



ATTACHMENT “A”

**TECHNICAL SPECIFICATION INDEX (FDOT Specifications,
COBB Specifications and Technical Requirements**

Technical Specifications Index

SPECIFICATIONS

In the event of a conflict between the FDOT LAP SPECIFICATIONS; “BIG THREE” listed in this section and other provisions of the technical specifications, the FDOT SPECIFICATIONS “BIG THREE” will govern and prevail.

The Engineering Division uses the Florida Department of Transportation (FDOT) Standard Specifications for Road and Bridge Construction, and the FDOT Design Standards as reference documents. It is the intent of the Engineering Division that the City of Boynton Beach technical specifications shall govern the applicable project work that is typically identified in those FDOT Specifications and Standard sections:

In the event that the City of Boynton Beach technical specification are either silent on an issue or requirement or if it appears to present a conflict with the referenced FDOT Specifications and Standards, it is the responsibility of the Contractor to request clarification or resolution, in writing, from the Project Manager and Engineer.

In the event that the City of Boynton Beach technical specification are either silent on or requirement is not listed for testing and acceptance requirements the FDOT Specifications and Standards shall govern.

In the event that the City of Boynton Beach technical specification are either silent on or requirement is not listed for method of measurement the FDOT Specifications and Standards shall govern.

In the event that the City of Boynton Beach technical specification are either silent on or if it appears to present a conflict with method of payment the referenced FDOT pay item shall govern.

FDOT SPECIFICATIONS FOR OFF-SYSTEM PROJECTS (“BIG THREE”)

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334	HOT MIX ASPHALT FOR LAP (OFF-SYSTEM)
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APPENDICES

120 EARTHWORK AND RELATED OPERATIONS FOR LAP (CLASS - D).
(REV 3-2-22) (FA 7-13-21) (FY 2023-24)

SECTION 120 is deleted and the following substituted:

SECTION 120
EARTHWORK AND RELATED OPERATIONS FOR LAP (CLASS - D)

120-1 Description.

120-1.1 General: Perform earthwork and related operations based on the type of work specified in the Contract and the Earthwork Categories as defined below. Meet the applicable requirements for materials, equipment and construction as specified.

Earthwork and related operations consist of excavation for the construction of the roadway, excavation for structures and pipe, constructing backfill around structures and pipe, and constructing embankments as required for the roadway, ditches, and channel changes.

120-1.2 Earthwork Categories: Performance of Earthwork Operations will fall into one of the following Earthwork Categories:

120-1.2.1 Earthwork Category 1: Includes the earthwork and related operations associated with the construction of sidewalks and bike paths along with any drainage structures associated with these facilities.

120-1.2.2 Earthwork Category 2: Includes the earthwork and related operations associated with the construction of turn lanes and other non-mainline traffic lanes, widening, roadway shoulders, concrete box culverts, retaining walls, and other drainage structures on the non-mainline pavement.

120-1.2.3 Earthwork Category 3: Includes the earthwork and related operations associated with the construction of new mainline pavement, along with concrete box culverts, retaining walls, and other drainage structures on the mainline pavement.

120-1.3 Unidentified Areas of Contamination: When encountering or exposing any abnormal condition indicating the presence of contaminated materials, cease operations immediately in the vicinity and notify the Engineer. The presence of tanks or barrels; discolored earth, metal, wood, ground water, etc.; visible fumes; abnormal odors; excessively hot earth; smoke; or other conditions that appear abnormal may indicate the presence of contaminated materials and must be treated with extreme caution.

Make every effort to minimize the spread of contamination into uncontaminated areas. Immediately provide for the health and safety of all workers at the job site and make provisions necessary for the health and safety of the public that may be exposed to any potentially hazardous conditions. Ensure provisions adhere to all applicable laws, rules or regulations covering potentially hazardous conditions and will be in a manner commensurate with the gravity of the conditions.

The Engineer will notify the Department of a contamination assessment/remediation process plan to determine the course of action necessary for site security and the steps necessary under applicable laws, rules, and regulations for additional assessment and/or remediation work to resolve the contamination issue.

120-2 Classifications of Excavation.

120-2.1 General: The Engineer may classify excavation specified under this Section for payment as any of the following: regular excavation, subsoil excavation, lateral ditch excavation, and channel excavation.

The definition of existing surface is a combination of the following:

1. The original unpaved ground line;
2. The bottom of the existing pavement;
3. The bottom of existing features removed by clearing and grubbing;
4. The bottom of the existing base, if the base is to be removed.

The definition of finished graded surface includes the completed grades of side slopes, unpaved shoulders, and the bottom of the base for flexible or rigid pavement.

120-2.2 Regular Excavation: Regular excavation includes roadway excavation and borrow excavation, as defined below for each.

: Roadway excavation consists of the excavation and the utilization or disposal of all materials necessary for the construction of the roadway, ditches, channel changes, etc., except as may be specifically shown to be paid for separately and that portion of the lateral ditches within the limits of the roadway right-of-way as shown in the Plans.

Borrow excavation consists of the excavation and utilization of material from authorized borrow pits, including only material that is suitable for the construction of roadway embankments or of other embankments covered by the Contract.

A Cost Savings Initiative Proposal (CSIP) submittal based on using borrow material from within the project limits will not be considered.

120-2.3 Subsoil Excavation: Subsoil excavation consists of the excavation and disposal of muck, clay, rock, or any other material that is unsuitable in its original position and that is excavated below the existing surface. For pond and ditches that identify the placement of a blanket material, the existing surface is the bottom of the blanket material. Subsoil excavation also consists of the excavation of all suitable material within the above limits as necessary to excavate the unsuitable material. Consider the limits of subsoil excavation indicated in the Plans as being particularly variable, in accordance with the field conditions encountered.

The quantity of material required to replace the excavated material and to raise the elevation of the roadway to the bottom of the template will be paid for under embankment or borrow excavation (Truck Measure).

120-2.4 Lateral Ditch Excavation: Lateral ditch excavation consists of all excavation of inlet and outlet ditches to structures and roadway, and ditches parallel to the roadway right-of-way. Dress lateral ditches to the grade and finished graded surface shown in the Plans.

120-2.5 Channel Excavation: Channel excavation consists of the excavation of channels of streams and satisfactory disposal of all materials from the limits of the channel as shown in the Plans.

120-2.6 Excavation for Structures and Pipe: Excavation for structures consists of the excavation for bridge foundations, box culverts, pipe culverts, storm sewers and all other pipelines, retaining walls, headwalls for pipe culverts and drains, catch basins, drop inlets, manholes, and similar structures.

120-3 Preliminary Soils Investigations.

When the Plans contain the results of a soil survey, do not assume such data is a guarantee of the depth, extent, or character of material present.

120-4 Excavation Requirements.

120-4.1 Removal of Unsuitable Materials and Existing Roads

120-4.1.1 Subsoil Excavation: Where rock, muck, clay, or other material within the limits of the roadway is unsuitable in its original position, excavate such material to the depth shown in the Plans as the removal limits or as indicated by the Engineer, and backfill with suitable material. Where the removal of plastic soils is required, meet a construction tolerance of ± 0.2 foot in depth and ± 6 inches (each side) in width.

120-4.1.2 Construction over Existing Old Road: Where a new roadway is to be constructed over an old one, completely remove the existing pavement for the entire limits of the width and depth. If the Plans provide that paving materials may be incorporated into the fill, distribute such material in a manner so as not to create voids. Recompact the old road meeting the requirements of 120-10.2.

120-4.2 Lateral Ditch Excavation: Excavate inlet and outlet ditches to structures and roadway, changes in channels of streams and ditches parallel to the roadway. Dress lateral ditches to the grade and finished graded surface shown in the Plans.

120-4.3 Channel Excavation: Excavate and dispose of all materials from the limits of the channel as shown in the Plans. Excavate for bridge foundations, box culverts, pipe culverts, storm sewers and all other pipelines, retaining walls, headwalls for pipe culverts and drains, catch basins, drop inlets, manholes, and similar structures.

120-4.4 Excavation for Structures and Pipe.

120-4.4.1 Requirements for all Excavation: Perform all excavation to foundation materials, satisfactory to the Engineer, regardless of the elevation shown in the Plans. Remove rock, boulders or other hard lumpy or unyielding material to a depth of 12 inches below the bottom of pipes and box culverts elevations. Remove muck or other soft material to the depth indicated in the Plans or as directed by the Engineer.

120-4.4.2 Earth Excavation:

120-4.4.2.1 Foundation Material other than the Rock: When masonry is to rest on an excavated surface other than rock, take special care to avoid disturbing the bottom of the excavation, and do not remove the final foundation material to grade until just before placing the masonry. In case the foundation material is soft or mucky, the Engineer may require excavation to a greater depth and to backfill to grade with approved material.

120-4.4.2.2 Foundation Piles: Where foundation piles are used, complete the excavation of each pit before driving the piles. After the driving is completed, remove all loose and displaced material, leaving a smooth, solid, and level bed to receive the masonry.

120-4.4.2.3 Removal of Obstructions: Remove boulders, logs, or any unforeseen obstacles encountered in excavating.

120-4.4.3 Rock Excavation: Clean all rock and other hard foundation material, remove all loose material, and cut all rock to a firm surface. Either level, step vertically and horizontally, or serrate the rock, as may be directed by the Engineer. Clean out all seams and fill them with concrete or mortar.

120-4.4.4 Pipe Trench Excavation: Excavate trenches for pipes to the elevation of the bottom of the pipe and to a width sufficient to provide adequate working room. Remove soil not meeting the classification specified as suitable backfill material in 120-8.3.2.2 to a depth of 4 inches below the bottom of the pipe elevation. Remove rock, boulders or other hard lumpy or unyielding material to a depth of 12 inches below the bottom of the pipe elevation. Remove

muck or other soft material to a depth necessary to establish a firm foundation. Where the soils permit, ensure that the trench sides are vertical up to at least the mid-point of the pipe.

For pipelines placed above the natural ground line, place and compact the embankment, prior to excavation of the trench, to an elevation at least 2 feet above the top of the pipe and to a width equal to four pipe diameters, and then excavate the trench to the required grade.

For pipe trenches utilizing trench boxes, ensure that the trench box used is of sufficient width to permit thorough tamping of bedding material under and around the pipes as specified in 125-8.1.6.

Do not disturb the installed pipe and its embedment when moving trench boxes. Move the trench box carefully to avoid excavated wall displacement or damage. As the trench box is moved, fill any voids left by the trench box and continuously place and compact the backfill material adjacent to and all along the side of the trench box walls to fill any voids created by the trench box.

120-5 Disposal of Surplus and Unsuitable Material.

120-5.1 Ownership of Excavated Materials: Take ownership of the materials and dispose them outside the right-of-way.

120-5.2 Placement of Muck on Side Slopes: As an exception to the provisions of 120-5.1, the Contractor may store muck (A-8 material) alongside the roadway, provided there is a clear distance of at least 6 feet between the roadway grading limits and the muck. Do not store such material in a manner which will impede the inflow or outfall of any channel or side ditches. All stored materials that is not used for the final surface material must be disposed of outside the right-of-way.

120-5.3 Disposal of Paving Materials: Unless otherwise noted, take ownership of paving materials, such as paving brick, asphalt block, concrete slab, sidewalk, curb and gutter, etc., excavated in the removal of existing pavements, and dispose of them outside the right-of-way. Existing limerock base that is removed may be incorporated in the stabilized portion of the subgrade. If the construction sequence will allow, incorporate all existing limerock base into the project as allowed by the Contract Documents.

120-5.4 Disposal Areas: Where the Contract Documents require disposal of excavated materials outside the right-of-way, and the disposal area is not indicated in the Contract Documents, furnish the disposal area without additional compensation.

Provide areas for disposal of removed paving materials out of sight of the project and at least 300 feet from the nearest roadway right-of-way line of any road. If the materials are buried, disregard the 300-foot limitation.

120-6 Materials for Embankment.

120-6.1 General Requirements for Embankment Materials: Construct embankments using suitable materials excavated from the roadway or delivered to the jobsite from authorized borrow pits. Embankment material shall not contain muck, stumps, roots, brush, vegetable matter, rubbish, reinforcement bar or other material that does not compact into a suitable and enduring roadbed.

Remove all waste material designated as undesirable. Use material in embankment construction in accordance with Plan details or as the Engineer directs.

Construct the embankment using maximum particle sizes as follows:

1. In top 12 inches: 3-1/2 inches (in any dimension).

2. 12 to 24 inches: 6 inches (in any dimension).
3. In the depth below 24 inches: not to exceed 12 inches (in any dimension) or the compacted thickness of the layer being placed, whichever is less.

Spread all material so that the larger particles are separated from each other to minimize voids between them during compaction. Compact around these rocks in accordance with 120-9.2.

When and where approved by the Engineer, larger rocks (not to exceed 18 inches in any dimension) may be placed outside the 1:2 slope and at least 4 feet or more below the bottom of the base. Compact around these rocks to a firmness equal to that of the supporting soil. Where constructing embankments adjacent to bridge end bents or abutments, do not place rock larger than 3-½ inches in diameter within 3 feet of the location of any end-bent piling.

120-6.2 Use of Materials Excavated from the Roadway and Appurtenances: Assume responsibility for determining the suitability of excavated material for use on the project in accordance with the applicable Contract Documents. Consider the sequence of work and maintenance of traffic phasing in the determination of the availability of this material.

120-6.3 Authorization for Use of Borrow: Use borrow pit only when sufficient quantities of suitable material are not available from roadway and drainage excavation, to properly construct the embankment, subgrade, and shoulders, and to complete the backfilling of structures and pipe. Do not use borrow material until so ordered by the Engineer, and then only use material from approved borrow pits.

120-6.3.1 Haul Routes for Borrow Pits: Provide and maintain, at no expense to the Agency, all necessary roads for hauling the borrow material. Where borrow area haul roads or trails are used by others, do not cause such roads or trails to deteriorate in condition.

Arrange for the use of all non-public haul routes crossing the property of any railroad. Incur any expense for the use of such haul routes. Establish haul routes which will direct construction vehicles away from developed areas when feasible and keep noise from hauling operations to a minimum. Advise the Engineer in writing of all proposed haul routes.

120-6.3.2 Borrow Material for Shoulder Build-up: When so indicated in the Plans, furnish borrow material with a specific minimum bearing value, for building up of existing shoulders. Blend materials as necessary to achieve this specified minimum bearing value prior to placing the materials on the shoulders. Take samples of this borrow material at the pit or blended stockpile. Include all costs of providing a material with the required bearing value in the Contract unit price for borrow material.

120-6.4 Materials Used at Pipes, Culverts, etc.: Construct embankments over and around pipes, culverts, and bridge foundations with selected materials.

120-7 Embankment Construction.

120-7.1 General: Construct embankments in sections of not less than 300 feet in length or for the full length of the embankment. Do not construct another LOT over an untested LOT without the Engineer's approval in writing.

For construction of mainline pavement lanes, turn lanes, ramps, parking lots, concrete box culverts and retaining wall systems, a LOT is defined as a single lift of finished embankment not to exceed 500 feet.

For construction of shoulder-only areas, shared use paths, and sidewalks areas, a LOT is defined as a single lift of finished embankment not to exceed 2000 feet.

Isolated compaction operations will be considered as separate LOTs. For multiple phase construction, a LOT shall not extend beyond the limits of the phase.

120-7.2 Dry Fill Method:

120-7.2.1 General: Construct embankments to meet compaction requirements in 120-7 and in accordance with the acceptance program requirements in 120-10.

Construct embankment in the dry whenever normal dewatering equipment and methods can accomplish the needed dewatering.

120-7.2.1.1 Maximum Compacted Lift Thickness Requirements:

Construct the embankment in successive layers with lifts up to a maximum listed in the table below based on the embankment material classification group.

Table 120-1			
Group	AASHTO Soil Class	Maximum Lift Thickness	Thick Lift Control Test Section Requirements
1	A-3	12 inches	Not Needed
	A-2-4 (No. 200 Sieve \leq 15%)		
2	A-1	6 inches without Control Test Section	Maximum of 12 inches per 120-7.2.1.2
	A-2-4 (No. 200 Sieve $>$ 15%)		
	A-2-5, A-2-6, A-2-7, A-4, A-5, A-6		
	A-7 (Liquid Limit $<$ 50)		

120-7.2.1.2 Thick Lift Requirements: For embankment materials classified as Group 2 in Table 120-1 above, the option to perform thick lift construction in successive layers of not more than 12 inches compacted thickness may be used after meeting the following requirements:

1. Demonstrate the possession and control of compacting equipment sufficient to achieve density required by 120-10.5 for the full depth of a thicker lift.
2. Construct a test section of the length of one full LOT of not less than 500 feet.
3. Perform five tests at random locations within the test section.
 - a. All five tests must meet the density required by 120-10.5.
 - b. Identify the test section with the compaction effort and soil classification in the project's records.
4. Obtain Engineer's approval for the compaction effort after completing a successful test section.

In case of a change in compaction effort or soil classification, failing density test, construct a new test section. The Contractor may elect to place material in 6 inches compacted thickness at any time. Construct all layers approximately parallel to the centerline profile of the road.

The Engineer reserves the right to terminate the Contractor's use of thick lift construction. Whenever the Engineer determines that the Contractor is not achieving satisfactory results, revert to the 6-inch compacted lifts.

120-7.2.1.3 Equipment and Methods: Provide normal dewatering equipment including, but not limited to, surface pumps, sump pumps and trenching/digging machinery. Provide normal dewatering methods including, but not limited to, constructing shallow surface drainage trenches/ditches, using sand blankets, sumps, and siphons.

When normal dewatering does not adequately remove the water, the Engineer may require the embankment material to be placed in the water or in low swampy ground in accordance with 120-9.2.4.

120-7.2.2 Placing in Unstable Areas: When depositing the material in water, or in low swampy ground that will not support the weight of hauling equipment, construct the embankment by dumping successive loads in a uniformly distributed layer of a thickness not greater than necessary to support the hauling equipment while placing subsequent layers. Once sufficient material has been placed so that the hauling equipment can be supported, construct the remaining portion of the embankment in layers in accordance with the applicable provisions of 120-9.2.3 and 120-9.2.6.

120-7.2.3 Placing on Steep Slopes: When constructing an embankment on a hillside sloping more than 20 degrees from the horizontal, before starting the fill, deeply plow or cut into steps the surface of the original ground on which the embankment is to be placed.

120-7.2.4 Placing Outside Standard Minimum Slope: The standard minimum slope is defined as the plane described by a one (vertical) to two (horizontal) slope downward from the roadway shoulder point or the gutter line, in accordance with Standard Plans, Index 120-001 and 120-002. Where material that is unsuitable for normal embankment construction is to be used in the embankment outside the standard minimum slope, place such material in layers of not more than 18 inches in thickness, measured loose. The Contractor may also place material, which is suitable for normal embankment, outside such standard minimum slope in 18-inch layers. Maintain a constant thickness for suitable material placed within and outside the standard minimum slope, unless placing in a separate operation.

120-7.3 Hydraulic Method:

120-7.3.1 Method of Placing: When the hydraulic method is used, as far as practicable, place all dredged material in its final position in the embankment by such method. Place and compact any dredged material that is reworked or moved and placed in its final position by any other method, as specified in 120-9.2. Baffles or any other form of construction may be used if the slopes of the embankments are not steeper than indicated in the Plans. Remove all timber used for temporary bulkheads or baffles from the embankment and fill and thoroughly compact all voids. When placing fill on submerged land, construct dikes prior to beginning of dredging, and maintain the dikes throughout the dredging operation.

120-7.3.2 Excess Material: Do not use excess material placed outside the prescribed slopes, below the normal high-water level, to raise the fill. Remove only the portion of this material required for dressing the slopes.

120-7.3.3 Protection of Openings in Embankment: Maintain openings in the embankments at the bridge sites. Remove any material which invades these openings or existing channels without additional compensation to provide the same depth of channel as existed before the construction of the embankment. Do not excavate or dredge any material within 200 feet of the toe of the proposed embankment.

120-8 Backfilling Around Structures and Pipe.

120-8.1 Requirements for Structures and Pipes:

120-8-1.1 General: Backfill around structures and pipe in the dry whenever normal dewatering equipment and methods can accomplish the needed dewatering. A LOT is defined as one lift of backfill material placement, not to exceed 500 feet in length or a single run of pipe connecting two successive structures, whichever is less. Backfill for structures and pipe compacted in one operation will be considered as one LOT within the cover zone. Backfill around structures compacted separately from the pipe will be considered as separate LOTs. Backfill on each side of the pipe for the first lift will be considered a separate LOT. Backfill on opposite sides of the pipe for the remaining lifts will be considered separate LOTs, unless the same compaction effort is applied. Same compaction effort is defined as the same type of equipment (make and model) making the same number of passes on both sides of the pipe. For multiple phases of backfill, a LOT shall not extend beyond the limits of the phase.

When placing backfill within a trench box, each lift of backfill is considered a LOT. Placement of backfill within a trench box limits will be considered a complete operation before trench box is moved for next backfill operation. When the trench box is moved for next backfill operation this will start new LOTs for each lift. Follow the density testing frequency in 125-9.3.1.

129-8.1.2 Equipment and Methods: Provide normal dewatering equipment including, but not limited to, surface pumps, sump pumps, wellpoints and header pipe and trenching/digging machinery. Provide normal dewatering methods including, but not limited to, constructing shallow surface drainage trenches/ditches, using sand blankets, perforated pipe drains, sumps, and siphons.

120-8.1.3 Backfill Materials: Backfill to the original ground surface or subgrade surface of openings made for structures, with a sufficient allowance for settlement. The Engineer may require that the material used for this backfill be obtained from a source entirely apart from the structure.

Do not allow heavy construction equipment to cross over culvert or storm sewer pipes until placing and compacting backfill material to the finished earthwork grade or to an elevation at least 4 feet above the crown of the pipe.

120-8.1.4 Use of A-7 Material: In the backfilling of trenches, A-7 material may be used from a point 12 inches above the top of the pipe up to the elevation shown in the Standard Plans as the elevation for undercutting of A-7 material.

120-8.1.5 Time of Placing Backfill: Do not place backfill against any masonry or concrete abutment, wingwall, or culvert until the Engineer has given permission to do so, and in no case until the masonry or concrete has been in place seven days or until the specified 28-day compressive strength occurs.

120-8.1.6 Placement and Compaction: Place the material in horizontal layers not exceeding 6 inches compacted thickness in depth above water level, behind abutments, wingwalls and end bents or end rest piers, under the haunches of the pipes, around box culverts, and all structures including pipe culverts. When the backfill material is deposited in water, compact as specified in 125-8.2.5 and 125-8.3.4.

120-8.1.6.1 Thick Lift Requirements: The Contractor may elect to place material in thicker lifts of no more than 12 inches compacted thickness above the Soil Envelope if the embankment material is classified as Group 1 in the table below. If the embankment material is classified as Group 2 in the table below and the Contractor chooses to place material in thicker lifts of no more than 12 inches compacted thickness above the soil envelope, then the Contractor must demonstrate with a successful test section that density can be achieved. Thick

lift around structures is only allowed above the soil envelope of the connecting pipe. Notify the Engineer in writing prior to beginning construction of a test section. Construct a test section of the length of one LOT. Perform five quality control tests at random locations within the test section. All five tests must meet the density required by 120-9.2. Identify the test section with the compaction effort and soil classification in the project's records. In case of a change in compaction effort or soil classification, construct a new test section. When a test fails the requirements of 120-9.2, construct a new test section. The Contractor may elect to place material in 6 inches compacted thickness at any time.

Table 120-2					
Group	AASHTO Soil Class	Maximum Lift Thickness		Thick Lift Control Test Section Requirements	
		Within Cover Zone	Above Soil Envelope	Within Cover Zone	Above Soil Envelope
1	A-3	6 inches	12 inches	N/A	Not Needed
	A-2-4 (No. 200 Sieve ≤ 15%)				
2	A-1	6 inches without control test section		N/A	Maximum of 12 inches per 120-7.2.1.2
	A-2-4 (No. 200 Sieve > 15%)				
	A-2-5, A-2-6, A-2-7, A-4, A-5, A-6				
	A-7 (Liquid Limit < 50)				

120-8.2 Additional Requirements for Structures Other than Pipe:

120-8.2.1 Density: Where the backfill material is deposited in water, obtain a 12 inch layer of comparatively dry material, thoroughly compacted by tamping, before the Engineer verifies layer and density requirements. Meet the requirements of the density Acceptance Criteria.

120-8.2.2 Box Culverts: For box culverts over which pavement is to be constructed, compact around the structure to an elevation not less than 12 inches above the top of the structure, using rapid-striking mechanical tampers.

120-8.2.3 Other Limited Areas: Compact in other limited areas using mechanical tampers or approved hand tampers, until the cover over the structure is at least 12 inches thick. When hand tampers are used, deposit the materials in layers not more than 4 inches thick using hand tampers suitable for this purpose with a face area of not more than 100 in². Take special precautions to prevent any wedging action against the masonry, and step or terrace the slope bounding the excavation for abutments and wingwalls if required by the Engineer.

120-8.2.4 Culverts and Piers: Backfill around culverts and piers on both sides simultaneously to approximately the same elevation.

120-8.2.5 Compaction Under Wet Conditions: Where wet conditions do not permit the use of mechanical tampers, compact using hand tampers. Use only A-3 material for the hand tamped portions of the backfill. When the backfill has reached an elevation and condition such as to make the use of the mechanical tampers practical, perform mechanical

tamping in such manner and to such extent as to transfer the compaction force into the sections previously tamped by hand.

120-8.3 Additional Requirements for Pipe Greater than 12 Inches Inside Diameter:

120-8.3.1 General: Trenches for pipe may have up to four zones that must be backfilled.

Lowest Zone: The lowest zone is backfilled for deep undercuts up to within 4 inches of the bottom of the pipe.

Bedding Zone: The zone above the Lowest Zone is the Bedding Zone. Usually, it will be the backfill which is the 4 inches of soil below the bottom of the pipe. When rock or other hard material has been removed to place the pipe, the Bedding Zone will be the 12 inches of soil below the bottom of the pipe.

Cover Zone: The next zone is the backfill that is placed after the pipe has been laid and will be called the Cover Zone. This zone extends to 12 inches above the top of the pipe. The Cover Zone and the Bedding Zone are considered the Soil Envelope for the pipe.

Top Zone: The Top Zone extends from 12 inches above the top of the pipe to the base or final grade.

120-8.3.2 Material:

120-8.3.2.1 Lowest Zone: Backfill areas undercut below the Bedding Zone of a pipe with coarse sand, or other suitable granular material, obtained from the grading operations on the project, or a commercial material if no suitable material is available.

120-8.3.2.2 Soil Envelope: In both the Bedding Zone and the Cover Zone of the pipe, backfill with materials classified as A-1, A-2, or A-3. Material classified as A-4 may be used if the pipe is concrete pipe.

120-8.3.2.3 Top Zone: Backfill the area of the trench above the soil envelope of the pipe with materials allowed on Standard Plans, Index 120-001.

120-8.3.3 Compaction:

120-8.3.3.1 Lowest Zone: Compact the soil in the Lowest Zone to approximately match the density of the soil in which the trench was cut.

120-8.3.3.2 Bedding Zone: If the trench was not undercut below the bottom of the pipe, loosen the soil in the bottom of the trench immediately below the approximate middle third of the outside diameter of the pipe.

If the trench was undercut, place the bedding material and leave it in a loose condition below the middle third of the outside diameter of the pipe. Compact the outer portions to meet the density requirements of the Acceptance Criteria. Place the material in lifts no greater than 6 inches (compacted thickness).

120-8.3.3.3 Cover Zone: Place the material in 6 inches layers (compacted thickness), evenly deposited on both sides of the pipe, and compact with mechanical tampers suitable for this purpose. Hand tamp material below the pipe haunch that cannot be reached by mechanical tampers. Meet the requirements of the density Acceptance Criteria.

120-8.3.3.4 Top Zone: Place the material in layers not to exceed 12 inches in compacted thickness. Meet the requirements of the density acceptance criteria.

120-8.3.4 Backfill Under Wet Conditions: Where wet conditions are such that dewatering by normal pumping methods would not be effective, the procedure outlined below may be used when specifically authorized by the Engineer in writing.

Granular material may be used below the elevation at which mechanical tampers would be effective, but only material classified as A-3. Place and compact the material

using timbers or hand tampers until the backfill reaches an elevation such that its moisture content will permit the use of mechanical tampers. When the backfill has reached such elevation, use normally acceptable backfill material. Compact the material using mechanical tampers in such manner and to such extent as to transfer the compacting force into the material previously tamped by hand.

