mulch.
- E. Lightly water to aid the dissipation of fertilizer.
- F. Spread fertilizer by hand on steep slopes or other areas where machine spreading may not be practical.

3.04 SEEDING AND MULCHING

- A. Seeding operations will not be permitted when wind velocities exceed 15 miles per hour.
- B. Seed only when the soil is moist and in proper condition to induce growth.
- C. Seed Application Rate: 8-10 pounds of Argentine Bahia per 1,000 square feet. During late fall, winter, and early spring applications, add 4-5 pounds of rye seed to the Bahia per 1,000 square feet. During late springs, summer and early fall, add 1-1/2 – 2 pounds of red top millet seed to the Bahia per 1,000 square feet.
- D. Immediately after completion of the seeding, roll entire seeded area. At least two trips over the entire area are required.
- E. Immediately following seeding and rolling, apply mulch to a loose thickness of 1 inch over the entire seeded area.
- F. Apply water with a fine spray immediately after each area has been mulched.
- G. Newly seeded areas are not to be watered to force seed germination but only to sustain grass growth.

3.05 HYRDO-SEEDING

- A. Seed Application Rate: 8-10 pounds of Argentine Bahia per 1,000 square feet. During late fall, winter, and early spring applications, add 4-5 pounds of rye seed to the Bahia per 1,000 square feet. During late springs, summer and early fall, add 1-1/2 – 2 pounds of red top millet seed to the Bahia per 1,000 square feet.
- B. Mulch Application Rate: 1,100 pounds per acre.
- C. Add to the mixture a dispersing agent to insure proper dispersion and a uniform application.
- D. Spray hydro mulch, seed, tackifier, and fertilizer in a one step operation. Keep mixture in a homogeneous slurry at all times.
- E. Hydraulically spray on the ground to form a ground cover impregnated uniformly with grass seed. Allow absorption of moisture from rainfall or mechanical watering to percolate to the underlying soil.
- F. Water so as to provide optimum growth conditions for the establishment of grass 24 hours after hydro-seeding. Irrigate for brief intervals, 3 to 4 times a day, until established. Keep top layer of soil moist until seeds germinate.

3.06 MAINTENANCE

- A. Maintenance begins immediately after each area is planted.
- B. Water to keep surface soil moist.
- C. Repair washed out areas by filling with topsoil, fertilizing, seeding, and mulching.
- D. Mow grass at regular intervals to maintain a maximum height of 4 inches. Do not cut more than 1/3 of grass blade at any one mowing.
- E. Immediately remove clippings after mowing.
- F. Roll surface to remove minor depressions or irregularities.
- G. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions. Remedy damage resulting from improper use of herbicides.
- H. Continue maintenance for the duration of the Contract Time but in no case less than two weeks.

3.07 ACCEPTANCE

- A. If, at the end of the maintenance period, a satisfactory stand of grass has not been produced, renovate and reseed the unsatisfactory portions thereof immediately.
- B. A satisfactory stand is defined as grass or section of grass that has:
 - 1. No bare spots larger than 3 square feet.
 - 2. Not more than 10 percent of total area with bare spots larger than 1 square foot.
 - 3. No more than 15 percent of total area with bare spots larger than 6 inches square.

END OF SECTION