The Engineer may permit the use of coarse aggregate below the elevation at which mechanical tampers would be effective. Use coarse aggregate from approved sources for Aggregate Size Number 89, 8, 78, 7, 68, 6, or 57. Place the coarse aggregate such that it will be stable and firm. Fully wrap the aggregate with an appropriate geosynthetic filter fabric, as specified by the Engineer. Do not place coarse aggregate within 4 feet of the ends of the trench or ditch. Use normally accepted backfill material at the ends.

120-9 Compaction Requirements.

120-9.1 Moisture Content: Compact the materials at a moisture content such that the specified density can be attained. If necessary, add water to the material, or lower the moisture content by manipulating the material or allowing it to dry, as is appropriate, to attain the specified density.

120-9.2 Compaction of Embankments:

120-9.2.1 Earthwork Category 1 and 2 Density Requirements: The Engineer will accept a minimum density of 95% of the maximum density as determined by FM 1-T099 for all earthwork items requiring densities.

120-9.2.2 Earthwork Category 3 Density Requirements: The Engineer will accept a minimum of 100% of the maximum density as determined by FM 1-T099 for all densities required under category 3. Except for embankments constructed by the hydraulic method as specified in 120-7.3, and for the material placed outside the standard minimum slope as specified in 120-7.2.4, and for other areas specifically excluded herein, compact each layer of the material used in the formation of embankments to the required density stated above. Uniformly compact each layer using equipment that will achieve the required density, and as compaction operations progress, shape and manipulate each layer as necessary to ensure uniform density throughout the embankment.

120-9.2.3 Compaction Over Unstable Foundations: Where the embankment material is deposited in water or on low swampy ground, and in a layer thicker than 12 inches (as provided in 120-7.2.2), compact the top 6 inches (compacted thickness) of such layer to the density as specified in 120-10.5.

120-9.2.4 Compaction Where Plastic Material Has Been Removed: Where unsuitable material is removed and the remaining surface is of soil classifications A-4, A-5, A-6, or A-7 per AASHTO M145, as determined by the Engineer, compact the surface of the excavated area by rolling with a sheepsfoot roller exerting a compression of at least 250 psi on the tamper feet, for the full width of the roadbed (subgrade and shoulders). Perform rolling before beginning any backfill and continue until the roller feet do not penetrate the surface more than 1 inch. Do not perform such rolling where the remaining surface is below the normal water table and covered with water. Vary the procedure and equipment required for this operation at the discretion of the Engineer.

120-9.2.5 Compaction for Pipes, Culverts, etc.: Compact the backfill of trenches to the densities specified for embankment or subgrade, as applicable, and in accordance with the requirements of this section.

Thoroughly compact embankments over and around pipes, culverts, and bridges in a manner which will not place undue stress on the structures, and in accordance with the requirements of this section.

120-9.2.6 Compaction of Grassed Shoulder Areas: For the upper 6-inch layer of all shoulders which are to be grassed, since no specific density is required, compact only to the extent needed for planting.

120-9.2.7 Compaction of Grassed Embankment Areas: For the outer layer of all embankments where plant growth will be established, do not compact. Leave this layer in a loose condition to a minimum depth of 6 inches for the subsequent seeding or planting operations.

120-9.3 Compaction of Subgrade: If the plans do not provide for stabilizing, compact the subgrade in both cuts and fills to the density specified in 120-10.5. For cut areas, determine Standard Proctor Maximum Density in accordance with FM 1-T099 at a frequency of one per mile or when there is a change in soil type, whichever occurs first. For undisturbed soils, do not apply density requirements where constructing paved shoulders is 5 feet or less in width.

Where trenches for widening strips are not of sufficient width to permit the use of standard compaction equipment, perform compaction using vibratory rollers, trench rollers, or other type compaction equipment approved by the Engineer.

Maintain the required density until the base or pavement is placed on the subgrade.

120-10 Acceptance Program.

120-10.1 Density over 105%: When a computed dry density results in a value greater than 105% of the applicable Proctor maximum dry density, the Engineer will perform a second density test within 5 feet. If the second density results in a value greater than 105%, investigate the compaction methods, examine the applicable Maximum Density and material description. If necessary, the Engineer will test an additional sample for acceptance in accordance with FM 1-T099.

120-10.2 Maximum Density Determination: The Engineer will determine the maximum density and optimum moisture content by sampling and testing the material in accordance with the specified test method listed in 120-10.3.

120-10.3 Density Testing Requirements: Compliance with the requirements of 120-10.5 will be determined in accordance FM 1-T 238. The in-place moisture content will be determined for each density in accordance with FM 5-507 (Determination of Moisture Content by Means of a Calcium Carbide Gas Pressure Moisture Tester), or ASTM D 4643 (Laboratory Determination of Moisture Content of Granular Soils by Use of a Microwave Oven).

120-10.4 Soil Classification and Organic Content: The Engineer will perform soil classification tests in accordance with AASHTO T88, T89, T90, and FM 1-T267. The Engineer will classify soils in accordance with AASHTO M-145 in order to determine compliance with embankment utilization requirements. The Engineer will verify the organic content test with the criteria specified in Standard Plans, Index 120-001.

120-10.5 Acceptance Criteria: The Engineer will accept a minimum density in accordance with 120-9.2 with the following exceptions:

- 1) embankment constructed by the hydraulic method as specified in 120-7.3;
- 2) material placed outside the standard minimum slope as specified in 120-7.2.4;
- 3) other areas specifically excluded herein.

120-10.6 Frequency: The Engineer will conduct sampling and testing at a minimum frequency listed in the table below.

Test Name	Frequency
Proctor Maximum Density	One per soil type
Density	1 per LOT (Alternate Lift)
Soil Classification and Organic Content	One per Maximum Density

120-11 Maintenance and Protection of Work.

While construction is in progress, always maintain adequate drainage for the roadbed. Maintain a shoulder at least 3 feet wide adjacent to all pavement or base construction to provide support for the edges.

Maintain and protect all earthwork construction throughout the life of the Contract and take all reasonable precautions to prevent loss of material from the roadway due to the action of wind or water. Repair any slides, washouts, settlement, subsidence, or other mishap which may occur prior to final acceptance of the work. Maintain all channels excavated as a part of the Contract work against natural shoaling or other encroachments to the lines and grades shown in the Plans, until final acceptance of the project.

120-12 Construction.

120-12.1 Construction Tolerances: Shape the surface of the earthwork to conform to the lines and grades shown in the Plans. In final shaping of the surface of earthwork, maintain a tolerance of 0.3 foot above or below the finished graded surface with the following exceptions:

1. Shape the surface of shoulders to within 0.1 foot of the finished graded surface.
2. Shape the earthwork to match adjacent pavement, curb, sidewalk, structures, etc.
3. Shape the bottom of ditches so that the ditch impounds no water.
4. When the work does not include construction of base or pavement, shape the entire roadbed (shoulder point to shoulder point) to within 0.1 foot above or below the Plan finished graded surface.

Ensure that the shoulder lines do not vary horizontally more than 0.3 foot from the true lines shown in the Plans.

120-12.2 Operations Adjacent to Pavement: Carefully dress areas adjacent to pavement areas to avoid damage to such pavement. Complete grassing of shoulder areas prior to placing the final wearing course. Do not manipulate any embankment material on a pavement surface.

When shoulder dressing is underway adjacent to a pavement lane being used to maintain traffic, exercise extreme care to avoid interference with the safe movement of traffic.

120-13 Method of Measurement.

120-13.1 Excavation: Excavation will be paid for by volume, in cubic yards, calculated by the method of average end areas, unless the Engineer determines that another method of calculation will provide a more accurate result. The material will be measured in its original position by field survey or by photogrammetric means as designated by the Engineer. Measurement for payment will include the excavation of unsuitable material, lateral ditch excavation, channel excavation, and excavation for structures and pipe. Payment will not be

made for excavation or embankment beyond the limits shown in the plans or authorized by the Engineer.

120-13.2 Embankment: Measurement will be made on a loose volume basis, as measured in trucks or other hauling equipment at the point of dumping on the road. Payment will not be made for embankment beyond the limits shown in the plans or authorized by the Engineer.

120-14 Basis of Payment.

120-14.1 General: Prices and payments for the work items included in this Section will be full compensation for all work described herein, including excavating, dredging, pumping, hauling, placing, and compacting; dressing the surface of the earthwork; and maintaining and protecting the complete earthwork.

120-14.2 Excavation: The total quantity of all excavation specified under this Section will be paid for at the Contract unit price for Excavation. No payment will be made for the excavation of any materials which are used for purposes other than those shown in the plans or designated by the Engineer. No payment will be made for materials excavated outside the lines and grades given by the Engineer, unless specifically authorized by the Engineer.

120-14.3 Embankment: The total quantity of embankment specified in this Section will be paid for at the Contract unit price for embankment. No payment will be made for materials which are used for purposes other than those shown in the plans or designated by the Engineer. No payment will be made for materials placed outside the lines and grades given by the Engineer.

334 ASPHALT CONCRETE FOR LAP (CLASS - D).
(REV 3-2-22) (FA 7-2-21) (FY 2023-24)

SECTION 334 is deleted and the following substituted:

SECTION 334
ASPHALT CONCRETE FOR LAP (OFF-SYSTEM)

334-1 Description.

334-1.1 General: Construct an Asphalt Concrete pavement based on the type of work specified in the Contract and the Asphalt Work Categories as defined below. Meet the applicable requirements for plants, equipment, and construction requirements as defined below. Use an asphalt concrete mix that meets the requirements of this specification.

334-1.2 Asphalt Work Mix Categories: Construction of Asphalt Concrete Pavement will fall into one of the following work categories:

334-1.2.1 Asphalt Work Category 1: Includes the construction of bike paths and miscellaneous asphalt.

334-1.2.2 Asphalt Work Category 2: Includes the construction of new turn lanes, paved shoulders and other non-mainline pavement locations.

334-1.2.3 Asphalt Work Category 3: Includes the construction of new mainline pavement lanes, milling and resurfacing.

334-1.3 Mix Types: Use the appropriate mix type as shown in Table 334-1.

Table 334-1 Mix Types			
Asphalt Work Category	Mix Types	Traffic Level	ESALs (millions)
1	Type SP-9.5 ⁽¹⁾	A	<0.3
2	Structural Mixes: Types SP-9.5 or SP-12.5 ⁽¹⁾ Friction Mixes: Types FC-9.5 or FC-12.5 ⁽¹⁾	B	0.3 to <3
3	Structural Mixes: Types SP-9.5 or SP-12.5 Friction Mixes: Types FC-9.5 or FC-12.5	C	≥3

(1) Equivalent mixes may be approved as determined by the Engineer. For example, Marshall S-III mixture type is equivalent to Superpave SP-9.5, Marshall S-I is equivalent to Superpave SP-12.5, and Marshall FC-3 is equivalent to Superpave FC-9.5.

For a Traffic Level A mixture, meet the mix design criteria for a Traffic Level B mixture and for a Traffic Level D mixture meet the mix design criteria for a Traffic Level E mixture.

At no additional cost to the Department, for a Type SP mix the following Traffic Level substitutions are allowed:

- Traffic Level E can be substituted for Traffic Level D.
- Traffic Level D or E can be substituted for Traffic Level C.
- Traffic Level C can be substituted for Traffic Level B.
- Traffic Level B or C can be substituted for Traffic Level A.

334-1.4 Gradation Classification: Asphalt concrete mixtures are classified as fine and are defined in Standard Specification 334-3.2.2.

The equivalent AASHTO nominal maximum aggregate size Superpave mixes are as follows:

Type SP-9.5, FC-9.5	9.5 mm
Type SP-12.5, FC-12.5	12.5 mm

334-1.5 Thickness: The total pavement thickness of the asphalt concrete pavement layers will be the plan thickness as shown in the Contract Documents. Before paving, propose a thickness for each individual layer meeting the requirements of this specification, which when combined with other layers (as applicable) will equal the plan thickness. For construction purposes, the plan thickness and individual layer thickness will be converted to spread rate using the following equation:

$$\text{Spread rate (lbs/yd}^2\text{)} = t \times G_{\text{mm}} \times 43.3$$

where: t = Thickness (in.) (Plan thickness or individual layer thickness)
 G_{mm} = Maximum specific gravity from the mix design

For target purposes only, spread rate calculations shall be rounded to the nearest whole number.

334-1.5.1 Layer Thicknesses: Unless otherwise called for in the Contract Documents, the allowable layer thicknesses for asphalt concrete mixtures are as follows:

Type SP-9.5, FC-9.5	1 to 1-1/2 inches
Type SP-12.5.....	1-1/2 to 3 inches
Type FC-12.5	1-1/2 to 2-1/2 inches

334-1.5.2 Additional Requirements: The following requirements also apply to asphalt Concrete mixtures:

1. When construction includes the paving of adjacent shoulders (less than or equal to 5 feet wide), the layer thickness for the upper pavement layer and shoulder shall be the same and paved in a single pass, unless otherwise called for in the Contract Documents.

2. For overbuild layers, use the minimum and maximum layer thicknesses as specified above unless called for differently in the Contract Documents. On variable thickness overbuild layers, the minimum and maximum allowable thicknesses will be as specified below, unless called for differently in the Contract Documents.

Type SP-9.5.....	3/8 to 2 inches
Type SP-12.5.....	1/2 to 3 inches
Type SP-19.0.....	1-1/2 to 4 inches

3. Variable thickness overbuild layers constructed using a Type SP-9.5 or SP-12.5 mixtures may be tapered to zero thickness provided the contract documents require a minimum of 1-1/2 inches of dense-graded mix placed over the variable thickness overbuild layer.

334-1.6 Weight of Mixture: The weight of the mixture shall be determined as provided in 320-3.2 of the Florida Department of Transportation (FDOT) specifications.

334-2 Materials.

334-2.1 Superpave Asphalt Binder: Unless specified elsewhere in the Contract Documents, use an asphalt binder grade as determined from Table 334-2. If the Contract calls for an alternative binder, meet the requirements of FDOT Specification 916.

334-2.2 Aggregate: Use aggregate capable of producing a quality pavement. Size, grade and combine the aggregate fractions to meet the grading and physical properties of the mix design. Aggregates from various sources may be combined.

For Type FC mixes, use an aggregate blend that consists of approved friction course aggregates that consists of crushed granite, crushed granitic gneiss, crushed limestone, crushed shell rock, or a combination of the above. As an exception, mixes that contain a minimum of 60% of approved friction course aggregates of crushed granite and/or crushed gneiss may either contain: up to 40% fine aggregate from other sources of aggregate not approved for friction courses or a combination of up to 20% RAP and the remaining fine aggregate from other sources of aggregate not approved for friction courses. Mixtures utilizing High Polymer (HP) binder are not allowed to contain RAP.

A list of aggregates approved for use in friction courses may be available on the FDOT's State Materials Office website. The URL for obtaining this information, if available, is: <https://mac.fdot.gov/>.

334-2.3 Reclaimed Asphalt Pavement (RAP) Material:

334-2.3.1 General requirements: RAP may be used as a component of the asphalt mixture subject to the following requirements:

1. Limit the amount of RAP material used in the mix to a maximum of 50% by weight of total aggregate.
2. Assume full responsibility for the design, production and construction of asphalt mixes which incorporate RAP as a component material.
3. Provide stockpiled RAP material that is reasonably consistent in characteristics and contains no aggregate particles which are soft or conglomerates of fines.
4. Provide RAP material having a minimum average asphalt content of 4.0% by weight of total mix. As an exception, when using fractionated RAP, the minimum average asphalt binder content for the coarse portion of the RAP shall be 2.5% by weight of the coarse portion of the RAP. The coarse portion of the RAP shall be the portion of the RAP retained on the No. 4 sieve. The Engineer may sample the stockpile to verify that this requirement is met.
4. When using RAP as a component material, prevent any oversized RAP from being incorporated into the completed mixture by the use of a grizzly or grid over the RAP bin; in-line roller or impact crusher; screen; or other suitable means. If oversized RAP material appears in the completed recycled mix, take the appropriate corrective action immediately. If the appropriate corrective actions are not immediately taken, stop plant operations.

334-2.3.2 Material Characterization: Assume responsibility for establishing the asphalt binder content, gradation, viscosity and bulk specific gravity (G_{sb}) of the RAP material based on a representative sampling of the material.

334-2.3.3 Asphalt Binder for Mixes with RAP: Select the appropriate asphalt binder grade based on Table 334-2

Table 334-2 Asphalt Binder Grade for Mixes Containing RAP	
Percent RAP	Asphalt Binder Grade
0 - 15	PG 67-22
16 - 30	PG 58-22
≥ 30	PG 52-28

334-3 Composition of Mixture.

334-3.1 General: Compose the asphalt mixture using a combination of aggregate (coarse, fine or mixtures thereof), mineral filler, if required, and asphalt binder material. Size, grade and combine the aggregate fractions to meet the grading and physical properties of the mix design. Aggregates from various sources may be combined.

334-3.2 Mix Design:

334-3.2.1 General: Design the asphalt mixture in accordance with AASHTO R 35, except as noted herein. Submit the proposed mix design with supporting test data indicating compliance with all mix design criteria to the Engineer. Prior to the production of any asphalt mixture, obtain the Engineer's conditional approval of the mix design. If required by the Engineer, send representative samples of all component materials, including asphalt binder to a laboratory designated by the Engineer for verification. As an exception to these requirements, use a currently approved FDOT Mix Design.

The Engineer will consider any marked variations from original test data for a mix design or any evidence of inadequate field performance of a mix design as sufficient evidence that the properties of the mix design have changed, and at his/her discretion, the Engineer may no longer allow the use of the mix design.

334-3.2.2 Mixture Gradation Requirements: Combine the coarse and fine aggregate in proportions that will produce an asphalt mixture meeting all of the requirements defined in this specification and conform to the gradation requirements at design as defined in AASHTO M 323. Aggregates from various sources may be combined.

334-3.2.2.1 Mixture Gradation Classification: Plot the combined mixture gradation on an FHWA 0.45 Power Gradation Chart. Include the Control Points from AASHTO M, as well as the Primary Control Sieve (PCS) Control Point from AASHTO M. Fine mixes are defined as having a gradation that passes above the primary control sieve control point and above the maximum density line for all sieve sizes smaller than the primary control sieve and larger than the No. 30 sieve. Use only fine mixes.

334-3.2.3 Gyratory Compaction: Compact the design mixture in accordance with AASHTO T 312, with the following exception: use the number of gyrations at N_{design} as defined in Standard Specification Table 334-4. Measure the inside diameter of gyratory molds in accordance with AASHTO T 312.

334-3.2.4 Design Criteria: Meet the requirements for nominal maximum aggregate size as defined in AASHTO M, as well as for relative density, VMA, VFA, and dust-to-binder ratio as specified in AASHTO M 323. N_{initial} and N_{maximum} requirements are not applicable.

334-3.2.5 Moisture Susceptibility:

1. For all traffic levels, use a liquid anti-strip agent listed on the APL at the specified dosage rate. Hydrated lime may be used instead of the liquid anti-strip agent.
2. Provide a mixture having a retained tensile strength ratio of at least 0.80 and a minimum tensile strength (unconditioned) of 100 psi in accordance with FM 1-T 283.

334-3.2.6 Additional Information: In addition to the requirements listed above, provide the following information on each mix design:

1. The design traffic level and the design number of gyrations (N_{design}).
2. The source and description of the materials to be used.
3. The Department source number and the FDOT product code of the aggregate components furnished from an FDOT approved source (if required).

4. The gradation and proportions of the raw materials as intended to be combined in the paving mixture. The gradation of the component materials shall be representative of the material at the time of use. Compensate for any change in aggregate gradation caused by handling and processing as necessary.

5. A single percentage of the combined mineral aggregate passing each specified sieve. Degradation of the aggregate due to processing (particularly material passing the No. 200 sieve) should be accounted for and identified.

6. The bulk specific gravity (G_{sb}) value for each individual aggregate and RAP component, as identified in the Department's aggregate control program.

7. A single percentage of asphalt binder by weight of total mix intended to be incorporated in the completed mixture, shown to the nearest 0.1%.

8. A target temperature for the mixture at the plant (mixing temperature) and a target temperature for the mixture at the roadway (compaction temperature). Do not exceed a target temperature of 340°F for High Polymer asphalt binders, 330°F for PG 76-22 asphalt binders, and 315°F for unmodified asphalt binders.

9. Provide the physical properties at the optimum asphalt content, which must conform to all specified requirements.

10. The name of the Construction Training Qualification Program (CTQP) mix designer.

11. The ignition oven and maximum specific gravity (G_{mm}) calibration factors.

12. The warm mix technology, if used.

334-4 Producer Process Control (PC).

Assume full responsibility for controlling all operations and processes such that the requirements of these Specifications are met at all times. Perform any tests necessary at the plant and roadway for process control purposes.

334-5 General Construction Requirements.

334-5.1 Weather Limitations: Do not transport asphalt mix from the plant to the roadway unless all weather conditions are suitable for the laying operations.

334-5.2 Limitations of Paving Operations:

334-5.2.1 General: Place the mixture only when the surface upon which it is to be placed has been previously prepared, is intact, firm, dry, clean, and the tack or prime coat, with acceptable spread rate, is properly broken or cured. Do not place friction course until the adjacent shoulder area has been dressed and grassed.

334-5.2.2 Ambient Air Temperature: Place the mixture only when the air temperature in the shade and away from artificial heat meets the requirements of Table 334-3. The minimum ambient temperature requirement may be reduced by 5°F when using warm mix technology, if mutually agreed to by both the Engineer and the Contractor.

Table 334-3 Ambient Air Temperature Requirements for Paving	
Layer Thickness or Asphalt Binder Type	Minimum Temperature (°F)
≤ 1 inch	50
Any mixture > 1 inch containing a PG asphalt binder with a high temperature designation ≥ 76°C	45
Any mixture > 1 inch containing a PG asphalt binder with a high temperature designation < 76°C	40
FC-5 ⁽¹⁾	65
⁽¹⁾ As an exception, place the mixture at temperatures no lower than 60°F, only when approved by the Engineer based on the Contractor's demonstrated ability to achieve a satisfactory surface texture and appearance of the finished surface. For mixtures containing PG 76-22 binder, the minimum ambient temperature may be further reduced to 55°F when using warm mix technology, if agreed to by both the Engineer and the Contractor.	

334-5.3 Mix Temperature: Heat and combine the ingredients of the mix in such a manner as to produce a mixture with a temperature at the plant and at the roadway, within a range of plus or minus 30°F from the target temperature as shown on the mix design. Reject all loads outside of this range. Reject any load or portion of a load of asphalt mix at the plant or at the roadway with a temperature outside of its respective master range shown in Table 334-4. Notify the Engineer of the rejection immediately.

Table 334-4 Mix Temperature Master Range Tolerance	
Location	Acceptable Temperature Tolerance
Plant	Mixing Temperature ±30 F
Roadway (mix in truck)	Compaction Temperature ±30°F

334-5.4 Transportation of the Mixture: Transport the mixture in trucks of tight construction, which prevents the loss of material and the excessive loss of heat and previously cleaned of all foreign material. After cleaning, thinly coat the inside surface of the truck bodies with soapy water or an asphalt release agent as needed to prevent the mixture from adhering to the beds. Do not allow excess liquid to pond in the truck body. Do not use a release agent that will contaminate, degrade, or alter the characteristics of the asphalt mix or is hazardous or detrimental to the environment. Petroleum derivatives (such as diesel fuel), solvents, and any product that dissolves asphalt are prohibited. Provide each truck with a tarpaulin or other waterproof cover mounted in such a manner that it can cover the entire load when required. When in place, overlap the waterproof cover on all sides so that it can be tied down. Cover each load during cool and cloudy weather and at any time it appears rain is likely during transit with a tarpaulin or waterproof cover. Cover and tie down all loads of friction course mixtures.

334-5.5 Surface Preparation:

334-5.5.1 Cleaning: Before placing the mixture, clean the surface of the base or underlying pavement of all loose and deleterious material by the use of power brooms or blowers, supplemented by hand brooming where necessary.

334-5.5.2 Patching and Leveling Courses: As shown in the plans, bring the existing surface to proper grade and cross-section by the application of patching or leveling courses.

334-5.5.3 Application over Surface Treatment: Where an asphalt mix is to be placed over a surface treatment, sweep and dispose of all loose material from the paving area.

334-5.5.4 Tack Coat: Use a rate of application as defined in Table 334-5. Control application rate within plus or minus 0.01 gallon per square yard of the target application rate. The target application rate may be adjusted by the Engineer to meet specific field conditions. Determine the rate of application as needed to control the operation. When using PG 52-28, multiply the target rate of application by 0.6.

Table 300-2 Tack Coat Application Rates		
Asphalt Mixture Type	Underlying Pavement Surface	Target Tack Rate (gal/yd ²) ¹
Base Course, Structural Course, Dense-Graded Friction Course, Open-Graded Friction Course	Newly Constructed Asphalt Layers	0.06
	Milled Asphalt Pavement Surface, Oxidized and Cracked Asphalt Pavement, Concrete Pavement	0.09
Note 1: Target tack application rates greater than those specified may be used upon approval of the Engineer.		

When using a meter to control the tack or prime application rate, manually measure the volume in the tank at the beginning and end of the application area for a specific target application rate. Perform this operation at a minimum frequency of once per production shift. Resolve any differences between the manually measured method and the meter to ensure the target application rate is met in accordance with this Section. Adjust the application rate if the manually measured application rate is greater than plus or minus 0.01 gallons per square yard when compared to the target application rate.

334-5.5.5 Curing and Time of Application: Apply tack coat sufficiently in advance of placing bituminous mix to permit drying, but do not apply tack coat so far in advance that it might lose its adhesiveness as a result of being covered with dust or other foreign material.

334-5.5.6 Protection: Keep the tack coat surface free from traffic until the subsequent layer of bituminous hot mix has been laid.

334-6 Placing Mixture:

334-6.1 Alignment of Edges: Place all asphalt mixtures by the stringline method to obtain an accurate, uniform alignment of the pavement edge. As an exception, pavement edges adjacent to curb and gutter or other true edges do not require a stringline. Control the unsupported pavement edge to ensure that it will not deviate from the stringline more than plus or minus 1.5 inches.

334-6.2 Rain and Surface Conditions: Immediately cease transportation of asphalt mixtures from the plant when rain begins at the roadway. Do not place asphalt mixtures while rain is falling, or when there is water on the surface to be covered. Once the rain has stopped, standing water has been removed from the tacked surface to the satisfaction of the Engineer, and

the temperature of the mixture caught in transit still meets the requirements as specified in 334-5.3, the Contractor may then place the mixture caught in transit.

334-6.3 Checking Depth of Layer: Check the depth of each layer at frequent intervals to ensure a uniform spread rate that will meet the requirements of the Contract.

334-6.4 Hand Work: In limited areas where the use of the paver is impossible or impracticable, the Contractor may place the mixture by hand.

334-6.5 Spreading and Finishing: Upon arrival, dump the mixture in the approved paver, and immediately spread and strike-off the mixture to the full width required, and to such loose depth for each course that, when the work is completed, the required weight of mixture per square yard, or the specified thickness, is secured. Carry a uniform amount of mixture ahead of the screed at all times.

334-6.6 Thickness Control: Ensure the spread rate is within 5% of the target spread rate, as indicated in the Contract. When determining the spread rate, use, at a minimum, an average of five truckloads of mix and at a maximum, an average of 10 truckloads of mix. When the average spread rate is beyond plus or minus 5% of the target spread rate, monitor the thickness of the pavement layer closely and adjust the construction operations.

When the average spread rate for two consecutive days is beyond plus or minus 5% of the target spread, stop the construction operation at any time until the issue is resolved.

The Engineer will allow a maximum deficiency from the specified spread rate for the total thickness as follows:

1. For pavement of a specified thickness of 2-1/2 inches or more: 50 pounds per square yard.
2. For pavement of a specified thickness of less than 2-1/2 inches: 25 pounds per square yard.

Address the unacceptable pavement in accordance with 334-5.10.4, unless an alternative approach is agreed upon by the Engineer.

334-6.7 Leveling Courses:

334-6.7.1 Patching Depressions: Before spreading any leveling course, fill all depressions in the existing surface as shown in the plans.

334-6.7.2 Spreading Leveling Courses: Place all courses of leveling with an asphalt paver or by the use of two motor graders, one being equipped with a spreader box. Other types of leveling devices may be used upon approval by the Engineer.

334-6.7.3 Rate of Application: When using Type SP-9.5 (fine graded) for leveling, do not allow the average spread of a layer to be less than 50 pounds per square yard or more than 75 pounds per square yard. The quantity of mix for leveling shown in the plans represents the average for the entire project; however, the Contractor may vary the rate of application throughout the project as directed by the Engineer. When leveling in connection with base widening, the Engineer may require placing all the leveling mix prior to the widening operation.

334-6.8 Compaction: For each paving or leveling train in operation, furnish a separate set of rollers, with their operators.

When density testing for acceptance is required, select equipment, sequence, and coverages of rolling to meet the specified density requirement. Regardless of the rolling procedure used, complete the final rolling before the surface temperature of the pavement drops

to the extent that effective compaction may not be achieved or the rollers begin to damage the pavement.

No vibratory compaction in the vertical direction will be allowed for layers one inch or less in thickness or, if the Engineer or Contract Documents limit compaction to the static mode only. Compact these layers in the static mode only. Other non-vertical vibratory modes of compaction will be allowed, if approved by the Engineer; however, no additional compensation, cost or time, will be made.

When density testing for acceptance is not required, use a rolling pattern approved by the Engineer.

Use hand tamps or other satisfactory means to compact areas which are inaccessible to a roller, such as areas adjacent to curbs, headers, gutters, bridges, manholes, etc.

334-6.9 Joints.

334-6.9.1 Transverse Joints: Construct smooth transverse joints, which are within 3/16 inch of a true longitudinal profile when measured with a 15 foot manual straightedge. The Engineer may waive straightedge requirements for transverse joints at the beginning and end of the project, at the beginning and end of bridge structures, at manholes, and at utility structures if the deficiencies are caused by factors beyond the control of the Contractor such as no milling requirement, as determined by the Engineer. When smoothness requirements are waived, construct a reasonably smooth transitional joint.

334-6.9.2 Longitudinal Joints: Place each layer of pavement so all longitudinal construction joints are offset 6 to 12 inches laterally between successive layers. Plan offsets in advance so the longitudinal joints of the friction course are not in wheel path areas. The longitudinal joints for friction course layers should be within 6 inches of the lane edge or at the center of the lane. The Engineer may waive these requirements where offsetting is not feasible due to the sequence of construction.

334-6.10 Surface Requirements: Construct a smooth pavement with good surface texture and the proper cross-slope.

334-6.10.1 Texture of the Finished Surface of Paving Layers: Produce a finished surface of uniform texture and compaction with no pulled, torn, raveled, crushed or loosened portions and free of segregation, bleeding, flushing, sand streaks, sand spots, or ripples. Correct any area of the surface that does not meet the foregoing requirements in accordance with 334-6.10.4.

334-6.10.2 Cross Slope: Construct a pavement surface with cross slopes in compliance with the requirements of the Contract Documents. Furnish a four-foot-long electronic level accurate to 0.1 degree, approved by the Engineer for the control of cross slope. Make this electronic level available at the jobsite at all times during paving operations.

334-6.10.3 Pavement Smoothness: Construct a smooth pavement meeting the requirements of this Specification. Furnish a 15 foot manual and a 15 foot rolling straightedge meeting the requirements of FM 5-509. Obtain a smooth surface on all pavement courses placed, and then straightedge all layers as required by this Specification.

334-6.10.3.1 Straightedge Testing:

334-6.10.3.1.1 Acceptance Testing: Using a rolling straightedge, test the final (top) layer of the pavement. Test all pavement lanes where the width is constant using a rolling straightedge and document all deficiencies on a form approved by the Engineer. Notify the Engineer of the location and time of all straightedge testing a minimum of 48 hours before beginning testing.

334-6.10.3.1.2 Final (Top) Pavement Layer: At the completion of all paving operations, straightedge the final (top) layer either behind the final roller of the paving train or as a separate operation. Address all deficiencies in excess of 3/16 inch in accordance with 334-5.10.4, unless waived by the Engineer. Retest all corrected areas.

334-6.10.3.1.3 Straightedge Exceptions: Straightedge testing will not be required in the following areas: shoulders, intersections, tapers, crossovers, sidewalks, bicycle/shared use paths, parking lots and similar areas, or in the following areas when they are less than 250 feet in length: turn lanes, acceleration/deceleration lanes and side streets. The limits of the intersection will be from stop bar to stop bar for both the mainline and side streets.

As an exception, in the event the Engineer identifies an objectional surface irregularity in the above areas, straightedge and address all deficiencies in excess of 3/8 inch in accordance with 334-5.10.4.

334-6.10.4 Correcting Unacceptable Pavement: Correct deficiencies in the pavement layer by removing and replacing the full depth of the layer, extending a minimum of 50 feet on both sides (where possible) of the defective area for the full width of the paving lane, at no additional cost.

334-7 Acceptance of the Mixture.

334-7.1 General: The asphalt mixture will be accepted based on the Asphalt Work Category as defined below:

1. Asphalt Work Category 1 – Certification by the Contractor as defined in 334-7.2.

2. Asphalt Work Category 2 – Certification and process control testing by the Contractor as defined in 334-7.3

3. Asphalt Work Category 3 – Process control testing by the Contractor and acceptance testing by the Engineer as defined in 334-7.4.

334-7.2 Certification by the Contractor: On Asphalt Work Category 1 construction, the Engineer will accept the mix on the basis of visual inspection. Submit a Notarized Certification of Specification Compliance letter on company letterhead to the Engineer stating that all material produced and placed on the project meets the requirements of the Specifications. The Engineer may run independent tests to determine the acceptability of the material.

334-7.3 Certification and Process Control Testing by the Contractor: On Asphalt Work Category 2 construction, submit a Notarized Certification of Specification Compliance letter on company letterhead to the Engineer stating that all material produced and placed on the project meets the requirements of the Specifications, along with supporting test data documenting all process control testing as described in 334-6.3.1. If required by the Contract, utilize an Independent Laboratory as approved by the Engineer for the process control testing. The mix will also require visual acceptance by the Engineer. In addition, the Engineer may run independent tests to determine the acceptability of the material. Material failing to meet these acceptance criteria will be addressed as directed by the Engineer such as but not limited to acceptance at reduced pay, delineation testing to determine the limits of the questionable material, removal and replacement at no cost to the agency, or performing an Engineering analysis to determine the final disposition of the material.

334-7.3.1 Process Control Sampling and Testing Requirements: Perform process control testing at a frequency of once per day. Obtain the samples in accordance with FDOT Method FM 1-T 168. Test the mixture at the plant for gradation (P₈ and P₂₀₀) and asphalt

binder content (P_b). Measure the roadway density with 6 inch diameter roadway cores at a minimum frequency of once per 1,500 feet of pavement with a minimum of three cores per day.

Determine the asphalt binder content of the mixture in accordance with FM 5-563. Determine the gradation of the recovered aggregate in accordance with FM 1-T 030. Determine the roadway density in accordance with FM 1-T 166. The minimum roadway density will be based on the percent of the maximum specific gravity (G_{mm}) from the approved mix design. If the Contractor or Engineer suspects that the mix design G_{mm} is no longer representative of the asphalt mixture being produced, then a new G_{mm} value will be determined from plant-produced mix with the approval of the Engineer. Roadway density testing will not be required in certain situations as described in 334-7.4.1. Assure that the asphalt binder content, gradation and density test results meet the criteria in Table 334-6.

Table 334-6 Process Control and Acceptance Values	
Characteristic	Tolerance
Asphalt Binder Content (percent)	Target ± 0.55
Passing No. 8 Sieve (percent)	Target ± 6.00
Passing No. 200 Sieve (percent)	Target ± 1.50
Roadway Density (daily average)	Minimum 91.5% of G_{mm}
Roadway Density (any single core)	Minimum 88.0 % of G_{mm}

334-7.4 Process Control Testing by the Contractor and Acceptance Testing by the Engineer: On Asphalt Work Category 3, perform process control testing as described in 334-6.3.1. In addition, the Engineer will accept the mixture at the plant with respect to gradation (P_{80} and P_{200}) and asphalt binder content (P_b). The mixture will be accepted on the roadway with respect to density. The Engineer will sample and test the material as described in 334-7.3.1. The Engineer will randomly obtain at least one set of samples per day. Assure that the asphalt content, gradation and density test results meet the criteria in Table 334-6. Material failing to meet these acceptance criteria will be addressed as directed by the Engineer such as but not limited to acceptance at reduced pay, delineation testing to determine the limits of the questionable material, removal and replacement at no cost to the agency, or performing an Engineering analysis to determine the final disposition of the material.

334-7.4.1 Acceptance Testing Exceptions: When the total quantity of any mix type in the project is less than 500 tons, the Engineer will accept the mix on the basis of visual inspection. The Engineer may run independent tests to determine the acceptability of the material.

Density testing for acceptance will not be performed on widening strips or shoulders with a width of 5 feet or less, open-graded friction courses, variable thickness overbuild courses, leveling courses, any asphalt layer placed on subgrade (regardless of type), miscellaneous asphalt pavement, bike/shared use paths, crossovers, gore areas, or any course with a specified thickness less than 1 inch or a specified spread rate less than 100 lb per square yard. Density testing for acceptance will not be performed on asphalt courses placed on bridge decks or approach slabs; compact these courses in static mode only. In addition, density testing for acceptance will not be performed on the following areas when they are less than 500 feet (continuous) in length: turning lanes, acceleration lanes, deceleration lanes, shoulders, parallel parking lanes, or ramps. Do not perform density testing for acceptance in situations where the

area requiring density testing is less than 50 tons. Density testing for acceptance will not be performed in intersections. The limits of the intersection will be from stop bar to stop bar for both the mainline and side streets. A random core location that occurs within the intersection shall be moved forward or backward from the intersection at the direction of the Engineer. Compact these courses in accordance with a standard rolling procedure approved by the Engineer. In the event that the rolling procedure deviates from the approved procedure, placement of the mix will be stopped.

334-8 Method of Measurement.

For the work specified under this Section, the quantity to be paid for will be the weight of the mixture, in tons.

The bid price for the asphalt mix will include the cost of the liquid asphalt and the tack coat application as specified in 334-5.5.4. There will be no separate payment or unit price adjustment for the asphalt binder material in the asphalt mix.

334-9 Basis of Payment.

334-.1 General: Price and payment will be full compensation for all the work specified under this Section.

344 CONCRETE FOR LOCAL AGENCY PROGRAM (LAP) (CLASS - D).
(REV 6-9-2021) (FA 7-2-21) (FY 2023-24)

SECTION 344 is deleted and the following substituted:

SECTION 344
CONCRETE FOR LAP (OFF-SYSTEM)

344-1 Description.

344-1 General: Construct concrete structures and other concrete members, based on the type of work as described in the Contract Documents and the concrete work categories as defined below.

344-1.2 Work Categories: Construction will fall into one of the following concrete work categories:

344-1.2.1 Concrete Work Category 1: Includes the construction of cast-in-place nonstructural concrete; including sidewalks, curb and gutter, ditch and slope pavement, or other non-reinforced cast-in-place elements.

344-1.2.2 Concrete Work Category 2: Includes the construction of precast and prestressed concrete products.

344-1.2.2.1 Precast Concrete Drainage Structures: Includes but are not limited to reinforced and non-reinforced concrete pipes, french drains, underdrains, inlets, manholes, junction boxes, endwalls, pipe culverts, storm sewers, and box culverts.

344-1.2.2.1 Incidental Precast/Prestressed Concrete Structures: Includes the fabrication, storage, transportation, and erection of prestressed concrete poles, concrete bases for light poles, highway sign foundations, retaining wall systems, traffic separators, sound barriers or other structural precast elements.

344-1.2.3 Concrete Work Category 3: Includes the work associated with the placement and/or construction of structural cast-in-place concrete meeting the requirements of this section.

344-2 Materials.

344-2.1 General: Use concrete composed of a mixture of portland cement, aggregates, and water, with or without chemical or mineral admixtures and supplementary cementitious materials that meet the following requirements:

344-2.1.1 Portland Cement: Portland cements meeting the requirements of AASHTO M 85 or ASTM C150 is required. Different brands of cement, cement of the same brand from different facilities or different types of cement shall be stored separately and shall not be mixed.

344-2.1.2 Coarse and Fine Aggregates: Aggregates shall meet ASTM C33.

344-2.1.3 Water: Water shall meet the requirements of ASTM C 1602.

344-2.1.4 Chemical Admixtures: Use chemical admixtures shall be listed on the FDOT Approved Products List (APL). Admixtures may be added at the dosage rates recommended by the manufacturer.

344-2.1.5 Types of Cement: Unless a specific type of cement is designated in the Contract Documents, use Type I, Type IL, Type IP, Type IS, Type II, Type II (MH) or Type III cement in all classes of concrete. Use Type IL or Type II (MH) for all mass concrete elements.

344-2.1.6 Supplementary Cementitious Materials: Supplementary Cementitious Materials shall meet the requirements of ASTM C618 and ASTM C 989, respectively. Fly ash shall not include the residue resulting from the burning of municipal garbage or any other refuse with coal, or the burning of industrial or municipal garbage in incinerators.

344-3 Production, Mixing and Delivery of Concrete.

344-3.1 Concrete Production Requirements:

344-3.1.1 Category 1: Use a concrete production facility that is certified by the National Ready Mixed Concrete Association (NRMCA) or listed on the FDOT list of non-structural concrete producers. Concrete production facilities listed on the FDOT Producers with Accepted QC Programs list for structural concrete may also be used for Category 1.

344-3.1.2 Category 2: Obtain precast concrete products from plants that are currently on the FDOT's Production Facility Listing for the types of products that they are producing.

344-3.1.3 Category 3: Obtain structural concrete from a plant that is currently on the FDOT's Production Facility Listing for structural concrete.

344-3.2 Classes of Concrete: Meet the requirements of Table 344-1.

Table 344-1 Master Proportion Table ⁽⁷⁾				
Class of Concrete	28-day Specified Minimum Compressive Strength (f _c ') (psi)	Maximum Water to Cementitious Materials Ratio (pounds per pounds)	Minimum Total Cementitious Materials Content (lb/yd ³)	Target Slump Value (inches) ⁽³⁾
Category 1				
Class NS	2,500	N/A	N/A	N/A
Category 3				
I ⁽¹⁾	3,000	0.53	470	3 ⁽²⁾
I (Pavement)	3,000	0.50	470	1.5 or 3 ⁽⁵⁾
II ⁽¹⁾	3,400	0.53	470	3 ⁽²⁾
II (Bridge Deck)	4,500	0.44	600 ⁽⁸⁾	3 ⁽²⁾
III ⁽⁴⁾	5,000	0.44	600 ⁽⁸⁾	3 ⁽²⁾
III (Seal)	3,000	0.53	600 ⁽⁸⁾	8
IV	5,500	0.41 ⁽⁶⁾	600 ⁽⁸⁾	3 ⁽²⁾
IV (Drilled Shaft)	4,000	0.41	600 ⁽⁸⁾	8.5
V (Special)	6,000	0.37 ⁽⁶⁾	600 ⁽⁸⁾	3 ⁽²⁾
V	6,500	0.37 ⁽⁶⁾	600 ⁽⁸⁾	3 ⁽²⁾
VI	8,500	0.37 ⁽⁶⁾	600 ⁽⁸⁾	3 ⁽²⁾
VII	10,000	0.37 ⁽⁶⁾	600 ⁽⁸⁾	3 ⁽²⁾

Notes:

- (1) For precast three-sided culverts, box culverts, endwalls, inlets, manholes and junction boxes, the target slump value and air content will not apply. The maximum allowable slump is 6 inches, except as noted in (2). The Contractor is permitted to use concrete meeting the requirements of ASTM C478 (4,000 psi) in lieu of the specified Class I or Class II concrete for precast endwalls, inlets, manholes and junction boxes.
- (2) The Engineer may allow a maximum target slump of 7 inches when a Type F, G, I or II admixture is used. When flowing concrete is used, meet the requirements of Section 8.6 of the FDOT Materials Manual.
- (3) For a reduction in the target slump for slip-form operations, submit a revision to the mix design to the Engineer. The target slump for slip-form mix is 1.50 inches.
- (4) When precast three-sided culverts, box culverts, endwalls, inlets, manholes or junction boxes require a Class III concrete, the minimum cementitious materials content is 470 pounds per cubic yard. Do not apply the air content range and the maximum target slump shall be 6 inches, except as allowed in (2).
- (5) Meet the requirements of Section 350 of FDOT Specifications.
- (6) When silica fume or metakaolin is required, the maximum water to cementitious material ratio will be 0.35. When ultrafine fly ash is used, the maximum water to cementitious material ratio will be 0.30.
- (7) Tolerance for slump is ± 1.5 inches and Air Content range is 0.0% to 6.0%.
- (8) The minimum total amount of cementitious materials content of 600 pounds per cubic yard is required for extremely aggressive environment. For moderately and slightly aggressive environments, the required amounts are 550 lb/yd³ and 510 lb/yd³, respectively.

344-3.3 Contractors Quality Control: For Categories 1 and 2, assume full responsibility for controlling all operations and processes such that the requirements of these Specifications are always met.

For Category 3, furnish a Quality Control (QC) plan to identify to the Engineer how quality will be ensured at the project site. During random inspections, the Engineer will use this document to verify that the construction of the project agrees with the QC plan.

344-3.4 Concrete Mix Design: Before producing any Category 1 or Category 2 concrete, submit the proposed mix designs to the Engineer. For Category 3, submit to the Engineer for approval, FDOT approved mix designs. Do not use concrete mix designs without prior approval of the Engineer.

Materials may be adjusted provided that the theoretical yield requirement of the approved mix design is met. Show all required original approved design mix data and batch adjustments on an Engineer approved concrete delivery ticket.

344-3.5 Delivery: For Category 3, the maximum allowable transit time of concrete is 90 minutes. For critical placements, with the Engineer's approval, the transit time may be extended to the allowable mixing time shown in the mix design.

Furnish a delivery ticket on a form approved by the Engineer with each batch of concrete before unloading at the placement site. Record material quantities incorporated into the mix on the delivery ticket. Ensure that the Batchers responsible for producing the concrete signs the delivery ticket certifying that the batch was produced and delivered in accordance with these requirements. Sign the delivery ticket certifying that the concrete was placed in accordance with these requirements.

344-3.6 Placing Concrete:

344-3.6.1 Concreting in Cold Weather: Do not mix or place concrete when the air temperature at placement is below 40°F.

During the curing period, if the National Oceanic and Atmospheric Administration (NOAA) predicts the ambient temperature to fall below 35°F for 12 hours or more or to fall below 30°F for more than 4 hours, enclose the structure in such a way that the air temperature within the enclosure can be kept above 50°F for a period of 3 days after placing the concrete or until the concrete reaches a minimum compressive strength of 1,500 psi.

Assume all risks connected with the placing and curing of concrete.

Although the Engineer may give permission to place concrete, the Contractor is responsible for satisfactory results. If the placed concrete is determined to be unsatisfactory, remove, dispose of, and replace the concrete at no expense to the Agency.

344-3.6.2 Concreting in Hot Weather: For Category 3, hot weather concreting is defined as the production, placing and curing of concrete when the concrete temperature at placing exceeds 86°F but is less than 100°F.

Spray reinforcing bars and metal forms with cool fresh water just prior to placing the concrete in a method approved by the Engineer.

Assume all risks associated with the placing and curing of concrete.

Although the Engineer may give permission to place concrete, the Contractor is responsible for satisfactory results. If the placed concrete is determined to be unsatisfactory, remove, dispose of, and replace the concrete at no expense to the Agency.

Unless the specified hot weather concreting measures are in effect, reject concrete exceeding 85°F at the time of placement. Regardless of special measures taken, reject concrete exceeding 100°F. Predict the concrete temperatures at placement time and implement hot weather measures to avoid production shutdown.

344-3.7 Mixers: For Category 3 concrete, do not place concrete from a truck mixer that does not have a current FDOT mixer identification card.

344-3.8 Small Quantities of Concrete: With approval of the Engineer, small quantities of concrete, less than 3 cubic yards placed in one day and less than 0.5 cubic yards placed in a single placement may be accepted using a pre-bagged mixture. The Engineer may verify that the pre-bagged mixture is prepared in accordance with the manufacturer's recommendations and will meet the requirements of this Specification.

344-3.9 Sampling and Testing:

344-3.9.1 Category 1: The Engineer may sample and test the concrete to verify its quality. The minimum 28 day compressive strength requirement for this concrete is 2,500 psi.

344-3.9.2: Category 2: No sampling and testing is required by the Engineer for category 2.

344-3.9.3 Category 3: The Engineer will randomly select a sample from each LOT to determine its plastic properties and to make three 4 x 8 inch cylinders for testing by the Engineer at 28 days to ensure that the design compressive strength has been met for the class of concrete as specified in Table 344-1. A LOT is defined as the concrete placement of 200 cubic yards or one day's production, whichever is less.

344-3.10 Records: Ensure the following records are available for review for at least 3 years after final acceptance of the project:

1. Accepted concrete Plant QC Plan.
2. Approved concrete mix designs.
3. Materials source (delivery tickets, certifications, certified mill test reports).

4. A copy of the scale company or testing agency report showing the signature of the scale company representative, date of inspection, observed deviations from quantities checked during calibration of the scales and meters.

5. A copy of the documentation certifying the admixture weighing/measuring devices.

6. Aggregate moisture control records including date and time of test.

7. Manufacturer's mixer information.

8. Certification documents for admixture weighing and measuring dispensers.

9. A daily record of all concrete batched for delivery to the projects, including respective mix design numbers and quantities of batched concrete.

344-4 Acceptance of the Work.

344-4.1 Category 1 Work: Category 1 work will be accepted based on certification by the batcher and contractor on the delivery ticket.

344-4.2 Category 2 Work: Certify that the precast elements were produced by production facilities that are currently on the FDOT's Production Facility Listing for the types of products that they are producing. In addition, the producer's logo shall be stamped on the element. The producer shall not use the Florida Department of Transportation QC stamp on elements used on this project. Provide a statement of certification from the manufacturer of the precast element that the element meets the requirements of this Specification.

344-4.3 Category 3 Work: Category 3 concrete will be accepted based on the Engineer's test results for plastic properties and compressive strength requirements for the class of concrete as defined in Table 344-2. In addition, a Delivery Ticket as described in 344-3.5 will be required for acceptance of the material at the project site.

344-4.4 Small Quantities of Concrete: Category 3 concrete meeting the definition of 344-3.8 will be accepted in accordance with 344-4.3 based on test results for plastic properties and compressive strength.

344-5 Method of Measurement.

The quantities to be paid for will be the items shown in the plans, completed and accepted.

344-6 Basis of Payment.

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



SECTION 01000 - GENERAL REQUIREMENTS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work: The work to be done consists of the furnishing of all labor, materials and equipment, and the performance of all work included in this Contract. The summary of the Work is presented in Section SC01010: Summary of Project.

B. Work Included:

1. The Contractor shall furnish all labor, superintendence, materials, plant power, light, heat, fuel, water, tools, appliances, equipment, supplies, and means of construction necessary for proper performance and completion of the work. The Contractor shall perform and complete the work in the manner best calculated to promote rapid construction consistent with safety of life and property and to the satisfaction of the Consultant, and in strict accordance with the Contract Documents. The Contractor shall clean up the work and maintain it during and after construction, until accepted, and shall do all work and pay all costs incidental thereto. The CONTRACTOR shall repair or restore all structures and property that may be damaged or disturbed during performance of the work.
2. The cost of incidental work described in these Contract Requirements, for which there are no specific Contract Items, shall be considered as part of the general cost of doing the work and shall be included in the prices for the various Contract Items. No additional payment will be made aforementioned incidental work.
3. The Contractor shall provide and maintain such modern plant, tools, and equipment as may be necessary, in the opinion of the Consultant, to perform in a satisfactory and acceptable manner all the work required by this Contract. Only equipment of established reputation and proven efficiency shall be used. The Contractor shall be solely responsible for the adequacy of its workmanship, materials, and equipment.

1.02 CONTRACT DOCUMENTS

A. The Technical Specifications consist of three (3) parts: General, Products and Execution. The General part of a Specification contains General Requirements which govern the work. Products and Execution Parts modify and supplement the General Requirements by detailed requirements for the work and shall always govern whenever there appears to be a conflict.

B. Intent:

1. Work not specified in the Specifications, but involved in carrying out their intent or in the complete and proper execution of the work, is required and shall be performed by the Contractor as though it were specifically delineated or described.
2. The silence of the Specifications as to any detail, or the omission from them of a detailed description concerning any work to be done and materials to be furnished, shall be regarded as meaning that only the best general practice is to prevail and that only material and workmanship of the best quality is to be used, the interpretation of these Specifications shall be made upon that basis.

1.03 MATERIALS AND EQUIPMENT

A. Manufacturer:

1. All transactions with the manufacturers or subcontractors shall be through the Contractor.
2. Any two (2) or more pieces of material or equipment of the same kind, type or classification, and being used for identical types of service, shall be made by the same manufacturer.

B. Delivery:

1. The Contractor shall deliver materials in ample quantities to insure the most speedy and uninterrupted progress of the work so as to complete the work within the allotted time.
2. The Contractor shall also coordinate deliveries in order to avoid delay in, or impediment of, the progress of the work of any related Contractor.

1.04 INSPECTION AND TESTING

A. General:

1. For tests specified to be made by



the Contractor, the testing personnel shall make the necessary inspections and tests and the reports thereof shall be in such form as will facilitate checking to determine compliance with the Contract Documents. Five (5) copies of the reports shall be submitted and authoritative certification thereof must be furnished to the Consultant as a prerequisite for the acceptance of any material or equipment.

2. If, in the making of any test of any material or equipment, it is ascertained by the Consultant that the material or equipment does not comply with the Contract Documents, the Contractor will be notified thereof and he will be directed to refrain from delivering said material or equipment, or to remove it promptly from the site or from the work and replace it with acceptable material, without cost to the CITY.
3. Tests of electrical and mechanical equipment and appliances shall be conducted in accordance with the recognized federal, state and local law test codes and manufacturer recommendation.

B. Costs:

1. All inspection and testing of materials furnished under this Contract will be provided by the Contractor, unless otherwise expressly specified.
2. Materials and equipment submitted by the Contractor as the equivalent to those specifically named in the Contract may be tested by the CITY for compliance. The Contractor shall reimburse the CITY for the expenditures incurred in making such tests of materials and equipment which are rejected for non-compliance.

C. Certificate of Manufacture:

1. Contractor shall furnish Consultant authoritative evidence in the form of Certificate of Manufacture that the materials to be used in the work have been manufactured and tested in conformity with the Contract Documents upon Project completion.
2. These certificates shall be notarized and shall include copies of the results of physical tests and chemical analyses, where necessary, that have been made directly on the product or on similar products of the manufacturer.

D. Start up Tests

1. As soon as conditions permit, the Contractor shall furnish all labor, materials, and instruments and shall make start-up tests of equipment.
2. If the start-up tests disclose any equipment furnished under this Contract which does not comply with the requirements of the Contract Documents, the Contractor shall, prior to demonstration tests, make all changes, adjustments and replacements required. The furnishing Contractor shall assist in the start-up tests as applicable.

1.05 CARE AND PROTECTION OF PROPERTY

The Contractor shall be responsible for the preservation of all public and private property, and shall use every precaution necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the work on the part of the Contractor, such property shall be restored by the contractor, at his expense, to a condition similar or equal to that existing before the damage was done, or he shall make good the damage in other manner acceptable to the Consultant.

1.06 MEASUREMENT AND PAYMENT

Payments will be made on completion of each phase of the Work and acceptance by the CITY shall be made pursuant to this Contract.

1.07 WORKING HOURS:

1. Working on this Contract shall be conducted during normal working hours (7:00 AM to 5:00 PM) on weekdays. Unless otherwise authorized in writing by the Project Manager, no work shall be performed on weekends, on City observed holidays or between 5:00 PM and 7:00 AM on weekdays.
2. Construction observation and/or inspection services needed beyond normal working hours as defined above, shall be paid for by the Contractor at an hourly rate of \$100.00 for each inspector providing such services.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION





SECTION 01010 - SUMMARY OF PROJECT

PART 1 - GENERAL

Controls: Section SC01500

1.01 WORK COVERED BY CONTRACT DOCUMENTS/REQUIREMENTS INCLUDED

- A. The work under this project consists of: The project will include the construction of a 10' shared use path on the west side of the SE 1st Street between Woolbright Road and SE 2nd Avenue. The existing open system drainage system between SE 2nd Avenue and Woolbright Road will be converted to a closed system with curb and gutter. This project includes pavement reconstruction, curb and gutter, a shared use path and drainage improvements. In addition to the improvements along SE 1st Street, the pedestrian connectivity is being extended east along SE 5th Avenue on the south side, with the construction of a 5-foot sidewalk between SE 1st Avenue and the railroad crossing to the east (~450' in length). The proposed sidewalk would connect to the existing ADA compliant ramps on the west of the tracks and will not require crossing the railroad tracks.
- B. Omission of a specific item or component of a system obviously necessary for the proper functioning of the equipment or system shall not relieve the Contractor of the responsibility of furnishing the item as part of the work at no additional expense to the Owner.
- C. Except as specifically noted elsewhere, Contractor(s) shall provide and pay for all labor, materials, equipment, tools, construction equipment and machinery, transportation, water, heat, utilities, and temporary facilities necessary for the proper execution and completion of work.
- D. Concurrent with the installation of the water main, drainage or sanitary sewer improvements and when shown on the project construction drawings, the work includes swale development and improvements on both sides of the streets in the project area. Work includes re-grading, driveway apron reconstruction and all surface restoration.
- E. Restoration shall immediately follow the acceptance of required system testing and be performed as required by Section 02960 RESTORATION OF SURFACE IMPROVEMENTS.

1.02 RELATED REQUIREMENTS

- A. Section SC01025: Measurement and Payment
- B. Construction Facilities and Temporary

- C. Restoration of Surface Improvements: Section SC02960

1.03 CONTRACTS

- A. Construct the Work in accordance with Section SC01025: Measurement and Payment Procedures.

1.04 CONTRACTOR'S USE OF SITE/PREMISES

- A. Contractor shall limit their use of the premises for Work and storage, to the areas designated.
- B. Coordinate use of premise under direction of CITY and/or Consultant.
- C. Assume full responsibility for the protection and safekeeping of Products under this Contract, stored on the site.
- D. Move any stored Products, under Contractor's control, which interfere with operations of the CITY, other contractors or the general public.

1.05 SAFETY AND OSHA COMPLIANCE

- A. The Contractor shall comply in all respects with all Federal, State and Local safety and health regulations. Copies of the Federal regulations may be obtained from the U.S. Department of Labor, Occupation Safety and Health Administration (OSHA), Washington, DC 20210 or their regional offices.
- B. The Contractor shall comply in all respects with the applicable Workman's Compensation Laws.

PART 2 – PRODUCTS

- 2.1 All materials are to be **MADE IN THE UNITED STATES OF AMERICA**. Allowable exceptions are ductile iron fittings supplied by American Cast Iron Pipe Company from Brazil, Sigma Corporation from China, and Star-Pipe Products from the United States and China, and Tyler Union from the United States and China; and Electronic Marking System (EMS) full-range makers by 3M from Mexico.

2.2 SALVAGED MATERIALS

In the absence of special provisions to the Contract, salvaged materials, equipment or supplies that occur are the property of the CITY and shall be cleaned, stored and delivered to the CITY as directed by the CITY's Project Manager.

2.3 CERTIFIED CHEMICALS



The Contractor shall use U.S. Department of Agriculture certified chemicals only during performance of all work under this contract. All chemicals used during project construction or furnished for project whether herbicide, pesticide, disinfectant, polymer, reactant or other classification, must show approval of either EPA or USDA and be accompanied by an MSDS. Use of all such chemicals and disposal of residue shall be in strict conformance with manufacturer's instructions.

PART 3 – EXECUTION

3.1 CONTRACTOR SUPERVISION

- A. As required by the Contract Documents, the Contractor's Project Representative (Superintendent) shall be on site at all times and actively engaged in controlling and coordinating all on site project activities including direction and oversight of self-performed and subcontractor work activities.
- B. The Superintendent/Contractor's Project Representative shall have the full authority to receive instructions to execute the orders or directions of the CITY and Consultant.

3.2 GENERAL

- A. The Contractor shall, prior to entering any section, prepare Pre Construction video and digital photographs, in accordance with Section 01390 VIDEO SITE SURVEY, of each property and Right-of-Way (ROW) areas to determine existing site conditions. Together the video and photographs will provide the basis for the condition of restoration required in Section 02960 RESTORATION OF SURFACE IMPROVEMENTS.
- B. The Contractor shall notify all property owners / residents forty-eight (48) hours prior to working in public Rights-of-Way or easements affecting or adjoining their properties. Notification shall be by hand-delivered flyer that shall contain the following information:
 - 1. Project Name
 - 2. Date of Commencement
 - 3. Description of Work
 - 4. Name of Contractor
 - 5. Name of Contractor's Representative
 - 6. Local Phone Number of Contractor's Representative

The CITY must approve the Contractor's notification prior to issuance. Contractor must submit Contractor's Notification to CITY and CONSULTANT in writing within one (1) week

prior to working in public Right-Of-Ways (ROW) or easements affecting for adjoining property owner's property.

- C. The Contractor shall, prior to the removal of any fences, erect temporary fences to secure the owner's property. These temporary fences shall be of 4' high woven wire (2" x 4" grid), on the T line post 10' on centers. These fences shall run along the easement line and will remain in place until the permanent fence is re-erected.
- D. The Contractor shall not start major construction activities, such as pipeline and structure excavations, or preparation for major activities, such as setting wellpoints and header pipe, just prior to extended holiday periods such as the typical week taken off at the end of each year.

3.3 NPDES COMPLIANCE

- A. Prior to the commencement of work, the Contractor must obtain the permit coverage for stormwater discharge from large and small construction activities and must implement appropriate pollution prevention techniques and SWPPP to minimize erosion and sedimentation to properly manage the stormwater runoff. The Contractor shall prepare a NPDES Site Plan including sketches and Best Management Practice procedures for review and comment from the Project Manager. The NPDES Site Plan shall include the control of stormwater, ground water and subsurface water during dewatering operations.

(DEP adopted Rule 62-621.300 (4), F.A.C., with specific provisions for requesting permit coverage for the management of stormwater discharge from large and small construction activities.)

- B. The permit coverage for construction activities is to be obtained by submitting DEP form 62-621.300 (4) (b) Notice of Intent (NOI) to Use Generic Permit for Stormwater Discharge from Large and Small Construction Activities and by preparing and implementing a Stormwater Pollution Prevention Plan (SWPPP). After construction is complete, Notice of Termination (NOT) to discontinue the permit coverage is to be submitted by utilizing form 62-621.300 (6).
- C. For additional information contact NPDES Stormwater Section at:

Florida Department of Environmental Protection
Tallahassee, FL 32399-2400
(850) 921-9904

3.4 PROTECTION OR REMOVAL OF UTILITY LINES



- A. Prior to construction the Contractor shall locate for physical location, elevation and dimensions and adequately uncover existing utilities, (within the path of its proposed work), to determine possible conflicts. By starting underground constructions, the Contractor has agreed that it is fully responsible for any and all damages and/or delays that may arise from not having adequately locating the underground utilities. This applies to underground utilities that are shown on the project construction drawings and those that have been physically marked in the field by the various locating organizations or agencies.
- B. Information provided on the plans may be used as an approximate guide to assist the Contractor, however, the Contractor shall rely on actual field investigation to assure that all of the existing utilities are accurately located prior to commencement of its work.
- C. Existing structures reflect the best available information, but it shall be the Contractor's responsibility to acquaint itself with all information and to avoid conflict with existing

conditions. Contractor shall protect all existing utility lines that are to be retained, or utility line constructed during excavation operations, from damage during excavation and backfilling; if damaged, repair at Contractor's expense.

- D. Existing Utility Lines to be Retained: Contractor shall repair damaged lines that are not shown on drawings, or locations of which are not known to Contractor in sufficient time to avoid further damage.
- E. Uncharted or incorrectly charted underground utilities that are discovered during construction shall be incorporated into the project As-Builts with vertical and horizontal coordinates.
- F. Prior to commencement of any excavation, the Contractor shall comply with Florida Statute 553.851 for the protection of underground gas lines and underground telecommunication lines.

END OF SECTION



SECTION 01025 - MEASUREMENT AND PAYMENT PROCEDURES

PART 1 GENERAL

1.01 GENERAL

- A. The Contractor shall receive and accept the compensation provided in the Bid and the Contract as full payment for furnishing all materials, labor, tools and equipment, for performing all operations necessary to complete the work under the Contract, and also in full payment for all loss or damages arising from the nature of the work, or from any discrepancy between the actual quantities of work and quantities herein estimated by the CONSULTANT, or from the action of the elements or from any unforeseen difficulties which may be encountered during the prosecution of the work until the final acceptance by the CITY.
- B. The prices stated in the Bid include all costs and expenses for taxes, labor, equipment, materials, commissions, transportation charges and expenses, patent fees and royalties, labor for handling materials during inspection, together with any and all other costs and expenses for performing and completing the work as shown on the Drawings and specified herein. The basis of payment for an item at the unit price shown in the proposal shall be in accordance with the description of that item in this Section.
- C. The Contractor's attention is again called to the fact that the quotations for the various items of work are intended to establish a total price for completing the work in its entirety. Should the Contractor feel that the cost for any item of work has not been established by the Bid Form or Payment Items, he shall include the cost for that work in some other applicable bid item, so that his proposal for the project does reflect his total price for completing the work in its entirety.

1.02 MEASUREMENT

- A. The quantities for payment under this Contract shall be determined by actual measurement of the completed items, in place, ready for service and accepted by the CITY, in accordance with the applicable method of measurement therefore contained herein.

1.03 AUTHORITY

- A. Measurement methods delineated in the FDOT Standard Specifications for Road and Bridge Construction, latest Edition, or the individual specification sections complement the criteria of this section. In the event of conflict, the Contractor shall notify the CITY in writing. In determining the resolution, the CITY shall consider the requirement of the individual specification section, FDOT requirements and this Section.
- B. Any requirements of the Contract Documents, i.e., technical specifications or project construction drawings for which the method of payment is not explicitly defined are considered to be incidental costs and should be included in other pay items as appropriate.

1.04 RELATED SECTIONS:

- A. Applications for Payments: Section SC01027
- B. Shop Drawings, Working Drawings, and Samples – Section SC01340
- C. Schedule of Values: Section SC01370
- D. Change Order Procedures: Section SC01153
- E. Field Engineering: Section SC01050
- F. Quality Requirements: Section SC01400



G. Record Drawing Requirements – Section SC01705

H. Testing Specific Utility Systems

1. Refer to Section 02513 POTABLE WATER AND RECLAIMED WATER DISTRIBUTION SYSTEMS, **02536 FORCE MAINS** and Section 02538 SANITARY SEWER SYSTEMS for applicable and specific requirements. Contractor is responsible for all testing costs associated with these systems.

1.05 ALLOWANCES – N/A

1.06 SCHEDULE OF VALUES

- A. Submit Schedule of Values at the Pre-Construction Meeting.
- B. The Schedule of Values shall be a computer generated original. When the Contractor's proposed Schedule of Values is accepted by the CITY, it shall become the basis for the Application for Payment.
- C. Contractor shall only revise the accepted Schedule of Values to identify, as separate line items approved on a Field Order or Change Order. The CITY may issue a Field Order substituting or modifying Schedule of Value items.

1.07 APPLICATIONS FOR PAYMENT

- A. Refer to Section SC01027 – APPLICATIONS FOR PAYMENT
- B. Submit one (1) original Application for Payment (AFP) for review, authorization and processing.
- I. Content and Format: Utilize Schedule of Values for listing items in Application for Payment outlining the following:
 1. Provide a column for each of the following:
 - a. Item Number
 - b. Item Description
 - c. Quantity
 - d. Unit of measurement
 - e. Scheduled Value
 - f. Change Orders
 - g. Work Completed:
 1. Previous Period (Quantity and Value)
 2. This Period (Quantity and Value)
 - h. To Date (Quantity and Value)
 - i. Percentage of Completion
 - j. Balance to Finish
 - k.. Retainage

NOTE: There is no column for "Materials Stored", the CITY does not pay for items ordered



and/or stored on site. As defined later in this Section, payment for pay items are paid for once the item is installed, measured in place, completed and accepted.

- J. Include one (1) set of progress photographs with each Application for Payment. Refer to the Contract Documents, specifically Section SC01380 CONSTRUCTION PHOTOGRAPHS for specific details and requirements.
- K. Application for Final Payment must be marked FINAL. Contractor must include in the FINAL AFP package, proof of payment and final settlement with the CITY with regards to any temporary and/or construction water meters used during the course of the project.
- L. When existing Right-Of-Way (ROW) irrigation must be disturbed due to pipeline installation, any existing irrigation lines shall be marked on the Contractors drawings prior to or at the time of temporary cutting-&-capping. The replacement of existing irrigation in the Public Right-Of-Way as the result of pipeline installation or swale development is NOT a pay item. Replacement of existing ROW irrigation shall be incidental to the Unit Price of the pipeline.

1.08 MEASUREMENT OF AND PAYMENT FOR WORK

- A. **Monthly Payments to the Contractor.** The Contractor shall plan its work for construction on the basis of twelve (12) monthly pay periods per year. So long as the work is prosecuted in compliance with the provisions of the Contract, the Contractor will, on or about the last day of the pay period, make an approximate estimate, in writing on a form approved by the CITY of the proportionate value of the work done, items, and locations of the work performed up to and including the last day of the period then ending. The CONSULTANT will then review such estimate and make the necessary recommendations to the Contractor for revision. The Contractor shall revise the Application for Payment and resubmit to the CONSULTANT for review and Certification. **Redlined Applications for Payment will not be accepted by the CITY.** If the Contractor and the CONSULTANT do not agree on the approximate estimate of the proportionate value of the work done for any pay period, the determination of the CONSULTANT shall be binding. The amount of such estimate after deducting ten percent (10%) and all previous payments, shall be due and payable to the Contractor in accordance with the Florida Prompt Payment Act, §218.70 Florida Statutes, as may be amended from time to time.
- B. Substantiating Data: When the CONSULTANT requires substantiating information, Contractor shall submit data justifying quantities and dollar amounts in question. Contractor shall provide three (3) copies of data with cover letter for each copy of submittal showing application number and date, and line item by number and description.

1.09 MEASUREMENT AND PAYMENT - UNIT PRICES

- A. Measurement methods delineated in individual specification sections complement criteria of this section. In event of conflict, requirements of individual specification section govern.
- B. Contractor shall take daily and weekly measurements and compute quantities. The Contractor shall review and sign these daily and weekly measurements with the CONSULTANT. The CONSULTANT shall also sign-off on the weekly measurement sheets indicating the CONSULTANT's progressive concurrence with the quantities. The Contractor shall transmit the signed-off weekly measurement sheets to the CONSULTANT. These measurement sheets shall be used to form the basis of the quantities claimed on the Application For Payment.
- C. Unit Quantities
 - 1. Quantities indicated in the Schedule of Bid Items are for bidding and contract purposes only. Quantities and measurements supplied or placed in the Work and verified by the Consultant and CITY determine payment.
 - 2. If the actual Work requires more or fewer quantities than those quantities indicated in the bid items, Contractor shall provide the required quantities at the unit sum/prices contracted.



- D. Payment Includes: Full compensation for required labor, products, tools, equipment, facilities, transportation, services and incidentals; erection; application or installation of an item of the Work; and overhead and profit.
- E. Final payment for Work governed by unit prices will be made on the basis of the actual measurements and quantities accepted by the CONSULTANT and CITY, multiplied by the unit sum/price for Work, which is incorporated in or made necessary by the Work.

1.10 Measurement of Quantities:

- A. Weigh Scales: Inspected, tested and certified by the applicable State of Florida Weights and Measures department within the past year.
- B. Platform Scales: Of sufficient size and capacity to accommodate the conveying vehicle.
- C. Metering Devices: Inspected, tested and certified by the applicable State of Florida Weights and Measures Department within the past year.
- D. Measurement by Weight: Concrete reinforcing steel rolled or formed steel or other metal shapes will be measured by handbook weights. Welded assemblies will be measured by handbook or scale weight.
- E. Measurement by Volume: Measured by cubic dimension using mean length, width and height or thickness.
- F. Measurement by Area: Measured by square dimension using mean length and width or radius.
- G. Linear Measurement: Measured by linear dimension, at the item centerline. Minor offsets (less than a total of five (5) feet) will not be measured for payment. Measurement shall be along the horizontal axis at finished grade.
- H. Stipulated Sum/Price Measurement: Items measured by weight, volume, area, or linear means or combination, as appropriate, as a completed and accepted item or unit of the Work.
- I. Payment for Work does not indicate acceptance. Work items previously paid for may require additional work effort to bring them into compliance with the requirements of the specific technical specifications and/or project drawings.

1.11 UNIT OF MEASURE – SCHEDULE OF BID PRICES

- A. Payment for furnishing and installing those items cited in the Schedule of Bid Items and subsequent Schedule of Values is noted herein. If "remove and replace" is indicated on the project construction drawings (by either annotation or line weight), then the item descriptions below include the removal and proper disposal of the existing items.
- B. Bid Item No
- C. Bid Item No

General

- D. Mobilization/Demobilization, Bonds & Insurance – Bid Item No 101-1
 - 1. Payment for the General Conditions shall be made on the basis of percentage of the Lump Sum Price and shall be full compensation for preparatory work and operations in mobilizing and demobilizing for the project including but not limited to, those operations necessary for the movement of personnel, equipment, supplies and incidentals to and from the project site, for establishment of temporary offices/field trailer, buildings, safety equipment, sanitary and other



facilities and compliance with permit conditions for permits secured by either the Owner or Contractor. This pay item shall include all General Requirements not listed as separate items. The cost of bonds, required insurance, permits and any other pre-construction expense necessary for the start of the work shall also be included in the General Conditions.

E. Maintenance of Traffic – Bid Item No 102-1

1. The quantity of traffic control to be considered for payment shall be equivalent to the percentage of the project determined by the Engineer to be complete as of the date of the pay request submitted. The percent completion of the project shall be based on the percent of the total project actually constructed and not on the percent of the Contract price completed.
2. Payment for traffic control shall be made on the basis of a percentage (as determined in '1' above) of the Lump Sum (LS) Price. The contract unit price shall include compensation for required labor, materials, and equipment necessary to keep roadways and property accesses in service during construction activities in accordance with the Contract Documents.
3. A detailed MOT plan will need to be provided by the Contractor and approved by City and Palm Beach County when applicable.
4. This item includes maintenance of traffic plan, traffic control, flagman, detour signs, barricades, advance warning arrow panels, temporary signage, construction and removal of temporary access driveways to residential homes, commercial material for driveway maintenance, etc. in order to provide safety and traffic access in accordance with local and state requirements.
5. This item also includes furnishing and installing material (temporary pavement or asphalt millings) for temporary roadways for local resident access and emergency vehicle access during the duration of the construction, and for providing all restoration due to the construction temporary roadways.
6. Refer to Specification Section SC01570 Maintenance of Traffic.

F. Sediment Barrier – Bid Item No 104-10-3

1. Payment for this item shall be made at the Contractor's Unit Price per linear foot of sediment barrier installed and accepted. The Contract Unit Price shall include compensation for labor, material, and equipment required to furnish, install and maintain the sediment barrier in accordance with the plans and specifications.

G. Inlet Protection System – Bid Item No 104-18

1. Payment for this item shall be made at the Contractor's Unit Price per each of inlet protection installed and accepted. The Contract Unit Price shall include compensation for labor, material, and equipment required to furnish, install and maintain the inlet protection system in accordance with the plans and specifications.

H. Monitor Existing Structures – Vibration Monitoring – Bid Item No 108-2

1. Payment for this item shall be made at the contract lump sum price bid for the item. No additional payment shall be made for the design, furnishing, construction, and removal of precautionary features, such as but not limited to sheeting, shoring, or bracing, installed for protection of existing structures. The contract lump sum price shall include compensation for labor, material, and equipment required to provide vibration monitoring in accordance with the plans and specifications. This is to be billed monthly.

I. Clearing & Grubbing – Bid Item No 110-1-1

1. Payment for this item shall be made on a Lump Sum (LS) basis. The Contractor's unit price shall include full compensation for all excavation necessary within the road right of way including



debris removal, grading, and any other required clearing and grubbing in accordance with the plans and specifications, except for any areas designated to be paid for separately or to be specifically included in the costs of other work under the Contract.

2. The Contractor shall remove and dispose of all bushes, trees, stumps, roots, fill material, debris, and other such protruding objects, appurtenances, fences, or any other facilities to prepare the area within the Right-of Way for construction of the proposed improvements.
3. The Contractor shall take the necessary precautions to protect existing landscape, fencing, above ground appurtenances, etc. which are determined to remain in place or relocated, by the CEI.
4. This item shall include root pruning, and the relocation of all mailboxes, signs, walls, fencing, meter boxes, trees, and other such appurtenances that conflict with the proposed improvements or is shown to be relocated.

J. Removal of Existing Concrete – Bid Item No 110-1-10

1. Payment for this item shall be made at the Contractor's Unit Price per square yard of material excavated. The Contractor's unit price shall include full compensation for all removing and disposing of existing concrete pavement, concrete sidewalks, slope pavement, ditch pavement and curb and gutter, where required because of construction operations, where the work is NOT included in other operations, labor, equipment, and materials required to complete the work in accordance with the plans and specifications. This unit pricing includes cost of legal disposal of all deleterious material, Trench Safety Compliance, and removal of all extraneous excavated materials in accordance with the plans and specifications.

K. Mailbox F&I, Single – Bid Item No 110-7-1

1. Payment for this item shall be made at the Contractor's Unit Price per each mailbox relocation, assembled, installed and accepted. The Contract Unit Price shall include compensation for labor, material, and equipment required to furnish, install and maintain the mailbox in accordance with the specifications.

L. Regular Excavation – Bid Item No 120-1

1. Payment for this item shall be made at the Contractor's Unit Price per cubic yard of material excavated. The Contractor's unit price shall include full compensation for all supervision, labor, equipment, and materials required to complete the work in accordance with the plans and specifications Section 120, Earthwork and Related Operations for LAP (Off-System). This unit pricing includes, Excavation including cost of legal disposal of all deleterious material, Trench Safety Compliance and removal of all extraneous excavated materials in accordance with the plans and specifications in accordance with FDOT Specifications.

M. Embankment – Bid Item No 120-6

1. Payment for this item shall be made at the Contractor's Unit Price per cubic yard of embankment material. The Contractor's unit price shall include compensation for all labor, material, and equipment required to install the embankment material in accordance with the plans and specifications.

N. Type B Stabilization – Bid Item No 160-1

1. Payment for this item shall be made at the Contractor's Unit Price per square yard of Type B Stabilization (stabilized subgrade) installed and accepted. The Contract Unit Price shall include compensation for all labor, material, subgrade compaction and equipment required to complete the work in accordance with the plans and specifications.
2. Payment shall be made for Type B Stabilization for subgrade constructed or replaced by authorization of the Consultant. Any Stabilization that is damaged incidental to construction or defective shall be replaced at the Contractor's expense.



O. Optional Base Group 4 – Bid Item No 285-704

1. Payment for this item shall be made at the Contractor's Unit Price per square yard of base installed and accepted. The Contract Unit Price shall include compensation for all labor, material, compaction, equipment, and all other miscellaneous work required to complete the work in accordance with the plans and specifications.
2. Payment shall be made for optional base group 4 constructed or replaced by authorization of the Consultant. Any optional base group 4 that is damaged incidental to construction or defective shall be replaced at the Contractor's expense.

P. Milling Existing Asphalt Pavement, 1/2" Average Depth – Bid Item No 285-704

1. Payment for this item shall be made at the Contractor's Unit Price square yard of milling existing asphalt pavement, 1/2" removed and accepted. The Contract Unit Price shall include compensation for all labor, material, and equipment required to remove 1/2" asphaltic concrete in accordance with the plans and specifications.

Q. Superpave Asphaltic Concrete (Traffic C) (PG76-22) – Bid Item No 334-1-53

1. Payment for this item shall be made at the Contractor's Unit Price per ton of Superpave Asphaltic Concrete installed and accepted. The Contract Unit Price shall include compensation for all labor, material, and equipment required to install the Superpave Asphaltic Concrete in accordance with the plans, specifications, and FDOT "Big Three" LAP Specifications.
2. Payment shall be made for Superpave Asphaltic Concrete constructed or replaced by authorization of the Consultant. Any Super Asphaltic Concrete that is damaged incidental to construction or defective shall be replaced at the Contractor's expense.

R. Inlets, Manholes – Bid Item No:

425-1-312 – Inlets, Curb, Type P-1, >10'
425-1-322 – Inlets, Curb, Type P-2, >10'
425-1-351 – Inlets, Curb, Type P-5, <10'
425-1-352 – Inlets, Curb, Type P-5, >10'
425-1-361 – Inlets, Curb, Type P-6, <10'
425-1-362 – Inlets, Curb, Type P-6, >10'
425-1-452 – Inlets, Curb, Type J-5, >10'
425-1-462 – Inlets, Curb, Type J-6, >10'
425-1-521 – Inlets, DT Bot, Type C, <10'
425-1-524 – Inlets, DT Bot, Type C, JBOT, >10'
425-1-525 – Inlets, DT Bot, Type C, Partial
425-1-711 – Inlets, Gutter, Type V, <10'
425-1-713 – Inlets, Gutter, Type V, JBOT, <10'
425-2-41 – Manholes, P-7, <10'
425-2-42 – Manholes, P-7, >10'
425-2-43 – Manholes, P-7, Partial

1. Payment for this item shall be made at the Contractor's Unit Price per each inlet, manhole, or junction structure installed and accepted. The Contract Unit Price shall include compensation for all labor, material, hardware, caulking, cutting and connecting existing pipes, pollution retardant baffles, grout, brick, shoring, trenching, equipment or any other items required to install the inlets, manholes, or junction structure complete in place in accordance with the plans and specifications.
2. Payment shall be made for each inlet, manhole, or junction structure installed by authorization of the Consultant. Any inlet, manhole, or junction structure that are damaged incidental to construction or defective shall be repaired at the Contractor's expense.

S. Manhole, Adjust, Utilities – Bid Item No 425-5-1



1. Payment for this item shall be made at the Contractor's Unit Price per each of manhole adjustments installed and accepted. The Contract Unit Price shall include compensation for labor, material, and equipment required to adjust manholes shown in the Plans to be adjusted or requiring adjustment for the satisfactory completion of the work.

T. Valve Boxes, Adjust – Bid Item No 425-6

1. Payment for this item shall be made at the Contractor's Unit Price per each of valve adjustments installed and accepted. The Contract Unit Price shall include compensation for labor, material, and equipment required to adjust manholes shown in the Plans to be adjusted or requiring adjustment for the satisfactory completion of the work.

U. Pipe Culvert, Optional Material, Round, 15" S/CD – Bid Item No 430-175-115

1. Payment for this item shall be made at the Contractor's Unit Price per linear foot of pipe installed and accepted. The Contract Unit Price shall include compensation for all labor, material, hardware, caulking, cutting and connecting existing pipes, grout, brick, shoring, trenching, equipment or any other items required to install the pipe complete in place in accordance with the plans and specifications.
2. Payment shall be made for 15" pipe culvert installed by authorization of the Consultant. Any 15" pipe culvert that is damaged incidental to construction or defective shall be repaired at the Contractor's expense.

V. Pipe Culvert, Optional Material, Round, 18" S/CD – Bid Item No 430-175-118

1. Payment for this item shall be made at the Contractor's Unit Price per linear foot of pipe installed and accepted. The Contract Unit Price shall include compensation for all labor, material, hardware, caulking, cutting and connecting existing pipes, grout, brick, shoring, trenching, equipment or any other items required to install the pipe complete in place in accordance with the plans and specifications.
2. Payment shall be made for 18" pipe culvert installed by authorization of the Consultant. Any 18" pipe culvert that is damaged incidental to construction or defective shall be repaired at the Contractor's expense.

W. Pipe Culvert, Optional Material, Round, 24" S/CD – Bid Item No 430-175-124

1. Payment for this item shall be made at the Contractor's Unit Price per linear foot of pipe installed and accepted. The Contract Unit Price shall include compensation for all labor, material, hardware, caulking, cutting and connecting existing pipes, grout, brick, shoring, trenching, equipment or any other items required to install the pipe complete in place in accordance with the plans and specifications.
2. Payment shall be made for 24" pipe culvert installed by authorization of the Consultant. Any 24" pipe culvert that is damaged incidental to construction or defective shall be repaired at the Contractor's expense.

X. French Drain, 24" – Bid Item No 443-70-4

1. Payment for this item shall be made at the Contractor's Unit Price per linear foot of 24" French drain installed and accepted. The Contract Unit Price shall include compensation for all labor, material, gravel backfill, filter fabric, slotted RCP, cutting and connecting existing pipes, grout, brick, shoring, trenching, equipment or any other items required to install the exfiltration trench complete in place in accordance with the plans and specifications.
2. Payment shall be made for 24" French drain installed by authorization of the Consultant. Any 24" French drain that is damaged incidental to construction or defective shall be repaired at the Contractor's expense.

Y. Concrete Curb – Bid Item No:



520-1-7 – Concrete Curb and Gutter, Type E
520-1-10 – Concrete Curb and Gutter, Type F
520-2-4 – Concrete Curb, Type D
520-2-10 – Concrete Curb, Header Curb
520-3 – Valley Gutter – Concrete

1. Payment for this item shall be made at the Contractor's Unit Price per linear foot of concrete curb installed and accepted. The Contract Unit Price shall include compensation for all labor, material, and equipment required to install the concrete curb complete in place in accordance with the plans and specifications.
2. Payment shall be made for Concrete Curb constructed or replaced by authorization of the Consultant. Any Concrete Curb that is damaged incidental to construction or defective shall be replaced at the Contractor's expense.

Z. Concrete Sidewalks and Driveways, 4" Thick – Bid Item No 522-1

1. Payment for this item shall be made at the Contractor's Unit Price per square yard of concrete sidewalk (4" thick) installed and accepted. The Contract Unit Price shall include compensation for all labor, material, and equipment required to install the concrete sidewalk in accordance with the plans, specifications, and FDOT "Big Three" LAP Specifications.
2. Payment shall be made for Concrete Sidewalk (4" Thick) constructed or replaced by authorization of the Consultant. Any Concrete Sidewalk (4" Thick) that is damaged incidental to construction or defective shall be replaced at the Contractor's expense.

AA. Concrete Sidewalks and Driveways, 6" Thick – Bid Item No 522-2

1. Payment for this item shall be made at the Contractor's Unit Price per square yard of concrete sidewalk and driveway (6" thick) installed and accepted. The Contract Unit Price shall include compensation for all labor, material, and equipment required to install the concrete sidewalk or driveway in accordance with the plans, specifications, and FDOT "Big Three" LAP Specifications.
2. Payment shall be made for Concrete Sidewalk and Driveway (6" Thick) constructed or replaced by authorization of the Consultant. Any Concrete Sidewalk and Driveway (6" Thick) that is damaged incidental to construction or defective shall be replaced at the Contractor's expense.

BB. Detectable Warnings – Bid Item No 527-2

1. Payment for this item shall be made at the Contractor's Unit Price per square foot of detectable warning installed and accepted. The Contract Unit Price shall include compensation for all labor, material, and equipment required to install the detectable warning in accordance with the plans and specifications.
2. Payment shall be made for Detectable Warning constructed or replaced by authorization of the Consultant. Any Detectable Warning that is damaged incidental to construction or defective shall be replaced at the Contractor's expense.

CC. Fencing, Type B, 5.1-6.0', Standard – Bid Item No 550-10-220

1. Payment for this item shall be made at the Contractor's Unit Price per linear foot of fencing installed and accepted. The Contract Unit Price shall include compensation for all labor, material, and equipment required to install the fencing complete in place in accordance with the plans and specifications.
2. Payment shall be made for fencing constructed or replaced by authorization of the Consultant. Any fencing that is damaged incidental to construction or defective shall be replaced at the Contractor's expense.

DD. Performance Turf, Sod – Bid Item No 570-1-2



1. Payment for this item shall be made on a square yard basis. The Contractor's unit price shall include full compensation for all sodding within the road right of way as indicated on the plans.
2. The Contractor's unit price shall constitute full compensation for all labor, materials, and equipment required for excavation, grading, hauling, placing, compacting, and dressing of the surface of the swales in preparation for sodding, placement, and establishment. Any sod that is damaged incidental to construction or defective shall be replaced at the Contractor's expense.

EE. Fire Hydrant, Install – Bid Item No 1644-300

1. Payment for this item shall be made at the Contractor's Unit Price per fire hydrant installed and accepted. The Contract Unit Price shall include compensation for all labor, material, and equipment required to install the fire hydrant in accordance with the plans and specifications.
2. Payment shall be made for fire hydrant installed by authorization of the Consultant. Any fire hydrant that is damaged incidental to construction or defective shall be replaced at the Contractor's expense.

FF. Fire Hydrant, Relocate – Bid Item No 1644-800

1. Payment for this item shall be made at the Contractor's Unit Price per fire hydrant relocated and accepted. The Contract Unit Price shall include compensation for all labor, material, and equipment required to relocate the fire hydrant in accordance with the plans and specifications.
2. Payment shall be made for fire hydrant relocated by authorization of the Consultant. Any fire hydrant that is damaged incidental to construction or defective shall be replaced at the Contractor's expense.

GG. Fire Hydrant, Remove – Bid Item No 1644-900

1. Payment for this item shall be made at the Contractor's Unit Price per fire hydrant removed and accepted. The Contract Unit Price shall include compensation for all labor, material, and equipment required to remove the fire hydrant in accordance with the plans and specifications.
2. Payment shall be made for fire hydrant removed by authorization of the Consultant. Any fire hydrant that is damaged incidental to construction or defective shall be replaced at the Contractor's expense.

HH. Single Post Sign, F&I, Ground Mount, Up to 12 SF – Bid Item No 700-1-11

1. Payment for this item shall be made at the Contractor's Unit Price per Sign Assemblies furnished and installed and accepted. The Contract Unit Price shall include compensation for all labor, material, and equipment required to install the Sign Assemblies in accordance with the plans and specifications.
2. Payment shall be made for each Single Post Sign Assembly installed by authorization of the Consultant. Any signs that are damaged incidental to construction shall be replaced at the Contractor's expense.

II. Single Post Sign, F&I, Ground Mount, 12-20 SF – Bid Item No 700-1-12

1. Payment for this item shall be made at the Contractor's Unit Price per Sign Assemblies furnished and installed and accepted. The Contract Unit Price shall include compensation for all labor, material, and equipment required to install the Sign Assemblies in accordance with the plans and specifications.
2. Payment shall be made for each Single Post Sign Assembly installed by authorization of the Consultant. Any signs that are damaged incidental to construction shall be replaced at the Contractor's expense.



JJ. Single Post Sign, Remove – Bid Item No 700-1-60

1. Payment for this item shall be made at the Contractor's Unit Price per sign assemblies removed. The Contractor's unit price shall include full compensation for all removing and disposing of existing sign panels, posts and ground attachments, where required because of construction operations, where the work is NOT included in other operations, labor, equipment, and materials required to complete the work in accordance with the plans and specifications. This unit pricing includes cost of legal disposal of all deleterious material and removal of all extraneous materials in accordance with the plans and specifications.

KK. Raised Pavement Marker, Type B Without Final Surface Markings – Bid Item No 706-1-3

1. Payment for this item shall be made at the Contractor's Unit Price per each Raised Pavement Marker furnished and installed and accepted. The Contract Unit Price shall include compensation for all labor, material, and equipment required to install the Raised Pavement Marker in accordance with the plans and specifications.
2. Payment shall be made for each Raised Pavement Marker installed by authorization of the Consultant. Any Raised Pavement Marker that are damaged incidental to construction shall be replaced at the Contractor's expense.

LL. Painted Pavement Markings, Final Surface – Bid Item No 710-90

1. Payment for this item shall be made on a Lump Sum Basis. The Contractor's unit price shall include full compensation for the painted pavement markings including, striping, messages, symbols, arrows or other similar pavement markings in accordance with the specifications.

MM. Thermoplastic, Standard, Pavement Striping – Bid Item No:

711-11123 – Thermoplastic, Standard, White, Solid, 12" for Crosswalk and Roundabout

711-11124 – Thermoplastic, Standard, White, Solid, 18" for Diagonal and Chevron

711-11125 – Thermoplastic, Standard, White, Solid, 24" for Stop Line and Crosswalk

1. Payment for this item shall be made at the Contractor's Unit Price per linear foot of striping installed and accepted. The Contract Unit Price shall include compensation for all labor, material, and equipment required to install the striping in accordance with the plans and specifications.
2. Payment shall be made for each linear foot of Thermoplastic, Standard, Pavement Striping installed by authorization of the Consultant. Any striping that is damaged incidental to construction or defective shall be replaced at the Contractor's expense.

NN. Thermoplastic, Standard, Pavement Striping – Bid Item No:

0711-11141 – Thermoplastic, Standard, White, 2-4 Dotted Guideline/6-10 Gap Extension, 6"

0711-11241 – Thermoplastic, Standard, Yellow, 2-4 Dotted Guideline/6-10 Gap Extension, 6"

1. Payment for this item shall be made at the Contractor's Unit Price per gross mile of striping installed and accepted. The Contract Unit Price shall include compensation for all labor, material, and equipment required to install the striping in accordance with the plans and specifications.
2. Payment shall be made for each gross mile of Thermoplastic, Standard, Pavement Striping installed by authorization of the Consultant. Any striping that is damaged incidental to construction or defective shall be replaced at the Contractor's expense.

OO. Thermoplastic, Standard, Pavement Message, Symbol and Arrow – Bid Item No:

711-11160 – Thermoplastic, Standard, White, Message or Symbol

711-11170 – Thermoplastic, Standard, White, Arrow



1. Payment for this item shall be made at the Contractor's Unit Price per each message, symbol or arrow installed and accepted. The Contract Unit Price shall include compensation for all labor, material, and equipment required to install the message, symbol, or arrow in accordance with the plans and specifications.
2. Payment shall be made for each Message, Symbol or Arrow installed by authorization of the Consultant. Any Message, Symbol or Arrow that is damaged incidental to construction or defective shall be replaced at the Contractor's expense.

PP. Thermoplastic, Standard – Other Surfaces, Pavement Striping – Bid Item No:

711-16101 – Thermoplastic, Standard – Other, Surfaces, White, Solid, 6"

711-16201 – Thermoplastic, Standard – Other, Surfaces, Yellow, Solid, 6"

1. Payment for this item shall be made at the Contractor's Unit Price per gross mile of striping installed and accepted. The Contract Unit Price shall include compensation for all labor, material, and equipment required to install the striping in accordance with the plans and specifications.
2. Payment shall be made for each gross mile of Thermoplastic, Standard, Pavement Striping installed by authorization of the Consultant. Any striping that is damaged incidental to construction or defective shall be replaced at the Contractor's expense.

QQ. Irrigation System Modifications – Bid Item No RD-1

1. Payment for this item shall be made at the contract allowance price bid for the item. The contract allowance price shall include compensation for labor, material, and equipment required to provide utility allowance in accordance with the plans and specifications.

RR. Professional Audio/Video of Construction Site – Bid Item No RD-2

1. Payment for Audio Video Documentation shall be made at the Contract lump sum price and shall be full compensation for Audio Video Documentation as specified in technical specification 01390 VIDEO AND PHOTOGRAPHIC SITE SURVEY and the requirements of this technical specification.

SS. Tree Allowance – Bid Item No RD-3

1. Payment for this item shall be made at the contract allowance price bid for the item. The contract allowance price shall include compensation for labor, material, and equipment required to provide utility allowance in accordance with the plans and specifications.

TT. Miscellaneous Metals Allowance – Bid Item No RD-4

1. Payment for this item shall be made at the contract allowance price bid for the item. The contract allowance price shall include compensation for labor, material, and equipment required to provide utility allowance in accordance with the plans and specifications.

UU. As-Built Record Drawings – Bid Item No

1. Payment for Record Drawings shall be made at the Contract Lump Sum Price and shall be full compensation for preparation and maintenance of the Record Drawings as specified in technical specification SC01340 SHOP DRAWINGS, WORK DRAWINGS AND SAMPLES and the requirements of this Special Conditions.

Partial payments for the Record Drawings shall be made in accordance with the following schedule:

Percent of Original Contract Amount Earned	Allowable percent of Lump Sum Price For Record Drawings
10	10



25	25
50	50
75	75
Final Payment	100

2. Contractor shall submit updated As-Built Drawings (1 hard copy set and 1 electronic copy in PDF with each Pay Application Request).

VV. Indemnification – Bid Item No

1. Consideration for Indemnification – Payment under this item is in accordance with the Front-End Contract Documents.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

*** SPECIAL NOTE:**

The CITY retains the option to utilize up to 20% of the excess material from excavation and trenching operations. If the CITY exercises this option, Contractor shall stockpile the excess material and deliver to the CITY's facility as directed by the CITY's Representative.

END OF SECTION



SECTION 01027 - APPLICATIONS FOR PAYMENTS

PART 1 - GENERAL

signature of a responsible officer of Contract firm.

1.01 DESCRIPTION

- A. Scope of Work: Submit Applications for Payment to the CONSULTANT in accordance with schedule established by Conditions of the Contract and Agreement between CITY and Contractor.
- B. Related requirements described elsewhere:
 - 1. Agreement:
 - 2. Application for Payment Form.
 - 3. Progress Schedules: Section SC01310.
 - 4. Schedule of Values: Section SC01370
 - 5. Construction Photographs: Section SC01380.
 - 6. Contract Closeout: Section SC01700.
 - 7. Project Record Documents: Section SC01720.

1.02 FORMAT REQUIRED

- A. Submit applications typed on form acceptable to CITY, Documents (Application for Payment Form), with itemized data typed on 8-1/2 inch x 11 inch or 8-1/2 inch x 14-inch white paper continuation sheets.

1.03 PREPARATION OF APPLICATION FOR EACH PROGRESS PAYMENT

- A. Application Form:
 - 1. Fill in required information, including that for Change Orders executed prior to date of submittal of application.
 - 2. Fill in percent complete for each activity and dollar value to agree with respective percents.
 - 3. Execute certification with

B. Continuation Sheets:

- 1. Fill in total list of all scheduled component items of work, with item number and scheduled dollar value for each item.
- 2. Fill in dollar value in each column for each scheduled line item when work has been performed. Round off values to nearest dollar, or as specified for Schedule of Values.
- 3. List each Change Order executed prior to date of submission, at the end of the continuation sheets. List by Change Order Number, and description, as for an original component item of work.
- 4. As provided for in the "Application for Payment" form, the Contractor shall certify, for each current pay request, that all previous progress payments received from the CITY, under this Contract, have been applied by the Contractor to discharge in full all obligations of the Contractor in connection with Work covered by prior Applications for Payment, and all materials and equipment incorporated into the Work are free and clear of all liens, claims, security interest and encumbrances. Contractor shall attach to each Application for Payment like affidavits by all subcontractors.

1.04 SUBSTANTIATING DATA FOR PROGRESS PAYMENTS

- A. Contractor shall submit suitable information, with a cover letter identifying:
 - 1. Project.
 - 2. Application number and date.
 - 3. Detailed list of enclosures.



- B. Submit one (1) copy of data and cover letter for each copy of application.
- C. The Contractor is to maintain an updated set of drawings to be used as record drawings in accordance with Section SC01720: Project Record Documents. As a prerequisite for monthly progress payments, the Contractor is to submit the updated record drawings for review by the CITY and the CONSULTANT.
- D. Each monthly application for payment shall incorporate the corresponding "monthly progress status report" prepared per the requirements of Section SC01310: Progress Schedules.
- E. Contractor shall submit a duly executed letter from surety consenting to payment due and progress to date.
- F. Provide construction photographs in accordance with Section SC01380: Construction Photographs.

1.05 PROGRESS PAYMENT
PROCEDURES

- A. The Contractor will prepare and submit one (1) original monthly invoice for work completed during the one-month period. Application for Payment shall be submitted in the format of the sample form provided by the CITY. All information must be completed for the pay application to be accepted. CITY's purchase order number for the project must be placed on each application. The Application for Payment must be submitted at least three (3) days in advance in an electronic format for review by the CITY and CONSULTANT for approval. **Redlined Applications for Payment will not be accepted by the CITY.**
- B. If the Application for Payment and support data are not approved, the Contractor is required to submit new, revised or missing information according to the CONSULTANT's instructions. Otherwise, the Contractor shall prepare and submit

to the CITY or CONSULTANT an invoice in accordance with the estimate as approved. CITY will pay Contractor, in accordance with Florida Prompt Payment Act, §218.70, Florida Statutes, as may be amended from time to time.

- C. Each Application For Payment shall be accompanied by an updated project schedule (three-week ahead schedule) along with the Construction/Progress photographs and Project Record Drawings in accordance with Section SC01720: PROJECT RECORD DOCUMENTS and SC01380: CONSTRUCTION PHOTOGRAPHS or as directed by the CITY. Any Application For Payment that is received without these items will be returned to the Contractor without review.
- D. The Contractor shall prepare a schedule of values by phases of work to show a breakdown of the Contract Sum corresponding to the payment request breakdown and progress schedule line items. The schedule of values must also show dollar value for each unit of work scheduled. Approved Change Order items shall be added as separate line items.
- E. Prior to initial payment request, the Contractor shall submit the following documents to the CITY and Consultant for their review and approval:

- 1. List of principle subcontractors and suppliers.
- 2. Schedule of values.
- 3. Shop drawing log.
- 4. Project schedule.

1.06 PREPARATION OF APPLICATION
FOR FINAL PAYMENT

- A. Fill in Application form as specified for progress payments. Provide information as required by the General Conditions and Section SC01700: Contract Closeout.
- B. Furnish evidence of completed



operations insurance in accordance with the General Conditions.

END OF SECTION

- C. Provide Final Release of Lien and other closeout submittals as required by the General Conditions.

1.07 SUBMITTAL PROCEDURES

- A. Submit Applications for Payment to the CITY at the time stipulated in the Agreement. Review the percents complete with the CONSULTANT and resolve any conflicts or discrepancies.
- B. Number of copies for each Final Application for Payment:
 - 1. CITY: One (1) copy.
 - 2. CONSULTANT: One (1) copy
- C. When the CONSULTANT finds Application properly completed and correct, it will transmit the certificate for payment to the CITY, with copy for the Contractor.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

- 3.01 Upon receipt by CONSULTANT and CITY of Contractor's written Notice of Final Completion of its work under this Contract, CONSULTANT and CITY shall verify all work has been completed on the project. When all work has been verified as complete, and the Contractor submits the items listed below, the Contractor may submit a final Application for Payment:
 - A. Complete work listed as incomplete at the time of Substantial Completion and obtain CONSULTANT certification of completed Work.
 - B. Provide copy of records indicating notification to all subcontractors and material suppliers of Contractor's Performance and Payment Bonds.
 - C. Transfer operational, access, security and similar provisions to CITY; remove temporary facilities, tools and similar items.



SECTION 01041 - PROJECT COORDINATION

PART I – GENERAL

1.01 REQUIREMENTS INCLUDED

A. The Contractor shall:

1. Coordinate work of its employees and subcontractors.
2. Expedite its work to assure compliance with schedules.
3. Coordinate its work with that of work by CITY.
4. Comply with orders and instructions of CONSULTANT.

1.02 RELATED REQUIREMENTS

- A. Section SC01010: Summary of Project.
- B. Section SC01027: Applications for Payment.
- C. Section SC01200: Project Meetings.
- D. Section SC01310: Progress Schedules.
- E. Section SC01340: Shop Drawings, Work Drawings and Samples.
- F. Section SC01500: Construction Facilities and Temporary Controls.
- G. Section SC01700: Contract Closeout.

1.03 CONSTRUCTION ORGANIZATION & START-UP

- A. CONSULTANT shall establish on-site lines of authority and communications:
 1. Schedule and conduct pre-construction meeting and progress meetings as specified in Section SC01200: PROJECT MEETINGS.
 2. Establish procedure for:
 - a. Submittals

b. Reports and records

c. Recommendations

d. Coordination of drawings

e. Schedules

f. Resolution of conflicts

3. Interpret Contract Documents:

- a. Transmit written interpretations to Contractor, and to other concerned parties.

4. Assist in Obtaining permits and approvals:

- a. Verify that Contractor and subcontractors have obtained inspections for Work and for temporary facilities.

5. Control the use of Site:

- a. Allocate space for Contractor's use for field offices, sheds, and work and storage areas.

6. Inspection and Testing:

- a. Inspect work to assure performance in accord with requirements of Contract Documents.
- b. Administer special testing and inspections of suspect Work.
- c. Reject Work, which does not comply with requirements of Contract Documents.
- d. Coordinate Testing Laboratory Services:
 1. Verify that required laboratory personnel are present.
 2. Verify that tests are made in accordance



with specified standards.

3. Review test reports for compliance with specified criteria.
4. Recommend and administer any required re-testing.

1.04 CONTRACTOR'S DUTIES

A. Construction Schedules:

1. Prepare a detailed schedule of basic operations.
2. Monitor schedules as work progresses:
 - a. Identify potential variances between scheduled and probable completion dates for each phase.
 - b. Recommend to CITY adjustments in schedule to meet required completion dates.
 - c. Document changes in schedule; submit to CITY, CONSULTANT and to involved subcontractors.
3. Observe work of each subcontractor to monitor compliance with schedule.
 - a. Verify that labor and equipment are adequate for the work and the schedule.
 - b. Verify that product procurement schedules are adequate.
 - c. Verify that product deliveries are adequate to maintain schedule.
 - d. Report noncompliance to CONSULTANT, with recommendation for changes.

B. Process Shop Drawings, Product Data and Samples:

1. Prior to submittal to CONSULTANT, review for compliance with Contract Documents:

- a. Field dimensions and clearance dimensions.
- b. Relation to available space.
- c. Effect of any changes on the work of any subcontractor.

A. Review Drawings prepared by Mechanical and Electrical subcontractors:

1. Prior to submittal to CONSULTANT, review for compliance with Contract Documents:

B. Prepare Coordination Drawings as required to resolve conflicts and to assure coordination of the work of, or affected by, mechanical and electrical trades, or by special equipment requirements.

1. Submit to CONSULTANT.
2. Reproduce and distribute copies to concerned parties after CONSULTANT review.

C. Maintain reports and records at job site, available to CONSULTANT and CITY.

1. Daily log of progress of work.
2. Records.
 - a. Contracts.
 - b. Purchase orders.
 - c. Materials and equipment records.
 - d. Applicable handbooks, codes and standards.
3. Maintain file of record documents.

1.05

CONTRACTOR'S DUTIES

CLOSE-OUT



A. Mechanical and Electrical equipment start-up:

1. Coordinate checkout of utilities, operational systems and equipment.
2. Organize initial start-up and testing.
3. Record dates of start of operation of systems and equipment.
4. Submit to CITY written notice of beginning of warranty period for equipment put into service.

B. At completion of Work, conduct an inspection to assure that:

1. Specified cleaning has been accomplished.
2. Temporary facilities have been removed from site.

C. Substantial Completion:

1. Conduct an inspection to develop a list of Work to be completed or corrected.

2. Assist CONSULTANT in inspection.

3. Supervise correction and completion of work of subcontractors.

1.06 CONSULTANT'S CLOSE-OUT DUTIES

A. Final Completion:

1. When Contractor determines that work is finally complete, conduct an inspection to verify completion of Work.

B. Administration of Contract closeout:

1. Receive and review Contractor's final submittals.
2. Transmit to CITY with recommendations for action.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION



SECTION 01050 - FIELD ENGINEERING

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work: Contractor to provide Field Engineering service for the Project.

1. Survey work required in execution of Project.
2. The method of field staking for the construction of the Work shall be at the option of the Contractor. The CITY has provided the engineering surveys, if available, necessary to establish reference points which in the CITY's judgment are necessary to enable the Contractor to proceed with its work.
3. The accuracy of any method of staking shall be the responsibility of the Contractor. All engineering for vertical and horizontal control shall be the responsibility of the Contractor.
4. The Contractor shall be held responsible for the preservation of all stakes and marks. If any stakes or marks are carelessly or willfully disturbed by the Contractor, the Contractor shall not proceed with any work until it has established such points, marks, lines and elevations as may be necessary for the prosecution of the Work.
5. The Contractor shall retain the services of a registered land surveyor licensed in the State of Florida to identify existing control

points and maintain a survey during construction.

B. Related Requirements Described Elsewhere:

1. Summary of Work: Section SC01010.
2. Project Record Documents: Section SC01720.

1.02 QUALIFICATIONS OF SURVEYOR

A. Qualified registered land surveyor, acceptable to the CITY.

1.03 SURVEY REFERENCE POINTS

A. Locate and protect control points prior to starting site work, and preserve all permanent reference points during construction.

1. Make no changes or relocations without prior written notice to the Consultant.
2. Report to the CONSULTANT when any reference point is lost or destroyed, or requires relocation because of necessary changes in grades or locations.
3. Require surveyor to replace Project control points which may be lost or destroyed at no additional cost to the CITY. Establish replacement based on original survey control.

1.04 PROJECT SURVEY REQUIREMENTS

A. Establish a minimum of two (2) permanent benchmarks each on site.



1. Record locations, with horizontal and vertical data, on Project Record Documents.
- B. Establish lines and levels, locate and lay out, by instrumentation and similar appropriate means.
- C. From time to time, verify layouts by same methods.

1.05 RECORDS

- A. Maintain a complete, accurate log of all control and survey work as it progresses.
- B. At the end of the project, submit a certified site survey at 1-inch equals 20 feet scale on 24 inches by 36 inches sheet, and per Section SC01720 – Project Record Documents.

1.06 SUBMITTALS

- A. Submit name and address of surveyor to the CONSULTANT.
- B. On request of the CONSULTANT, submit documentation to verify accuracy of Field Engineering work.
- C. Submit certificate signed by a registered surveyor certifying that elevations are in conformance with the Contract Documents, or if not in conformance, certify as to variances from the Contract Documents.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION



SECTION 01065 - PERMITS AND FEES

PART 1 – GENERAL

- A. The Contractor shall obtain all permits and licenses related to its work, including but not limited to, the necessary construction permits. Cost of permit fees shall be paid by Contractor. CITY to be invoiced at actual cost without markup.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.01 NPDES COMPLIANCE

- A. In addition to other required field permitting, prior to the commencement of work, the Contractor must obtain the permit coverage for stormwater discharge from large and small construction activities and must implement appropriate pollution prevention techniques and SWPPP to minimize erosion and sedimentation to properly manage the stormwater runoff. The Contractor shall prepare a NPDES Site Plan including sketches and Best Management Practice procedures for review and comment from the Project Manager. The NPDES Site Plan shall include the control of stormwater, ground water and subsurface water during dewatering operations.

(DEP adopted Rule 62-621.300 (4), F.A.C., with specific provisions for requesting permit coverage for the management of stormwater discharge from large and small construction activities.)

- B. The permit coverage for construction activities is to be obtained by submitting DEP

form 62-621.300 (4) (b) Notice of Intent (NOI) to Use Generic Permit for Stormwater Discharge from Large and Small Construction Activities and by preparing and implementing a Stormwater Pollution Prevention Plan (SWPPP). After construction is complete, Notice of Termination (NOT) to discontinue the permit coverage is to be submitted by utilizing form 62-621.300 (6).

- C. For additional information contact NPDES Stormwater Section at:

Florida Department of
Environmental Protection
Tallahassee, FL 32399-2400
(850) 921-9904

END OF SECTION



SECTION 01070 - ABBREVIATIONS AND SYMBOLS

PART 1 - GENERAL

1.01 STANDARDS AND ABBREVIATIONS

A. Referenced Standards: Any reference to published specifications or standards of any organization or association shall comply with the requirements of the specification or standard which is current on the date of Advertisement for Bids. In case of a conflict between the referenced specifications or standards, the one having the more stringent requirements shall govern.

B. In case of conflict between the referenced specifications or standards and the Contract Documents, the Contract Documents shall govern.

C. Abbreviations:

AA	Aluminum Association
AAA	American Arbitration Association
AABC	Associated Air Balance Council
AAMA	Architectural Aluminum Manufacturers Assoc.
AASHO	The American Association of State Highway Officials
ABA	American Bar Association
ABMA	American Boiler Manufacturers Association
ABPA	Acoustical and Board Products Association
ACI	American Concrete Institute
ACPA	American Concrete Pipe Association
AEIC	Association of Edison Illuminating Companies
AFBMA	Anti-Friction Bearing Manufacturers Assoc.

AGA	American Gas Association
AGC	Associated General Contractors of America
AGMA	American Gear Manufacturers Association
AHA	American Hardboard Association
AI	The Asphalt Institute
AIA	American Institute of Architects
AIA	American Insurance Association
AIEE	American Institute of Electrical Engineers (Now IEEE)
AIMA	Acoustical and Insulating Materials Association
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AITC	American Institute of Timber Construction
AMCA	Air Moving and Condition Association
ANSI	American National Standard Institute
APA	American Plywood Association
API	American Petroleum Institute
APWA	American Public Works Association
AREA	American Railway Engineering Association
ARI	American Refrigeration Institute
ASA	American Standards Association (Now ANSI)
ASAHC	American Society of Architectural Hardware Consultants
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air Conditioning



	Engineers	EEI	Edison Electric Institute
ASME	American Society of Mechanical Engineers	EPA	Environmental Protection Agency
ASSCBC	American Standard Safety Code for Building Construction	FCI	Fluid Control Institute
ASSHTO	American Association of State Highway Transportation Officials	FDER	Florida Department of Environmental Regulation
ASTM	American Society for Testing and Materials	FDOT	Florida Department of Transportation
AWG	American Wire Gauge	FEC	Florida East-Coast Railway
AWI	Architectural Woodwork Institute	Fed Spec	Federal Specification
AWPA	American Wood Preservers Association	FPL	Florida Power and Light
AWPB	American Wood Preservers Bureau	FPS	Feet Per Second
AWPI	American Wood Preserves Institute	FS	Federal Standards
AWS	American Welding Society	GA	Gypsum Association
	AWWA American Water Works Association	GPM	Gallons Per Minute
BHMA	Builders Hardware Manufacturers Association	HMI	Hoist Manufacturers Institute
BIA	Brick Institute of America (formerly SCPI)	HP	Horsepower
	CDA Copper Development Association	HSBII	Hartford Steam Boiler Inspection and Insurance Co.
CFS	Cubic Feet Per Second	ID	Inside Diameter
CMAA	Crane Manufacturers Association of America	IEEE	Institute of Electrical and Electronic Engineers
CRSI	Concrete Reinforcing Steel Institute	IFI	Industrial Fasteners Institute
CS	Commercial Standard	IPCEA	Insulated Power Cable Engineers Association
DHI	Door and Hardware Institute	IPS	Iron Pipe Size
DIPRA	Ductile Iron Pipe Association	LWDD	Lake Worth Drainage District
DOT	Spec-Standard Specification for Road and Bridge Construction Florida Department of Transportation, 1982	MF	Factory Mutual System
E/A	Engineer and/or Architect	MGD	Million Gallons Per Day
EDA	Economic Development Association	MHI	Materials Handling Institute
		MIL	Military Specification
		MMA	Monorail Manufacturers Association
		NBFU	National Board of Fire Underwriters
		NBHA	National Builders' Hardware Association
		NBS	National Bureau of Standards
		NCSA	National Crushed Stone Association
		NCSPA	National Corrugated Steel Pipe Association
		NEC	National Electrical Code



NECA	National Electrical Contractors' Association		Manufacturer's Association
NEMA	National Electrical Manufacturers' Association	SJI	Steel Joists Institute
NFPA	National Fire Protection Association	SMACNA	Sheet Metal and Air Conditioning Contractors' National Association
NLA	National Lime Association	SSI	Scaffolding and Shoring Institute
NPC	National Plumbing Code	SSPC	Steel Structures Painting Council
NPDES	National Pollutant Discharge Elimination System	SSPC	Structural Steel Painting Council
NPT	National Pipe Threads	STA	Station (100 feet)
NSC	National Safety Council	TAS	Technical Aid Series
NSF	National Sanitation Foundation		
OD	Outside Diameter	TCA	Tile Council America
OSHA	U.S. Department of Labor, Occupational Safety and Health Administration	TDH	Total Dynamic Head
PCA	Portland Cement Association	TH	Total Head
PCI	Prestressed Concrete Institute	UBC	Uniform Building Code
PS	United States Products Standards	UL	Underwriter's Laboratories, Inc.
PSI	Pounds per Square Inch	USACE	United States Army Corps of Engineers
PSIA	Pounds per Square Inch Atmosphere	USASI	United States of American Standards Institute
PSIG	Pounds Per Square Inch Gauge		
RPM	Revolutions Per Minute		
SAE	Society of Automotive Engineers		
SDI	Steel Decks Institute		
SFWMD	South Florida Water Management District		
SIGMA	Sealed Insulating Glass		

C. Additional abbreviations and symbols are shown on the Drawings.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION



SECTION 01091 - REFERENCE SPECIFICATIONS

PART 1 - GENERAL

1.01 GENERAL

A. Applicable Publications. Whenever in these Specifications references are made to published specifications, codes, standards, or other requirements, it shall be understood that wherever no date is specified, only the latest specifications, standards, or requirements of the respective issuing agencies which have been published as of the date that the Work is advertised for bids, shall apply; except to the extent that such standards or requirements may be in conflict with applicable federal, state and local laws, ordinances, or governing codes. No requirements set forth herein or shown on the Drawings shall be waived because of any provision of or omission from such standards or requirements.

B. Assignment of Specialists. In certain instances, the Specifications require (or imply) that specific Work is to be assigned to specialist or expert entities who must be engaged for the performance of the Work. Such assignments shall be recognized as special requirements over which the Contractor has no choice or option. These requirements shall not be interpreted so as to conflict with the enforcement of building codes and similar regulations governing the Work. These requirements are not intended to interfere with local union jurisdiction settlements and similar conventions. Such assignments are intended to establish which party or entity involved in a specific unit of Work is recognized as "expert" for the indicated construction processes or operations. Nevertheless, the final responsibility for fulfillment of the entire set of contract requirements remains with the Contractor.

1.02 REFERENCE SPECIFICATIONS, CODES AND STANDARDS

A. Without limiting the generality of other requirements of the Specifications, all Work specified herein shall conform to, or exceed, the requirements of such documents and are not in conflict with the requirements of these Specifications or applicable codes.

B. References herein to "Building Code" shall mean the Florida Building Code, or the approved building code which replaces it. The latest edition of the code as adopted by the CITY as of the date of award as adopted by the Local Public Agency having jurisdiction shall apply to the Work herein, including all addenda, modifications, amendments, or other lawful changes thereto.

C. In case of conflict between codes, reference standards, drawings, and the other Contract Documents, the most stringent requirements shall govern. All conflicts shall be brought to the attention of the CONSULTANT for clarification and directions prior to ordering or providing any materials or labor. The Contractor shall bid the most stringent requirements.

D. Applicable Standard Specifications. The Contractor shall construct the Work specified herein in accordance with the requirements of the Contract Documents and the referenced portions of those referenced codes, standards, and Specifications listed.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION



SECTION 01110 - ENVIRONMENTAL PROTECTION PROCEDURES

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. The work covered by this Section consists of furnishing all labor, materials and equipment and performing all work required for the prevention of environmental pollution in conformance with applicable federal, state and local laws and regulations, during and as the result of construction operations under this Contract. For the purpose of this Specification, environmental pollution is defined as the presence of chemical, physical, or biological elements or agents which adversely affect human health or welfare; unfavorably alter ecological balances; adversely affect plants or animals; or degrade the utility of the environment for aesthetic and/or recreational purposes.
- B. The control of environmental pollution requires consideration of air, water and land, and involves management of noise and solid waste, as well as other pollutants.
- C. The Contractor shall schedule and conduct all work in a manner that will minimize the erosion of soils in the area of the work. Provide erosion control measures required to prevent silting, muddying, or pollution of wetlands, streams, rivers, impoundments, lakes, stormwater ponds, etc. All erosion control measures shall be in place in an area prior to any construction activity in that area and shall be maintained throughout construction. Specific requirements for erosion and sedimentation controls are specified in Section 02270. The Contractor will be required to meet all the conditions specified in the permits and in the Specifications.

- D. All specific conditions attached to existing permits for this site shall be included in the sedimentation and erosion control measures.

1.2 APPLICABLE REGULATIONS

- A. The Contractor shall comply with all applicable Federal, State and local laws and regulations and applicable permits and their specific conditions concerning environmental pollution control and abatement.

1.3 NOTIFICATIONS

- A. The CITY and/or CONSULTANT will notify the Contractor in writing of any non-compliance with the foregoing provisions or of any environmentally objectionable acts and corrective action to be taken. State or local agencies responsible for verification of certain aspects of the environmental protection requirements shall notify the Contractor in writing, through the CITY or CONSULTANT, of any non-compliance with State or local requirements. The Contractor shall, after receipt of such notice from the CITY or Consultant or from the regulatory agency through the CITY and/or CONSULTANT, immediately take corrective action. Such notice, when delivered to the Contractor or their authorized representative at the site of the work, shall be deemed sufficient for the purpose. If the Contractor fails or refuses to comply promptly, the CITY may issue an order stopping all or part of the work until satisfactory corrective action has been taken. No part of the time lost due to any such stop orders shall be made the subject of a claim for extension of time or for excess costs or damages by the Contractor unless it is later



determined that the Contractor was in compliance.

1.04 IMPLEMENTATION

- A. Prior to commencement of the Work, the CONTRACTOR shall meet with the CITY and CONSULTANT to develop mutual understandings relative to compliance with this provision and administration of the environmental pollution control program.
- B. The Contractor shall remove temporary environmental control features, when approved by the CITY or CONSULTANT, and incorporate permanent control features into the project at the earliest practicable time.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 EROSION CONTROL

- A. The Contractor shall provide positive means of erosion control such as shallow run on and run off ditches around construction to carry off surface water. Erosion control measures, such as siltation basins, hay check dams, mulching, jute netting and other equivalent techniques, shall be used as appropriate. Flow of surface water into excavated areas shall be prevented. Ditches around construction area shall also be used to carry away water resulting from dewatering of excavated areas. If dewatering is necessary and exceeds SFWMD thresholds, a dewatering plan must be prepared by a certified Registered Professional Engineer in the State of Florida and submitted to the CITY and CONSULTANT; then submitted and approved by the South Florida Water Management District prior to the commencement of work requiring dewatering. Contractor must comply with permits. However,

no water from dewatering activities may be discharged offsite. At the completion of the Work, ditches shall be backfilled and the ground surface restored to original condition.

3.2 PROTECTION OF STREAMS AND CANALS

- A. Care shall be taken by Contractor to prevent, or reduce to a minimum, any damage to any ditch or the stormwater outfall canal, from pollution by debris, sediment or other material, or from the manipulation of equipment and/or materials in or near such ditches. Water that has been used for washing or processing, or that contains oils or sediments that will reduce the quality of the water in the ditch, shall not be directly returned to the ditch. Such waters will be diverted through a settling basin or filter approved by the CITY or CONSULTANT and meet required standards before being directed into the ditches and other water bodies.
- B. The Contractor shall not discharge water from dewatering operations directly into any live or intermittent stream, channel, wetlands, surface water or any storm sewer. Water from dewatering operations shall be treated by filtration, settling basins, or other approved method to reduce the amount of sediment contained in the water to allowable levels.
- C. All preventative measures shall be taken by Contractor to avoid spillage of petroleum products and other pollutants. In the event of any spillage, prompt remedial action shall be taken in accordance with a contingency action plan approved by the Florida Department of Environmental Protection. Contractor shall submit two (2) copies of approved contingency



plans to the CITY and CONSULTANT.

3.3 PROTECTION OF LAND RESOURCES

- A. Land resources within the project boundaries and outside the limits of permanent work shall be restored to a condition, after completion of construction that will appear to be natural and not detract from the appearance of the project. Contractor shall confine all construction activities to areas shown on the Drawings.
- B. Outside of areas requiring earthwork for the construction of the new facilities, the Contractor shall not deface, injure, or destroy trees or shrubs, nor remove or cut them without prior approval from the CITY and CONSULTANT. No ropes, cables, or guys shall be fastened to or attached to any existing nearby trees for anchorage unless specifically authorized by the CITY and CONSULTANT. Where such special emergency use is permitted, first wrap the trunk with a sufficient thickness of burlap or rags over which softwood cleats shall be tied before any rope, cable, or wire is placed. The Contractor shall in any event be responsible for any damage resulting from such use.
- C. Where trees may possibly be defaced, bruised, injured, or otherwise damaged by the Contractor's equipment, dumping or other operations, protect such trees by placing barricades around them. Monuments and markers shall be protected similarly before beginning operations near them.
- D. Any trees or other landscape feature scarred or damaged by the Contractor's equipment or operations shall be restored as nearly as possible to its original condition.

All trimming or pruning shall be performed in an approved manner by experienced workmen with saws or pruning shears. Tree trimming with axes will not be permitted.

Climbing ropes shall be used where necessary for safety. Trees that are to remain, either within or outside established clearing limits, that are subsequently damaged by the Contractor and are beyond saving as determined by the CITY and/or CONSULTANT shall be immediately removed and replaced.

- E. The locations of the Contractor's storage, and other construction structures required temporarily in the performance of the Work, shall be cleared as shown on the Drawings. Drawings showing storage facilities shall be submitted for approval of the CITY and CONSULTANT.
- F. If the Contractor proposes to construct temporary roads or embankments and excavations for work areas, it shall submit the following for approval at least thirty (30) days prior to scheduled start of such temporary work.
 - 1. A layout of all temporary roads, excavations and embankments to be constructed within the work area.
 - 2. Details of temporary road construction.
 - 3. Drawings and cross sections of proposed embankments and their foundations, including a description of proposed materials.
- G. The Contractor shall remove all signs of temporary construction facilities such as haul roads, work areas, structures, foundations of temporary structures, stockpiles of excess of waste materials, or



any other vestiges of construction as directed by the CITY and CONSULTANT. The disturbed areas shall be prepared and seeded as described in Section 02924 SEED, MULCH and FERTILIZER, or as approved by the CONSULTANT.

- H. All debris and excess material will be disposed of in approved areas as noted on the Drawings.

3.4 PROTECTION OF AIR QUALITY

- A. Burning. No open fires or burning will be permitted. If need dictates burning of any kind, Contractor must obtain prior approval of CITY and obtain appropriate permits from the state and local government agencies.
- B. Dust Control. The Contractor will be required to maintain all excavations, embankment, stockpiles, access roads, waste areas, borrow areas, and all other work areas within or without the project boundaries free from dust which could cause the standards for air pollution to be exceeded, and which would cause a hazard or nuisance to others.
- C. An approved method of stabilization consisting of

sprinkling or other similar methods will be required to control dust. The use of petroleum products is prohibited.

- D. Sprinkling, to be approved, must be repeated at such intervals as to keep all parts of the disturbed area at least damp at all times, and the Contractor must have sufficient competent equipment on the job to accomplish this if sprinkling is used. Dust control shall be performed as the work proceeds and whenever a dust nuisance or hazard occurs, as determined by the CITY and/or CONSULTANT.

3.5 MAINTENANCE OF POLLUTION CONTROL FACILITIES DURING CONSTRUCTION

- A. During the life of this Contract, the Contractor shall maintain all facilities constructed for pollution control as long as the operations creating the particular pollutant are being carried out or until the material concerned has become stabilized to the extent that pollution is no longer being created.

END OF SECTION



SECTION 01153 - CHANGE ORDER PROCEDURES

PART 1 – GENERAL

1.01 SCOPE:

- A. The CITY, without invalidating the Contract, may make adjustments to bid item quantities by adding to or deducting from the quantities on the Schedule of Bid Items, as the Work progresses. These adjustments shall be in accordance with the unit or line item price set forth on the Schedule of Bid Items and are tracked as Work progresses, and approved on the monthly Application for Payment form.

1.02 REQUIREMENTS INCLUDED

- A. Promptly implement Change Order procedures.
 - 1. Provide full written data required to evaluate change.
 - 2. Maintain detailed records of work done on a time and material/force account basis.
 - 3. Provide full documentation to CONSULTANT on request.
- B. Designate in writing the member of Contractor's organization.
 - 1. Who is authorized to accept changes in the Work.
 - 2. Who is responsible for informing others in the Contractor's employ the authorization of changes in the Work.
- C. CITY will designate in writing the person who is authorized to execute Change Orders.

1.03 RELATED REQUIREMENTS

- A. Bid Form.
- B. Agreement.
- C. General Conditions.
- D. Supplementary Conditions.

- E. Section SC01027: Applications for Payments.

- F. Section SC01310: Progress Schedules.

- G. Section SC01370: Schedule of Values.

- H. Section SC01630: Substitutions and Product Options.

- I. Section SC01700: Contract Closeout.

1.04 DEFINITIONS

- A. Change Order: See General Conditions.
- B. Construction Change Authorization: A written order to the Contractor, signed by CITY and CONSULTANT, which amends the Contract Documents as described, and authorizes Contractor to proceed with a change that affects the Contract Sum or the Contract Time, for inclusion in a subsequent Change Order.
- C. Field Order: A written order, instructions, or interpretations, signed by CONSULTANT making minor changes in the Work not involving a change in Contract Sum or Contract Time.

1.05 PRELIMINARY PROCEDURES

- A. CONSULTANT may initiate changes by submitting a Proposal Request to Contractor. Request will include:
 - 1. Detailed description of the change, products, and location of the change in the Project.
 - 2. Supplementary or revised Drawings and Specifications.
 - 3. The projected time span for making the change, and a specific statement as to whether overtime work is, or is not, authorized.



4. A specific period of time during which the requested price will be considered valid.

5. Such request is for information only, and is not an instruction to execute the changes, nor to stop work in progress.

B. Contractor may initiate changes by submitting a written notice to Consultant containing:

1. Description of the proposed changes.

2. Statement of the reason for making the changes.

3. Statement of the effect on the Contract Sum and the Contract Time.

4. Statement of the effect on the Work of separate contractors.

5. Documentation supporting any change in Contract Sum or Contract Time, as appropriate.

1.06 CONSTRUCTION-CHANGE AUTHORIZATION

A. In lieu of Proposal Request, CONSULTANT may issue a construction change authorization for Contractor to proceed with a change for subsequent inclusion in a Change Order.

B. Authorization will describe changes in the Work, both additions and deletions, with attachments of revised Contract Documents to define details of the change, and will designate the method of determining any change in the Contract Sum and any change in Contract Time.

C. CITY and CONSULTANT will sign and date the Construction Change Authorization as authorization for the Contractor to proceed with the changes.

D. Contractor shall sign and date the Construction Change Authorization to indicate agreement with the terms therein.

1.07 DOCUMENTATION OF PROPOSALS AND CLAIMS

A. Support each quotation for a lump-sum proposal, and for each unit price which has not previously been established, with sufficient substantiating data to allow CONSULTANT to evaluate the quotation.

B. On request provide additional data to support time and cost computations:

1. Labor required.

2. Equipment required.

3. Products required.

a. Recommended sources of purchase and unit cost.

b. Quantities required.

4. Taxes, insurance, and bonds.

5. Credit for work deleted from Contract, similarly documented.

6. Overhead and profit.

7. Justification for any change in Contract Time.

C. Support each claim for additional costs, and for work done on a time-and-material/force account basis, with documentation as required for a lump-sum proposal, plus additional information:

1. Name of CITY's authorized agent who ordered the work, and the date of the order.

2. Dates and times work was performed, and by whom.

3. Time record, summary of hours worked, and hourly rates paid.

4. Receipts and invoices for:

a. Equipment used, listing dates and times of use.

b. Products used, listing of quantities.



c. Subcontractors.

- D. Document requests for substitutions for products as specified in Section SC01630.

1.08 PREPARATION OF CHANGE ORDERS

- A. CONSULTANT will initiate each Change Order.
- B. Change Order will describe changes in the Work, both additions and deletions, with attachments of revised Contract Documents to define details of the change.
- C. Change Order will provide an accounting of the adjustment in the Contract Sum and in the Contract Time.

1.09 LUMP-SUM/FIXED PRICE CHANGE ORDER

- A. Content of Change Orders will be based on, either:
1. CONSULTANT's Proposal Request and Contractor's Responsive Proposal as mutually agreed between CITY and Contractor; or
 2. Contractor's Proposal for a change, as recommended by the CONSULTANT.
- B. CITY and CONSULTANT will sign and date the Change Order as authorization for the Contractor to proceed with the changes.
- C. Contractor shall sign and date the Change Order to indicate agreement with the terms therein.

1.10 UNIT PRICE CHANGE ORDER

- A. Content of Change Orders will be based on, either:
1. CONSULTANT's definition of the scope of the required changes; or
 2. Contractor's Proposal for a change, as recommended by CONSULTANT; or

3. Survey of completed work.

- B. The amounts of the unit prices to be:
1. Those stated in the Agreement.
 2. Those mutually agreed upon between CITY and Contractor.
- C. When quantities of each of the items affected by the Change Order can be determined prior to start of the work:
1. CITY and CONSULTANT will sign and date the Change Order as authorization for Contractor to proceed with the changes.
 2. Contractor shall sign and date the Change Order to indicate agreement with the terms herein.
- D. When quantities of the items cannot be determined prior to start of the work:
1. CONSULTANT will issue a construction change authorization-directing Contractor to proceed with the change on the basis of unit prices.
 2. At completion of the change, CONSULTANT will determine the cost of such work based on the unit prices and quantities used.
 - a. Contractor shall submit documentation to establish the number of units of each item and any claims for change in Contract Time.
 3. CONSULTANT will sign and date the Change Order to establish the change in Contract Sum and in Contract Time.
 4. CITY and Contractor will sign and date the Change Order to indicate their agreement with the terms therein.



1.11 TIME AND MATERIAL/FORCE
ACCOUNT CHANGE ORDER/
CONSTRUCTION CHANGE
AUTHORIZATION

- A. CONSULTANT will issue a Construction Change Authorization directing Contractor to proceed with the changes.
- B. At completion of the change, Contractor shall submit itemized accounting and supporting data as provided in the Article "Documentation of Proposals and Claims" of this Section.
- C. CONSULTANT will determine the allowable cost of such work, as provided in General Conditions and Supplementary Conditions.
- D. CONSULTANT will sign and date the Change Order to establish the change in Contract Sum and in Contract Time.
- E. CITY and Contractor will sign and date the Change Order to indicate their agreement therewith.

1.12 CORRELATION WITH
CONTRACTOR'S SUBMITTALS

- A. Contractor shall periodically revise Schedule of Values and Request for Payment forms to record each change as a separate item of work, and to record the adjusted Contract Sum.
- B. Contractor shall periodically revise the Construction Schedule to reflect each change in Contract Time.
 - 1. Contractor shall revise sub-schedules to show changes for other items of work affected by the changes.
- C. Upon completion of work under a Change Order, Contractor shall enter pertinent changes in Record Documents.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION



SECTION 01200 - PROJECT MEETINGS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. The Consultant shall schedule and administer pre-construction meeting, monthly progress meetings, and specifically called meetings throughout the progress of the Work. The Consultant shall:
 - a. Prepare agenda for meetings.
 - b. Make physical arrangements for meetings.
 - c. Preside at meetings.
2. Representatives of Contractor, subcontractors and suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents.
3. The Contractor shall attend meetings to ascertain that work is expedited consistent with Contract Documents and construction schedules. The Consultant shall record the pre-construction meeting and each progress meeting in its entirety, and shall provide the Consultant with a voice recording, having good quality and clarity, and a typed transcript of the minutes of each meeting. A copy of the minutes of each progress meeting shall be available five (5) business days after the meeting.

B. Related Requirements Described Elsewhere:

1. Progress Schedules: Section SC01310.
2. Shop Drawings, Working Drawings, and Samples: Section SC01340.
3. Security and Safety Procedures for Infrastructure Projects: Section SC01540
4. Project Record Documents: Section SC01720.

1.02 PRE-CONSTRUCTION MEETING

A. The Consultant shall schedule a preconstruction meeting within ten (10) days after the effective date of the contract.

B. Location: A local site, convenient for all parties, designated by the Consultant.

C. Attendance:

1. CITY's representative.
2. Consultant and Consultant's professional consultants.
3. Resident project representative.
4. Contractor and its superintendent.
5. Major subcontractors.
6. Representatives of major suppliers and manufacturers as appropriate.
7. Governmental and Utilities representatives as appropriate.
8. Others as requested by the Contractor, CITY and



Consultant.

D. The purpose of the pre-construction meeting is to designate responsible personnel and establish a working relationship. Matters requiring coordination will be discussed and procedures for handling such matters established. The suggested agenda should include:

1. Distribution and discussion of:
 - a. List of major subcontractors and suppliers.
 - b. Projected schedules.
 - c. Schedule of Values
 - d. NPDES plan
2. Critical work sequencing: Relationships and coordination with other contracts and/or work.
3. Major equipment deliveries and priorities.
4. Project coordination: Designation and responsible personnel.
5. Procedures and processing of:
 - a. Field decisions.
 - b. Proposal requests.
 - c. Request for Information.
 - d. Submittals.
 - e. Change Orders.
 - f. Applications for Payment.
6. Submittal of Shop

Drawings, project data and samples.

7. Adequacy of distribution of Contract Documents.
8. Procedures for maintaining Record Documents.
9. Use of premises:
 - a. Office, work and storage areas.
 - b. CITY's requirements.
 - c. Access and traffic control.
10. Construction facilities, controls and construction aids.
11. Temporary utilities.
12. Safety and first aid procedures.
13. Check of required Bond and Insurance certifications.
14. Completion time for Contract and liquidated damages.
15. Request for extension of Contract Time.
16. Weekly job meeting for all involved.
17. Security procedures.
18. Procedures for making partial payments.
19. Guarantees on completed work.
20. Equipment to be used.
21. Staking of work.
22. Project inspection.



23. Labor requirements.
24. Laboratory testing of material requirements.
25. Provisions for material stored on site.
26. Requirements of other organizations.
27. Rights-of-way and easements.
28. Housekeeping procedures.
29. Liquidated damages.
30. Posting of signs.
31. Pay request submittal dates.
32. Equal opportunity requirements.
3. CITY's representatives.
4. Subcontractors (active on the site).
5. Others as appropriate to the agenda (suppliers, manufacturers, other subcontractors, etc.).

E. The Consultant shall preside at the meetings and provide for keeping minutes and distribution of the minutes to the CITY, Consultant and others. The purpose of the meetings will be to review the progress of the Work. The agenda will include but not be limited to the following:

1.03 PROGRESS MEETINGS

- A. The Consultant shall schedule and conduct regular periodic meetings. The progress meetings will be held every thirty (30) days and at other times as required by the progress of the Work. The first meeting shall be held within thirty (30) days after the preconstruction meeting or thirty (30) days or less after the date of Notice to Proceed.
- B. Hold called meetings as required by progress of the Work.
- C. Location of the meetings: Site selected by Consultant.
- D. Attendance:
 1. Consultant and its representatives as needed.
 2. Contractor.
 1. Review approval of minutes of previous meeting.
 2. Review of work progress since previous meeting and work scheduled (3-week look ahead schedule).
 3. Field observations, problems, and conflicts.
 4. Problems which impede construction Schedule.
 5. Review of off-site fabrication, delivery schedules.
 6. Corrective measures and procedures to regain projected schedule.
 7. Status of approved construction schedule.
 8. Progress schedule during succeeding work period.
 9. Coordination of schedules.
 10. Review status of submittals, expedite as required.
 11. Maintenance of quality



standards.

12. Pending changes and substitutions.

13. Shop Drawing problems.

14. Review proposed changes for:

a. Effect on construction schedule and on completion date.

b. Effect on other contracts of the Project.

15. Construction schedule.

16. Critical/long lead items.

17. Other business.

F. The Contractor is to attend monthly progress meetings and is to study previous meeting minutes and current agenda items, and be prepared to discuss pertinent topics and provide specific information including but not limited to:

1. Status of all submittals and what specifically is being done to expedite them.

2. Status of all activities

behind schedule and what specifically will be done to regain the schedule.

3. Status of all material deliveries, latest contact with equipment manufacturer and specific actions taken to expedite materials.

4. Status of open deficiencies and what is being done to correct the same.

G. The Contractor is to provide a current submittal log at each progress meeting in accordance with Section SC01340: Shop Drawings, Working Drawings and Samples.

1.04 SPECIAL MEETINGS

A. The Contractor may be required to attend certain City Hall meetings to inform the public before commencement or during progress of the project to discuss specific issues.

PART 2- PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION



SECTION 01310 - PROGRESS SCHEDULES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. Prior to Pre-Construction Meeting, Contractor shall prepare and submit to the CONSULTANT initial construction schedule(s) demonstrating complete fulfillment of all Contract requirements utilizing a Critical Path Method (hereinafter referred to as CPM) in planning, coordinating and performing the Work under this Contract (including all activities of subcontractors, equipment vendors and suppliers). The principles and definition CPM terms used herein shall be as set forth in the Associated General Contractors of America (AGC) publication, The Use of CPM in Construction, A Manual for General Contractors and the Construction Industry, latest edition, but the provisions of this Specification shall govern the planning, coordinating and performance of the Work. Assumed notice to proceed date for this schedule shall be ninety (90) days from bid opening date.

2. After issuance of Notice To Proceed, Contractor shall submit revised progress schedules on a bi-weekly basis. No partial payments shall be approved until there is an approved construction progress schedule on hand.

B. Related Requirements Described Elsewhere:

1. Summary of Project: Section SC01010
2. Applications for Payment: Section SC01027

3. Change Order Procedures: Section SC01153

4. Project Meetings: Section SC01200

5. Shop Drawings, Working Drawings, and Samples: Section SC01340

6. Schedule of Values: Section SC01370

1.02 QUALIFICATIONS

- A. A statement of computerized CPM capability shall be submitted by Contractor in writing prior to the award of the Contract and shall verify that either Contractor's organization has in-house capability to use the CPM technique or that Contractor will employ a CPM consultant who is so qualified.
- B. In-house capability shall be verified by description of construction projects to which Contractor or Contractor's consultant has successfully applied computerized CPM and shall include at least two (2) projects valued at least half the expected value of this Project.

1.03 FORM OF SCHEDULES

- A. Maximum Sheet Size: 24 inches by 36 inches.

1.04 CONTENT OF SCHEDULES

A. Construction Progress Schedule:

1. Show the complete sequence of construction by activity.
2. Show the dates for the beginning of, and completion of, each major element of construction in no more than a two (2) week increment scale. Specifically list, but not limit to:
 - a. Obtaining all permits/construction easements (if needed)
 - b. Shop Drawing submitted/review time



- c. Site clearing/filling
 - d. Site utilities
 - e. Pipeline installation
 - f. Roadway installation
 - g. Subcontractor work
 - h. Equipment installations
 - i. Finishings
 - j. Instrumentation
 - k. Painting
 - l. Operator training
 - m. Testing
 - n. Start-up
 - o. Receipt of spare parts
3. Show projected percentage of completion for each item, as of the first day of each month.
4. Show projected dollar cash flow requirements for each month of construction and for each activity as indicated by the approved Schedule of Values.
- B. Submittals schedule for Shop Drawings and Samples shall be in accordance with Section SC01340: Shop Drawings, Product Data and Samples. Indicate on the Schedule the following:
- 1. The dates for Contractor's submittals.
 - 2. The dates submittals will be required for CITY-furnished products, if applicable.
 - 3. The dates approved submittals will be required from the CONSULTANT.
- C. A typewritten list of all long lead items (equipment, materials, etc.).
- D. To the extent that the progress schedule or any revised progress schedule shows anything not jointly agreed upon or fails to show anything jointly agree upon, it shall not be deemed to have been approved by the CONSULTANT. Failure to include any element of work required for the performance of this Contract shall not excuse the Contractor from completing all work required within any applicable Completion Date, notwithstanding the CONSULTANT's approval of the progress schedule.

1.05 PROGRESS REVISIONS

- A. Indicate progress of each activity to date of submission.
- B. Show changes occurring since previous submission of schedule:
- 1. Major changes in scope.
 - 2. Activities modified since previous submission.
 - 3. Revised projections of progress and completion.
 - 4. Other identifiable changes.
- C. Provide a narrative report as needed to define:
- 1. Problem areas, anticipated delays, and the impact on the schedule.
 - 2. Corrective action recommended, and its effect.
 - 3. The effect of changes on schedules of other prime contractors.
- D. If the Work falls behind the critical path schedule by two (2) weeks or more, the Contractor must prepare a recovery schedule.

1.06 SUBMISSIONS

- A. Submittal Requirements.
- 1. Logic network and/or time phased bar chart, computer generated.
 - 2. Computerized network analysis:
 - a. Sort by early start
 - b. Sort by float
 - c. Sort by predecessor/successor
 - 3. Narrative description of the logic and reasoning of the schedule.
- B. Within ten (10) working days after the conclusion of the



CONSULTANT's review of initial schedule, Contractor shall revise the network diagram as required and resubmit the network diagram and a tabulated schedule produced therefrom. The revised network diagram and tabulated schedule shall be reviewed and accepted or rejected by the CONSULTANT within fifteen (15) working days after receipt. The network diagram and tabulated schedule when accepted by the CONSULTANT shall constitute the Project work schedule unless a revised schedule is required due to substantial changes in the work scope, a change in Contract Time or a recovery schedule is required and requested.

- C. Acceptance. The finalized schedule will be acceptable to the CONSULTANT, when in the opinion of the CONSULTANT; it demonstrates an orderly progression of the Work to completion in accordance with the Contract requirements. Such acceptance will neither impose on the CONSULTANT responsibility for the progress or scheduling of the Work nor relieve Contractor from full responsibility therefore. The finalized schedule of Shop Drawing submittals will be acceptable to the CONSULTANT, when in the opinion of the CONSULTANT, it demonstrates a workable arrangement for processing the submittals in accordance with the requirements. The finalized Schedule of Values (lump sum price breakdown), as applicable, will be acceptable to the CONSULTANT as to form and content, when in the opinion of the CONSULTANT, it demonstrates a substantial basis for equitably distributing the Contract Sum. When the network diagram and tabulated schedule have been accepted, The Contractor shall submit to the CONSULTANT five (5) copies of the time-scaled network diagram, five (5) copies of a computerized tabulated schedule in which the activities have been sequenced by numbers, five (5) copies of a computerized tabulated schedule in which the activities

have been sequenced by early starting date, and five (5) copies of a computerized, tabulated schedule in which activities have been sequenced by total float, and five (5) copies sorted by predecessor/successor.

- D. Revised Work Schedules. Contractor, if requested by the CONSULTANT, shall provide a revised work schedule if, at any time, the CONSULTANT considers the completion Date to be in jeopardy because of "activities behind schedule." The revised work schedule shall include a new diagram and tabulated schedule conforming to the requirements of Paragraph 1.09, herein, designed to show how Contractor intends to accomplish the work to meet the completion date. The form and method employed by Contractor shall be the same as for the original work schedule. No payment will be made if activities fall more than two (2) weeks behind schedule and a revised work schedule is not furnished.
- E. Schedule Revisions. The CONSULTANT may require Contractor to modify any portions of the work schedule that become infeasible because of "activities behind schedule" or for any other valid reason. An activity that cannot be completed by its original latest completion date shall be deemed to be behind schedule. No change may be made to the sequence, duration or relationships of any activity without approval of the CONSULTANT.

1.07 DISTRIBUTION

- A. Contractor shall distribute copies of the reviewed schedules to:
1. CONSULTANT
 2. Jobsite file
 3. Subcontractors
 4. Other concerned parties
 5. CITY (two copies)



- B. Instruct recipients to report promptly to the Contractor, in writing, any problems anticipated by the projections shown in the schedules.

1.08 CHANGE ORDERS

- A. Upon approval of a Change Order, the approved changes shall be reflected in the next scheduled revision or update submittal by Contractor.

1.09 CPM STANDARDS

- A. CPM, as required by this Section, shall be interpreted to be generally as outlined in the Associated General Contractor's (AGC) publication, The Use of CPM in Construction, A Manual for General Contractors and the Construction Industry, Copyright 1976.

- B. Work schedules shall include a graphic network and computerized, tabulated schedules as described below. To be acceptable the schedule must demonstrate the following:

1. A logical succession of work from start to finish.
2. Definition of each activity.
3. A logical flow of work crews/equipment (crews are to be defined by manpower category and man-hours; equipment by type and hours).
4. Show all work activities and interfaces including submittals as well as major material and equipment deliveries.

- C. Networks.

1. The CPM network, or diagram, shall be in the form of a time-scaled diagram of the customary activity-on-type and may be divided in to a number of separate pages with suitable notation relating the interface points among the pages. Individual pages shall not exceed 36 inches by 60 inches. Notation on each activity line shall include a brief work

description and a duration, as described in Paragraph 1.09D., herein.

2. All construction activities and procurement shall be indicated in a time-scaled format, and a calendar shall be shown on all sheets along the entire sheet length. Each activity arrow shall be plotted so the beginning and completion dates of such activity can be determined graphically by comparison with the calendar scale. All activities shall be shown using the symbols that clearly distinguish between critical path activities, non-critical path activities and float for each non-critical activity. All non-critical path activities shall show estimated performances time and float time in scaled form.

- D. The duration indicated for each activity shall be in calendar days and shall represent the single best time considering the scope of the Work and resources planned for the activity including time for inclement weather. Except for certain non-labor activities, such as curing concrete or delivering materials, activity durations shall not exceed fourteen (14) days nor be less than one (1) day unless otherwise accepted by the CONSULTANT.

- E. Tabulated Schedules. The initial schedule shall include the following minimum data for each activity.

1. Activity Beginning and Ending Numbers, single activity numbers may be used.
2. Duration.
3. Activity Description.
4. Early Start Date (Calendar Dated).
5. Early Finish Date (Calendar Dated).
6. Identified Critical Path.
7. Total Float (Note: No activity



may show more than 20 days float).

8. Cost of Activity.
9. Equipment Hours by type, man power/hours by crew or trade.

F. Project Information. Each tabulation shall be prefaced with the following summary data.

1. Project Name.
2. Contractor.
3. Type of Tabulation (Initial or Updated).
4. Project Duration.
5. Project Scheduled Completion Date.
6. Effective or Starting Date of the Schedule.
7. New Projects Completion Date and Project Status, if an updated or revised schedule.
8. Actual Start Date and Finish Date for all update schedules.

- A. At not less than monthly intervals or when specifically requested by CONSULTANT, Contractor shall submit to the CONSULTANT a computer printout of an updated schedule for those activities that remain to be completed.
- B. The updated schedule shall be submitted in the form, sequence, and number of copies requested for the initial schedule.

1.11 PROGRESS MEETINGS

For the monthly progress meeting, Contractor shall submit a revised CPM schedule and a 3-week look-ahead schedule, showing all activities in progress, uncompleted or scheduled to be worked during the weeks. The 3 weeks include the current week plus the next 2 weeks. All activities shall be from the approved CPM and must be as shown on the CPM unless behind or ahead of schedule.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

1.10 SCHEDULE MONITORING

END OF SECTION



SECTION 01340 - SHOP DRAWINGS, WORKING DRAWINGS, AND SAMPLES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. The Contractor shall submit to the CONSULTANT for review and approval, such Shop Drawings, Test Reports and Product Data on materials and equipment (hereinafter in this Section called Data), and material samples (hereinafter in this Section called Samples) as are required for the proper control of work, including but not limited to those Shop Drawings, Data and Samples for materials and equipment specified elsewhere in the Specifications and in the Contract Drawings.
2. With the Contractor's executed agreement and Bond Submittal, the Contractor shall submit to the CONSULTANT a complete list of preliminary Data on items for which Shop Drawings are to be submitted. Included in this list shall be the names of all proposed manufacturers furnishing specified items. Review of this list by the CONSULTANT shall in no way expressed or implied relieve the Contractor from submitting complete Shop Drawings and providing materials, equipment, etc., fully in accordance with the Specifications. This procedure is required in order to expedite final review of Shop Drawings. The Contractor shall include Shop Drawing review time on the Project schedule (see section SC01310).
3. The Contractor is to maintain an accurate updated submittal log and will bring this log to each scheduled progress meeting with the City and the CONSULTANT. This log should include the following

items:

- a. Submittal-Description and Number assigned.
- b. Date to CONSULTANT.
- c. Date returned to Contractor.
- d. Status of Submittal (Approved as Noted, Rejected/Re-submit).
- e. Date of Resubmittal and Return (as applicable).
- f. Date material release for fabrication.
- g. Projected date of fabrication.
- h. Projected date of delivery to site.
- i. Status of O&M manuals submittal.
- j. Specification Section.
- k. Drawings Sheet Number.

B. Related Requirements Described Elsewhere:

1. General Conditions:
2. Progress Schedules: Section SC01310.
3. Material and Equipment: Section SC01600.
4. Project Record Documents: Section SC01720.
5. Operating and Maintenance Data: Section SC01730.

1.02 CONTRACTOR'S RESPONSIBILITY

- A. The Contractor shall furnish the CONSULTANT a schedule of Shop Drawings submittals fixing the respective dates for the submission of Shop Drawings, the beginning of



manufacture, testing and installation of materials, supplies and equipment. This schedule shall indicate those that are critical to the progress schedule.

- B. The Contractor shall not begin any of the work covered by a Shop Drawing, Data, or a Sample returned for correction until a revision or correction thereof has been reviewed and returned to him, by the CONSULTANT, with approval.
- C. The Contractor shall submit to the CONSULTANT all drawings and schedules sufficiently in advance of construction requirements to provide no less than twenty-one (21) calendar days for checking and appropriate action from the time the Consultant receives them.
- D. All submittals shall be accompanied with a transmittal letter prepared in duplicate containing the following information:
 - 1. Date.
 - 2. Project Title and Number.
 - 3. Contractor's name and address.
 - 4. The number of each Shop Drawings, Project Data, and Sample submitted.
 - 5. Notification of Deviations from Contract Documents.
 - a. The Contractor shall indicate in **bold type** at the top of the cover sheet of submittal of Shop Drawing if there is a deviation from Contract Drawings, Project Specifications and referenced specifications or codes.
 - b. The Contractor shall also list any deviations from Contract Drawings, Project Specifications and referenced specifications or codes and identify in "green" ink prominently on

the drawings.

- 6. Submittal Log Number conforming to Specification Log Number.

- E. The Contractor shall submit SHOP DRAWINGS electronically to the CONSULTANT through eBuilder. The CONSULTANT will review the submittal and return to the Contractor with appropriate review comments.
- F. The Contractor shall be responsible for and bear all costs of damages which may result from the ordering of any material or from proceeding with any part of work prior to the completion of the review by the CONSULTANT of the necessary Shop Drawings.
- G. The Contractor shall not use Shop Drawings as means of proposing alternate items to demonstrate compliance to Contract requirements.
- H. Each submittal will bear a stamp indicating that Contractor has satisfied Contractor's obligations under the Contract Documents with respect to Contractors review and approval of that submittal.
- I. Drawings and schedules shall be checked and coordinated with the work of all trades and sub-contractors involved, before they are submitted for review by the CONSULTANT and shall bear the Contractor's stamp of approval as evidence of such checking and coordination. Drawings or schedules submitted without this stamp of approval shall be returned to the Contractor for resubmission.

1.03 CONSULTANT'S REVIEW OF SHOP DRAWINGS

- A. The CONSULTANT's review of Shop Drawings, Data and Samples as submitted by the Contractor, will be to determine if the items(s) conform to the information in the Contract Documents and are compatible with the design concept. The CONSULTANT's review and exceptions, if any, will not constitute



an approval of dimensions, connections, quantities, and details of the material, equipment, device, or item shown.

- B. The review of drawings and schedules will be general, and shall not be construed:

1. As permitting any departure from the Contract requirements.
2. As relieving the Contractor of responsibility for any errors, including details, dimensions, and materials.
3. As approving departures from details furnished by the Consultant, except as otherwise provided herein.

- C. If the drawings or schedules as submitted describe variations and show a departure from the Contract requirements which the CONSULTANT finds to be in the interest of the City and to be so minor as not to involve a change in Contract Price or time for performance, the CONSULTANT may return the reviewed drawings without noting an exception.

- D. "Approved As Noted" - Contractor shall incorporate CONSULTANT's comments into the submittal before release to manufacturer. The Contractor shall send a letter to the CONSULTANT acknowledging the comments and their incorporation into the Shop Drawing.

- E. "Amend And Resubmit" - Contractor shall resubmit the Shop Drawing to the CONSULTANT. The resubmittal shall incorporate the CONSULTANT's comments highlighted on the Shop Drawing.

- F. "Rejected" - Contractor shall resubmit Shop Drawing for review by Consultant.

- G. Resubmittals will be handled in the same manner as first submittals. On resubmittals the Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, to revisions other than the corrections

requested by the CONSULTANT on previous submissions. The Contractor shall make any corrections required by the CONSULTANT.

- H. If the Contractor considers any correction indicated on the drawings to constitute a change to the Contract Drawings or Specifications, the Contractor shall give written notice thereof to the CONSULTANT.

- I. When the Shop Drawings have been completed to the satisfaction of the CONSULTANT, the Contractor shall carry out the construction in accordance therewith and shall make no further changes therein except upon written instructions from the CONSULTANT.

- J. No partial submittals will be reviewed. Submittals not deemed complete will be stamped "Rejected" and returned to the Contractor for resubmittal. Unless otherwise specifically permitted by the CONSULTANT, make all submittals in groups containing all associated items for:

1. Systems.
2. Processes.
3. As indicated in specific Specifications Sections.

- K. All drawings, schematics, manufacturer's product Data, certifications and other Shop Drawing submittals required by a system specification shall be submitted at one time as a package to facilitate interface checking.

- L. Only the CONSULTANT shall utilize the color "red" in marking Shop Drawing submittals.

- M. For any submittal returned to the Contractor marked "Amend and Submit" or "Rejected," Contractor shall pay CITY a resubmittal fee of \$250.00. Monies shall be deducted from monies owed Contractor by CITY monthly and incorporated into



a Change Order at completion of the contract.

1.04 SHOP DRAWINGS

- A. Shop Drawings shall be complete and detailed and shall consist of fabrication, erection and setting drawings and schedule drawings, manufacturer's scale drawings, and wiring and control diagrams. Cuts, catalogs, pamphlets, descriptive literature, and performance and test data, shall be considered only as supportive information. As used herein, the term "manufactured" applies to standard units usually mass-produced; and "fabricated" means items specifically assembled or made out of selected materials to meet individual design requirements.
- B. Manufacturer's catalog sheets, brochures, diagrams, illustrations and other standard descriptive data shall be clearly marked to identify pertinent materials, product or models. Delete information which is not applicable to the Work by striking or cross-hatching.
- C. Each Shop Drawing shall have a blank area 3-1/2 inches by 3-1/2 inches, located adjacent to the title block. The title block shall display the following:
 - 1. Project Title and Number.
 - 2. Name of Project building or structure.
 - 3. Number and title of the Shop Drawing.
 - 4. Date of Shop Drawing or revision.
 - 5. Name of Contractor and subcontractor submitting drawing.
 - 6. Supplier/manufacturer.
 - 7. Separate detailer when pertinent.
 - 8. Specification title and number.
 - 9. Specification section.

10. Application Contract Drawing Number.

- D. Data on materials and equipment include, without limitation, materials and equipment lists, catalog data sheets, cuts, performance curves, diagrams, materials of construction and similar descriptive material. Materials and equipment lists shall give, for each item thereon, the name and location of the supplier or manufacturer, trade name, catalog reference, size, finish and all other pertinent Data.

1.05 WORKING DRAWINGS

- A. When used in the Contract Documents, the term "Working Drawings" shall be considered to mean the Contractor's plan for temporary structures such as temporary bulkheads, support of open cut excavation, support of utilities, ground water control systems, forming and false work; for underpinning; and for such other work as may be required for construction but does not become an integral part of the Project.
- B. Working Drawings shall be signed by a registered Professional Consultant, currently licensed to practice in the State of Florida.

1.06 SAMPLES

- A. The Contractor shall furnish, for the approval of the Consultant, samples required by the Contract Documents or requested by the CONSULTANT. Samples shall be delivered to the CONSULTANT as specified or directed. The Contractor shall prepay all shipping charges on samples. Materials or equipment for which samples are required shall not be used in work until approved by the CONSULTANT.
- B. Samples shall be of sufficient size and quantity to clearly illustrate:
 - 1. Functional characteristics of the product, with integrally related parts and attachment devices.



2. Full range of color, texture and pattern.
3. A minimum of two (2) samples of each item shall be submitted.

C. Field samples and mock-ups:

1. Contractor shall erect, at the Project site, at a location acceptable to the Consultant.
2. Size of area: 15 feet long x 6 feet high or that specified in the respective specification section.
3. Fabricate each sample and mock-up complete and finished.
4. Remove mock-ups at conclusion of Work or when acceptable to the Consultant.

D. Each sample shall have a label indicating:

1. Name of Project.
2. Name of Contractor and Subcontractor.
3. Material or Equipment Represented.
4. Place of Origin.
5. Name of Producer and Brand (if any).

6. Location in Project.

Samples of finished materials shall have additional marking that will identify them under the finished schedules.

- E. The Contractor shall prepare a transmittal letter in triplicate for each shipment of samples containing the information required in Paragraph 1.06B above. It shall enclose a copy of this letter with the shipment and send a copy of this letter to the CONSULTANT. Approval of a sample shall be only for the characteristics or use named in such approval and shall not be construed to change or modify any Contract requirements.

- F. Approved samples not destroyed in testing shall be sent to the CONSULTANT or stored at the site of the Work. Approved Samples of the hardware in good condition will be marked for identification and may be used in the work. Materials and equipment incorporated in work shall match the approved Samples. Samples which failed testing or were not approved will be returned to the Contractor at its expense, if so requested at time of submission.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION



SECTION 01370 - SCHEDULE OF VALUES

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. Contractor shall submit to the Consultant a Schedule of Values allocated to the various lump sum portions of the Work, within fifteen (15) days of the Notice to Proceed date.
2. Upon request of the Consultant, Contractor shall support the values with data which will substantiate their correctness. The data shall include, but not be limited to quantity of materials, all sub-elements of the activity and their units of measure.
3. Schedule of Values shall establish the actual value for each activity of the Work to be completed taken from the approved Critical Path Method (CPM), and shall be used as the basis for the Contractor's Applications for Payment.

B. Related Requirements Described Elsewhere:

1. Conditions of the Construction Contract.

1.02 FORM AND CONTENT OF SCHEDULE OF VALUES

- ##### A. Type schedule on an 8-1/2 inch by 11 inch or 8-1/2 inch by 14 inch white paper. Contractor's standard forms and computer printout will be considered for approval by the Consultant upon Contractor's request. Identify schedule with:

1. Title of Project and location.

2. Consultant and Project number.

3. Name and address of Contractor.

4. Contract designation.

5. Date of submission.

- ##### B. Schedule shall list the installed value of the component parts of the Work in sufficient detail to serve as a basis for computing item prices for progress payments during construction.

- ##### C. Identify each line item with the number and the title of the respective section of the Specifications.

- ##### D. For each line item, list sub-values of major products or operations under the item.

- ##### E. For the various portions of the Work:

1. Each item shall include a directly proportional amount of the Contractor's overhead and profit.

2. For items on which progress payments will be requested for stored materials, break down the value into:

- a. The cost of the materials, delivered unloaded, with taxes paid. Paid invoices required for materials. Payment for materials shall be limited to the invoiced amount only.

- b. The total installed value.

- ##### F. The sum of all lump sum values listed in the schedule shall equal



the total Contract Sum.

1.03 UNIT QUANTITIES:

- A. Quantities indicated in the Schedule of Bid Items are for bidding and contract purposes only. Quantities and measurements supplied or placed in the Work and verified by the Consultant and CITY determines payment.
- B. If the actual Work requires more or fewer quantities than those quantities indicated in the bid items, Contractor shall provide the required quantities at the unit sum/prices contracted.

1.04 REVIEW AND RESUBMITTAL

- A. After review by Consultant, Contractor shall revise and resubmit Schedule of Values and Schedule of Unit Material values pursuant to this Section.
- B. Contractor shall resubmit revised Schedules in same manner pursuant to this Section.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION



SECTION 01380 - CONSTRUCTION PHOTOGRAPHS

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Scope of Work: The Contractor shall employ a competent professional photographer to take construction record photographs periodically during the course of the Work using a digital camera and a preconstruction video inspection.
- B. Related Requirements Described Elsewhere:
 - 1. General Requirements: Section SC01000.
 - 2. Summary of Project: Section SC01010.
 - 3. Video and Photographic Site Survey: Section 01390
 - 4. Project Record Documents: Section SC01720.

1.02 PHOTOGRAPHY REQUIRED

- A. Photographs taken in conformance with this Section shall be furnished to the Consultant with each Application for Payment.
- B. Views and Quantities Required:
 - 1. Five (5) views of overall Project site monthly, or as directed by the Consultant (for facilities projects only).
 - 2. Two (2) aerial views of overall Project site after completion of site restoration and landscaping (for facilities projects only).
 - 3. Provide electronically at least five (5) photographs

(views) of progress work with each Application for Payment.

- 4. Additional aerial photographs may be used upon prior approval by the CITY.

- C. In addition to the general progress photographs required, photographs of each tie-in point shall be taken prior to backfill and turned in with the monthly Application for Payment.

1.03 COSTS OF PHOTOGRAPHY

- A. The Contractor shall pay costs for specified photography and prints. Parties requiring additional photography or prints shall pay the photographer directly.

PART 2 - PRODUCTS

2.01 NEGATIVES/DIGITAL FILES

- A. The negatives/digital files are to be categorized by month taken and must correspond to the progress photographs that accompany each. At project closeout, the negatives/digital files are to be submitted to the CITY. If the Contractor uses digital photography, then the images shall be provided on CD.

PART 3 - EXECUTION

3.01 TECHNIQUE

- A. Factual Presentation.
- B. Correct exposure and focus.
 - 1. High resolution and sharpness.



2. Maximum depth-of-field.
3. Minimum distortion.

3.02 VIEWS REQUIRED

A. Photograph from locations to adequately illustrate condition of construction and state of progress.

1. At successive periods of photography, take at least one (1) photograph from the same overall view as previously.
2. Consult with the Consultant at each period of photography for instructions concerning views required.
3. All views to contain a relative dimension reference that is easily recognizable by the average person. In views where dimensions are critical, use of recognizable measuring devices such as a folding ruler, measuring tape in a manner the makings are clear and sharp in the photograph and the device located in close relationship with subject of photograph.

3.03 DELIVERY OF PHOTOGRAPHS

A. Deliver electronic files to the CONSULTANT to accompany each Application for Payment.

END OF SECTION



SECTION 01390 - VIDEO AND PHOTOGRAPHIC SITE SURVEY

PART 1 - GENERAL

1.01 SECTION INCLUDES:

- A. The work under this Section includes the performance of a Pre and Post Construction Video Survey of the condition of existing facilities, public Rights-of Way (ROW), easements, roads, private property, and other surface features and "before and after" digital still photographs.

1.02 RELATED SECTIONS:

- A. Section SC01050 – Field Engineering
- B. Section SC01380 – Construction Progress Photographs

1.03 PRE/POST-CONSTRUCTION VIDEO INSPECTION

- A. Prior to start of construction, Contractor shall retain the services of a firm specializing in pre-construction video inspection.
- B. Video inspection shall delineate all aspects of facilities on site and surrounding properties.
- C. Any claims for damages not clearly shown as existing prior to construction shall be paid for by the Contractor, unless conclusive evidence to the contrary is provided.

1.04 SUBMITTALS:

- A. Pre-Construction Video and Photographic Site Survey
 - 1. The Contractor shall submit one (1) copy of the Pre Construction Video Survey with video log to the CITY for review and acceptance.
- B. Post-Construction Video Site Survey
 - 1. At the discretion of the CITY, the requirement for a Post-Construction video may be

waived.

- 2. The Contractor shall submit one (1) copy of the Post-Construction Video Survey with log to the CITY for review.
- 3. Accompanying this submittal, or as a separate submittal in the event the CITY waives the Post-Construction Video, the Contractor shall issue a letter attesting to having reviewed the Pre Construction Video Survey and confirm restoration of surface attributes.

PART 3 - EXECUTION

4. VIDEO SITE SURVEY

- A. The Contractor shall provide the CONSULTANT with a DVD accurately representing existing conditions of the site to be disturbed by its operations. This DVD shall be submitted at least twenty-one (21) days prior to the start of work on this project.
- B. Recording shall be on a new, high quality, DVD. The camera shall be capable of producing clean color images. The original is to be submitted to the CONSULTANT for review and a copy is to be retained by the Contractor until Final Acceptance. CITY shall receive one (1) copy of the Final Videotaping after approval by the CONSULTANT.
- C. At a minimum, the video shall contain:
 - 1. At the beginning of the video, the project name and date of taping shall be superimposed on the picture.
 - 2. As the location of the video tapping progresses, i.e., the individual street name shall be temporally superimposed on the picture.
 - 3. Centerline stationing at 100 feet intervals or clear reference to the individual residences (by



street number) and/or business (by street number and name).

5. The video shall be run twice the full length of the project, first facing and proceeding ahead station wise and slightly angled to the right of centerline. The second run shall be the full length of the project facing and proceeding back station wise and slightly angled to the right of centerline.
 6. Both shootings shall contain the centerline within the view of the observer. The taping is to be continuous during each run. Areas of special importance / interest may be "zoomed-in" on to provide the necessary details but must be "zoomed-out" to the original view before proceeding.
- D. Audio content
1. Simultaneously record the audio portion during videotaping.
 2. Audio recording shall assist in viewer orientation and in any Audio recording will only consist of camera operator commentary.
- E. Prepare a written video log that describes the contents of each tape including:
1. Name of streets and/or easements.
 2. Videotape location designator.
 3. Coverage begin/end, station and location.
 4. Recording date.
- F. The video shall present a clear and accurate representation of existing conditions. If the CITY determines that this intent is not met, the tape shall be returned and the area re-

televised at no additional cost to the CITY.

- G. This accepted video along with the still photographs will serve as an aid to the CITY in determining existing conditions. Nothing contained in the video or still photographs will supersede or relieve the CITY from determining the acceptability of restoration.
- H. Prior to Substantial Completion, the Contractor is responsible to review the video and still photographs and prepare a detailed list of surface improvements to be reinstated. This list shall include lawn areas, trees and plants, driveways, driveway aprons, roadways, signage, sprinkler systems, sidewalks, mailboxes and any other existing conditions affected by the work and submit to the CITY for review and approval.

3.02 PHOTOGRAPHIC SURVEY

- A. In addition to the videotape, the Contractor shall take "before and after" digital still photographs of each home and/or property. The photographs of each home and/or property shall consist of a set of photographs (3 minimum) and shall provide property-line to property-line coverage of the roadway, swale and sidewalk areas for each property. The "areas of interest" are the edge of roadway, condition of the swale, type of grass, landscaping within the swale, mail box and driveway apron.
- B. The digital "file" name is to be the address of the property being photographed and shall be incorporated as part of the image. The Contractor shall provide the CITY with the following for review and acceptance:
 1. One (1) CD with the digital files in street named/numbered subdirectory and a digital file log.
 2. Two (2) sets of "Before" color prints and one (1) set of "After"



color prints of each digital file, with the file name displayed. Color print sets are to be bound with a Table of Contents and divided and tabbed by street name/number.

3. "Before" photographs (color prints and CD) shall be submitted twenty-one (21) days in advance of the commencement of the work. "After" photographs (color prints and CD) shall be submitted with the final Application For Payment (refer to Section 01380 PROGRESS PHOTOGRAPHS for additional requirements).

- C The Contractor shall provide a bound set of accepted pre-construction photographs to the Consultant to be maintained at the Consultant's Field Office for use during the project.
- D. An additional page (page 3), with sample photographs, follows the End of Section.

END OF SECTION





102 NE 16th Court



SECTION 01400 - QUALITY REQUIREMENTS

PART 1 GENERAL

1.01 GENERAL

- A. Contractor is required to follow all technical specification requirements with regards to material quality, certification, placement and installation. If the Contractor has questions concerning these items, it is required to generate and issue a Request For Information to the CITY and Consultant for resolution and or guidance.
- B. In the absence of other quality requirements, FDOT Standard Specifications and Index, of the most current edition, shall prevail.

1.02 RELATED SECTIONS

- A. Section SC01025 – Measurement and Payment Procedures
- B. Section SC01050 – Field Engineering
- C. Section SC01340 – Shop Drawings, Work Drawings and Samples

1.03 Field QA/QC

- A. The Contractor shall monitor quality control over suppliers, subcontractors, products and workmanship, to produce work of specified quality.
- B. Comply with manufacturers' instructions, including each step in sequence.
- C. Should manufacturers' instructions conflict with Contract Documents, issue Request For Information to the Consultant before proceeding.
- D. Comply with specified standards as minimum quality for the work except where more stringent tolerances, codes, or specified requirements indicate higher standards or more precise workmanship.
- E. Perform work by persons qualified to produce required and specified quality.

- F. Verify that field measurements are as indicated on shop drawings / catalog cut sheets or as instructed by the manufacturer.

- G. Secure products in place with positive anchorage devices designed and sized to withstand stresses, vibration, physical distortion, or disfigurement.

1.04 TOLERANCES

- A. Installed tolerances:
 - 1. Plus / minus 0.20 foot radius of plan center
 - 2. Plus / minus 0.05 foot vertical
 - 3. Plus / minus 10% of specified vertical slope
 - 4. Plus / minus 5% uniformity of specified vertical slope measured between any two points of a single run of pipe.
- B. Monitor fabrication and installation tolerance control of products to produce acceptable Work. Do not permit tolerances to accumulate.
- C. Comply with manufacturers' tolerances. Should manufacturers' tolerances conflict with Contract Documents, request clarification from Consultant before proceeding.
- D. Adjust products to appropriate dimensions, position before securing products in place.

1.05 TESTING SERVICES

- A. Contractor required to hire a professional, licensed independent firm to perform tests and other services specified.
- B. Field copies of on site density testing are to be left on site at the completion of each day's testing. The independent firm is required to "map" the results of each day's testing results on the Contractor's.



- C. Certified, signed and sealed test reports will be submitted by the independent firm to the Consultant, CITY and Contractor, indicating observations and results of tests and indicating compliance or non-compliance with Contract Documents.
- D. Cooperate with independent firm; furnish samples of materials, design mix, equipment, tools, storage, safe access, and assistance by incidental labor as requested.
- E. Testing does not relieve Contractor to perform work to Contract requirements.
- F. Re-testing required because of non-conformance to specified requirements shall be performed by the same independent firm on instructions by the CITY or Consultant.

1.06 INSPECTION SERVICES

- A. The CITY shall appoint, employ, and pay inspector for specified services for inspection. These services may be from the Consultant, or from the CITY or any combination of the above.
- B. The Inspector shall perform construction observation, inspections and other services specified in individual specification sections and as required by the CITY and/or Consultant.
- C. The Contractor shall cooperate with Inspector; furnish safe access and assistance by incidental labor as requested. Additionally, the Contractor shall keep the inspection personnel fully informed of the needs, scheduling and progress of the project.
- D. This inspection does NOT relieve the Contractor from performing their own QA/QC on the Work as required in this and other technical specification sections.

1.07 MANUFACTURERS' FIELD SERVICES

- A. When specified in the Contract documents, requiring material or

product suppliers or manufacturers to provide qualified staff personnel to observe site conditions, conditions of surfaces and installation, quality of workmanship, start-up of equipment, test, adjust and balance of equipment as applicable, and to initiate instructions when necessary.

- B. Report observations and site decisions or instructions given to applicators or installers that are supplemental or contrary to manufacturers' written instructions.

PART 2 PRODUCTS (Not Used)

PART 3 EXECUTION

3.01 EXAMINATION

- A. The Contractor shall verify that existing site conditions and substrate surfaces are acceptable for subsequent Work. Beginning new Work means acceptance of existing conditions.
- B. Verify that existing substrate is capable of structural support or attachment of new Work being applied or attached.
- C. Perform "receiving" inspection of materials, structures and equipment.
- D. Perform "in-process" inspection as the Work progresses.
- E. Monitor and inspect the work performed by subcontractors as the Work progresses.
- F. Examine and verify specific conditions described in individual technical specification sections.
- G. Notify the CITY and Consultant, forty-eight (48) hours prior to the expected time for inspection purposes and/or the witnessing of pressure testing. All pressure testing shall be witnessed by the CITY and/or Consultant.

END OF SECTION



SECTION 01500 - CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 – GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Contractor shall furnish, install and maintain temporary utilities required for construction. Remove on completion of work.

water from private homes and/or business' is strictly forbidden.

- B. Water utilization for concrete plaster and mortar shall meet the respective requirements and standards set forth for water utilized in these construction materials.

1.02 RELATED REQUIREMENTS

- A. General Conditions.
- B. Section SC01010: Summary of Work

2.04 TEMPORARY SANITARY FACILITIES

- A. Provide sanitary facilities in compliance with Federal, state and local laws and regulations.
- B. Service, clean and maintain facilities and enclosures.

1.03 REQUIREMENTS OF REGULATORY AGENCIES

- A. Comply with National Electric Code.
- B. Comply with Federal, State, and local codes and regulations and with utility company requirements.

2.05 TEMPORARY CONTROLS

- A. Noise Control: See Section SC01100 – Special Project Procedures

PART 2 – PRODUCTS

- B. Dust Control:

2.01 MATERIALS, GENERAL

- A. Materials may be new or used, but must be adequate in capability for the required usage of the CITY, must not create unsafe conditions, and must not violate requirements of applicable codes and standards.

- 1. Provide positive methods and apply dust control materials to minimize raising dust from construction operations, and provide positive means to prevent airborne dust from dispensing into the atmosphere.

2.02 TEMPORARY TELEPHONE SERVICE

- A. Superintendent, foreman or other contractor personnel in charge shall be equipped with a functioning cell phone during the term of the contract.

- C. Pest and Rodent Control:

- 1. Provide pest and rodent control prior to start of construction to prevent infestation of surrounding neighborhood.

2.03 TEMPORARY WATER

- A. Schedule use and provide deposit to the City's Utility Department for a portable hydrant meter. No water shall be taken from the existing water distribution system unless it's through the portable hydrant meter. The Contractor shall install and maintain a certified backflow preventer or check valve on all CITY issued portable hydrant meters; **no exceptions**. Using

- a. Employ methods and use materials that will not adversely affect conditions at the site or on adjoining properties.

- b. Should the use of rodenticides be considered necessary, submit an informational copy of the proposed program to the Consultant. Clearly indicate:

- 1) The area or areas to be treated



- 2) The rodenticides to be used, with a copy of the manufacturer's printed instructions.
- 3) The pollution preventative measures to be employed.
2. The use of any rodenticide shall be in full accordance with the Manufacturer's printed instructions and recommendations.

D. Debris Control:

1. Maintain all areas under Contractor's control free of extraneous debris.
2. Initiate and maintain a specific program to prevent accumulation of debris at construction site, storage and parking areas, or along access roads and haul routes.
 - a. Provide acceptable containers for deposit of debris.
 - b. Prohibit overloading of trucks to prevent spillages on access and haul routes.
 - 1) Provide periodic inspection of traffic areas to enforce requirements.
3. Schedule periodic collection and disposal of debris.
 - a. Provide additional collections and disposals of debris whenever the periodic schedule is inadequate to prevent accumulation.

E. Pollution Control:

1. Provide methods, means and facilities required to prevent contamination of soil, water or atmosphere by the discharge of noxious substances from construction operations.

2. Provide equipment and personnel, perform emergency measures required to contain any spillages, and to remove contaminated soils or liquids.

- a. Excavate and dispose of any contaminated earth off-site, and replace with suitable compacted fill and topsoil.

3. Take special measure to prevent harmful substances from entering public waters.

- a. Prevent disposal of wastes, effluents, chemicals, or other such substances adjacent to streams, or in sanitary or storm sewers.

4. Provide systems for control of atmospheric pollutants

- a. Prevent toxic concentrations of chemicals

- b. Prevent harmful dispersal of pollutants into the atmosphere

PART 3 – EXECUTION

3.01 GENERAL

- A. Maintain and operate systems to assure continuous service.
- B. Modify and extend systems, as work progress requires.

3.02 REMOVAL

- A. Completely remove temporary materials and equipment when their use is no longer required.
- B. Clean and repair damage caused by temporary installations or use of temporary facilities.

END OF SECTION



SECTION 01505 – MOBILIZATION

PART I - GENERAL

1.01 DEFINITION AND SCOPE

A. Mobilization shall include the Contractor obtaining of all permits, insurance, and bonds; moving onto the site of all plant and equipment, temporary buildings and other construction facilities; all as required for the proper performance and completion of the Work. Mobilization shall include, but not be limited to, the following principal items:

1. Move onto the site all Contractor's plan and equipment required for first month operations.
2. Install temporary construction power, wiring, and lighting facilities.
3. Establish fire protection plan and safety program.
4. Secure construction water supply.
5. Provide on-site sanitary facilities and potable water facilities as specified.
6. Arrange for and erect Contractor's work and storage yard and employees' parking facilities.
7. Submit all required insurance certificates and bonds.
8. Obtain all required permits.
9. Post all OSHA, EPA, Department of Labor, and all other required notices.

10. Have Contractor's superintendent at the job site full time.

11. Submit a detailed construction CPM schedule acceptable to the Consultant as specified.

12. Submit a Schedule of Values of the Work.

13. Submit a schedule of submittals.

1.02 DEMOBILIZATION

A. Demobilization is the timely and proper removal of all contractor-owned material, equipment or plant, from the job site and the proper restoration or completion of work necessary to bring the site into full compliance with the Contract Documents.

1.03 PAYMENT FOR MOBILIZATION/DEMOBILIZATION

A. Contractor shall be limited to a maximum of 3.0 percent of the total price bid for mobilization. The cost of mobilization/demobilization shall be shown in the Schedule of Values.

B. Demobilization shall be shown in the schedule of values as a minimum 25 percent of the value for mobilization.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION



SECTION 01525 - CONSTRUCTION AIDS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work: The Contractor shall furnish, install and maintain required construction aids and remove on completion of work.

B. Related Requirements Described Elsewhere:

1. Summary of Work: Section SC01010

C. Contractor must comply with applicable requirements of the specified in Sections of Divisions 2 through 16 - Technical Specifications

PART 2 - PRODUCTS

2.01 MATERIALS

A. Materials may be new or used, suitable for the intended purpose, but must not violate requirements of applicable codes and standards.

2.02 CONSTRUCTION AIDS

A. Contractor shall provide construction aids and equipment required by personnel and to facilitate execution of the Work: scaffolds, staging, ladders, stairs, ramps, runways, platforms, railings, hoists, cranes, chutes and other such facilities and equipment such as temporary valves and fittings. Refer to respective Technical Specifications Sections for particular requirements for each trade.

B. When permanent stair framing is in place, provide temporary treads, platforms

and railings, for use by construction personnel.

C. Maintain facilities and equipment in first-class condition.

PART 3 - EXECUTION

3.01 PREPARATION

A. Contractor shall consult with the CONSULTANT, review site conditions and factors which affect construction procedures and construction aids, which may be affected by execution of the Work.

3.02 GENERAL

A. Comply with applicable requirements specified in sections of Divisions 2 through 16.

B. Relocate construction aids as required by progress of construction, by storage of work requirements and to accommodate legitimate requirements of CITY and other contractors employed at the site.

3.03 REMOVAL

A. Completely remove temporary materials, equipment and services:

1. When construction needs can be met by use of permanent construction.

2. At completion of work.

B. Clean and restore areas damaged by installation by use of temporary facilities.

1. Remove foundations and underground installations



for construction aids.

2. Restore area of site affected by temporary installations to required elevations, slopes, ground cover and clean the area.

- C. Restore permanent facilities used for temporary purposes to specified condition or in kind if not specified.

END OF SECTION



SECTION 01530 – BARRIERS

PART 1 - GENERAL

1.01 REQUIREMENTS INCLUDED

- A. Contractor shall furnish, install and maintain suitable barriers as required to prevent public entry, and to protect the Work, existing facilities, trees and plants from construction operations; remove when no longer needed, or at completion of work.

1.02 RELATED REQUIREMENTS

- A. Section SC01010: Summary of Work.
- B. Section SC01500: Temporary Facilities.

PART 2 - PRODUCTS

2.01 MATERIALS, GENERAL

- A. Materials may be new or used, suitable for the intended purpose, but must not violate requirements of applicable codes and standards.

2.02 FENCING

- A. Minimum fence height 6 feet.
- B. Open-Mesh Fence:
 - 1. No. 11 gauge, 2-inch mesh, 72 inches high-galvanized chain link fabric, with extension arms and 3 strands of galvanized barbed wire.
 - 2. Galvanized steel posts; 1-1/2 inch line posts and 2-inch corner posts.

2.03 BARRIERS

- A. Materials are Contractor's

option, as appropriate to serve required purpose.

PART 3 - EXECUTION

3.01 GENERAL

- A. Install facilities of a neat and reasonably uniform appearance, structurally adequate for the required purpose.
- B. Maintain barriers during entire construction period.
- C. Relocate barriers as required by the progress of construction.

3.02 FENCES

- A. Provide and maintain fences necessary to assure security of the site during construction to keep unauthorized people and animals from the site when construction is not in progress.
- B. Gates shall have locks; and keys shall be furnished to the CITY.
- C. Provide additional security measures as deemed necessary and approved by the CONSULTANT.

3.03 TREE AND PLANT PROTECTION

- A. Preserve and protect existing trees and plants at site that are designated to remain, and those adjacent to site.
- B. Consult with the CONSULTANT, and remove agreed-on roots and branches that interfere with construction.
 - 1. Employ qualified tree surgeon to remove branches and tree cuts.



- C. Provide temporary barriers to a height of 6 feet, around each, or around each group, of trees and plants.
- D. Protect root zones of trees and plants:
 - 1. Do not allow vehicular traffic or parking.
 - 2. Do not store materials or products.
 - 3. Prevent dumping of refuse or chemically injurious materials or liquids.
 - 4. Prevent puddling or continuous running water.
- E. Carefully supervise excavating, grading and filling, and other construction operations to prevent damage.
- F. Replace, or suitably repair, trees and plants designated to remain which are damaged or destroyed due to construction operations.

3.04 REMOVAL

- A. Completely remove barricades, including foundations, when construction has progressed to the point that they are no longer needed and when approved by CONSULTANT.
- B. Repair damage caused by construction. Fill and grade areas of the site to the required elevations, and clean up the area.

END OF SECTION



SECTION 01540 - SECURITY AND SAFETY PROCEDURES FOR INFRASTRUCTURE PROJECTS

PART 1 GENERAL

1.01 As a minimum, the Contractor shall provide and assure that all of its personnel have and wear common colored Company shirts, safety vests, hard hats and substantial leather work shoes / boots. Other Personal Protective Equipment (PPE) as required by governing local, state and Federal laws and regulations.

1.02 SECTION INCLUDES

- A. Responsibility for Work Security
- B. Protection of Work in Progress, Materials and Equipment
- C. Protection of Existing Property
- D. Security Program
- E. Entry Control
- F. Personnel Identification
- G. Security Service
- H. Miscellaneous Restrictions

1.03 RELATED SECTIONS

- A. Section 01010 - Summary of Project
- B. Section 01500 - Temporary Facilities and Controls

1.04 RESPONSIBILITY OF WORK SECURITY

- A. Contractor shall, at its expense, at all times conduct all operations under the Contract in a manner to avoid the risk of loss, theft or damage by vandalism, sabotage or other means to any property. Contractor shall promptly take all reasonable precautions that are necessary and adequate against any conditions that involve a risk of loss, theft or damage to its property, at a minimum.
- B. Contractor shall continuously inspect all its work, materials,

equipment and facilities to discover and determine any such conditions and shall be solely responsible for discovery, determination and correction of any such condition.

- C. Contractor shall prepare and maintain accurate reports of incidents of loss, theft or vandalism and shall furnish these reports to CITY within three (3) days of each incident.

1.05 PROTECTION OF WORK IN PROGRESS, MATERIALS AND EQUIPMENT

- A. Contractor shall be responsible for and shall bear any and all risk of loss or damage to work in progress, all materials delivered to the site, and all materials and equipment involved in the Work until completion and final acceptance of Work under this Contract. Excluded from Contractor's responsibility is any loss or damage that results from the sole active negligence of the CITY or its representatives.

1.06 PROTECTION OF EXISTING PROPERTY

- A. Contractor shall so conduct its operations as not to damage, close, or obstruct any utility installation, highway, road or other property until permits therefore have been obtained. If facilities are closed, obstructed, damaged or rendered unsafe by Contractor's operations, Contractor shall, at its expense, make such repairs and provide temporary guards, lights and other signals as necessary or required for safety and as will be acceptable to the CITY.
- B. Contractor shall conduct its operation so as not to damage any existing buildings or structures. The Contractor shall verify that means and methods of construction used inside, adjacent to, under or over existing buildings will not cause damage. The Contractor shall provide protection methods that are



acceptable to the CITY.

- C. Unless otherwise specifically provided in the Contract, Contractor shall not do any work that would disrupt or otherwise interfere with the operation of any pipeline, telephone, electric, radio, gas, transmission line, ditch or other structure, nor enter upon lands in their natural state until approved by the CITY.
- D. Thereafter, and before it begins such work, Contractor shall give due notice to CITY of its intention to start such work. Contractor shall not be entitled to any extension of time or any extra compensation on account of any postponement, interference or delay caused by any such line, ditch or structure on or adjacent to the site of work.
- E. Contractor shall preserve and protect all cultivated and planted areas and vegetation such as trees, plants, shrubs and grass on or adjacent to the premises, which, as determined by CITY, do not reasonably interfere with the performance of this Contract.
- F. Contractor shall be responsible for damage to any such areas and vegetation and for unauthorized cutting of trees and vegetation, including, without limitation, damage arising from the performance of its work through operation of equipment or stockpiling of materials. All cost in

connection with any repairs or restoration necessary or required by reason of any such damage or unauthorized cutting shall be borne by Contractor.

1.07 SECURITY PROGRAM

- A. At the Pre-Construction Meeting, the CITY will make a final determination on which, if any, of the following requirements are to be implemented.
 - 1. Protect Work existing premises and CITY's operations from theft, vandalism, and unauthorized entry.
 - 2. Initiate program at project mobilization.
 - 3. Maintain program throughout construction period until CITY acceptance precludes the need for Contractor security.

1.08 RESTRICTIONS

- A. Do not allow cameras on site or photographs taken except by written approval of the CITY.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

Not Used.

END OF SECTION



SECTION 01568 - TEMPORARY EROSION AND SEDIMENTATION CONTROL

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. The Work specified in this Section consists of designing, providing, maintaining and removing temporary erosion and sedimentation controls as required by rules and regulations and permit conditions.
2. Temporary erosion controls include, but are not limited to, grassing, mulching, setting, watering and reseeding on-site surfaces and soil and burrow area surfaces and providing interceptor ditches at ends of berms and at those locations which will ensure that erosion during construction will be either eliminated or maintained within acceptable limits as established by the CITY.
3. Temporary sedimentation controls include, but are not limited to silt dams, traps, barriers, and appurtenances at the foot of sloped surfaces which will ensure that sedimentation pollution will be either eliminated or maintained within acceptable limits as established by the CITY.
4. Contractor is responsible for providing effective temporary erosion and sedimentation control and leaving them installed at completion of the Work.

B. Related Work Described Elsewhere:

1. Site Clearing: Section 02230
2. Sedimentation and Erosion Control: Section 02270.

PART 2 - PRODUCTS

2.01 SEDIMENTATION CONTROL

- A. Bales shall be clean, seed-free cereal hay type.
- B. Netting shall be fabricated of material acceptable to the CITY.
- C. Filter stone shall be crushed stone which conforms to Florida Department of Transportation (FDOT) specifications.
- D. Concrete block shall be hollow, non-load bearing type.
- E. Concrete shall be exterior grade not less than 1-inch thick.

PART 3 - EXECUTION

3.01 SEDIMENTATION CONTROL

- A. Install and maintain silt dams, traps, barriers, and appurtenances as shown on the approved descriptions and working drawings. Hay bales which deteriorate and filter stone which is dislodged shall be replaced.

3.02 PERFORMANCE

- A. Should any of the temporary erosion and sediment control measures employed by the Contractor fail to produce results which comply with the requirements of the State of Florida, the CITY or Consultant, Contractor shall immediately take whatever steps are necessary to correct the deficiency at its own expense.

END OF SECTION



SECTION 01570 – MAINTENANCE OF TRAFFIC

PART 1 GENERAL

- 1.01 Contractor shall provide all labor, material and services to perform all operations required for the maintenance and protection of vehicular and pedestrian traffic in conformance to all applicable FDOT laws and regulations and subject to acceptance and permits by Owner, Palm Beach County and FDOT as applicable.

1.02 REFERENCES

- A. State of Florida Department of Transportation Standard Specifications for Road and Bridge Construction, Section 102, 2000 Edition (or latest edition)
- B. State of Florida Manual of Traffic Control and Safe Practices for Street and Highway Construction, Maintenance and Utility Operations
- C. The Manual of Uniform Traffic Control Devices, latest edition
- D. CBB ROW Permit

1.03 SUBMITTAL

- A. Submit Traffic Control Plans, ROW Permit Applications and Construction Schedule to the Owner, Palm Beach County (if applicable), and the FDOT (if applicable) for review and acceptance 30 days prior to the start of construction.

1.04 SIGNS AND DEVICES

- A. Traffic Control and Informational Signs
- B. Traffic Cones and Drums, and Lights
- C. Traffic Controllers Equipment

1.05 CONSTRUCTION PARKING CONTROL

- A. Control vehicular parking to prevent interference with public traffic and parking, access by emergency

vehicles and Owner's operations. Contractor's employee's personal vehicles shall NOT be parked "in and around" the project site. Contractor's employee's personal vehicles shall be parked at the storage yard.

1.06 TRAFFIC CONTROLERS

- A. Provide trained and equipped traffic controllers to regulate traffic when construction operations encroach on public traffic lanes.

1.07 LIGHTS

- A. Use approved barricades with lights during hours of low visibility to delineate traffic lanes and to guide traffic.

1.08 TRAFFIC SIGNS AND DEVICES

- A. At approaches to site and on site, install at crossroads, detours, parking areas, and elsewhere as needed, to direct construction and affected public traffic. The Contractor shall submit traffic control through work zone plans based on FDOT Roadway and Traffic Design Standards, 2001 Edition (or latest edition).
- B. Relocate as Work progresses, to maintain effective traffic control.

1.09 REMOVAL

- A. Remove equipment and devices when no longer required.
- B. Repair damage caused by installation.

1.10 SPECIFIC TRAFFIC CONTROL

- A. Contractor shall maintain through traffic on all public roads at all times unless stated otherwise herein.
- B. Contractor shall maintain access to all vehicular driveways (public or private) at all times. Contractor shall backfill and install temporary rock base as necessary in order to



provide safe and functional access to all driveways.

- C. Contractor shall coordinate with the Police and Fire Departments for whom the Contractor will provide satisfactory access at all times.
- D. Contractor shall maintain, at the minimum, one travel lane, in each direction, when performing work within the Palm Beach County Right-of-Way.

1.11 EXECUTION

- A. The Contractor shall arrange its work to cause minimum disturbance to normal pedestrian and vehicular traffic; and shall be held responsible for providing and maintaining suitable means of access (including emergencies) to all public and

private properties during all stages of the construction.

- B. If it becomes necessary to block off an entire street to vehicular traffic during construction (other than for an emergency situation), the Contractor must secure the written authorization of the CITY and Palm Beach County or FDOT as acknowledged as a condition of the Right-of-Way (ROW) permit(s) prior to completely blocking off the roadway.

1.12 UNIT PRICE – MEASUREMENT AND PAYMENT

- A. Refer to Section 01025 - MEASUREMENT AND PAYMENT PROCEDURES.

END OF SECTION



SECTION 01580 - PROJECT IDENTIFICATION AND SIGNS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. Contractor shall furnish, install and maintain two (2) project signs.
2. Contractor shall allow no other signs to be displayed.

B. Related Requirements Described Elsewhere:

1. Summary of Project: Section SC01010.

1.02 PROJECT SIGNS

- A. One (1) painted sign with lettering, size, color and construction in accordance with the local requirements.
- B. Erect on each site at a location of high public visibility, as approved by the Consultant.
- C. Information to be included shall be as indicated on sample attached.

1.03 QUALITY ASSURANCE

- A. Sign Painter: Professional experience in type of work required.
- B. Finishes, Painting: Adequate to resist weathering and fading for three (3) year period.

1.04 SUBMITTALS

- A. An 11-inch by 17-inch color sketch of the Project sign shall be submitted to the Consultant for approval prior to final preparation of the project sign.

PART 2 - PRODUCTS

2.01 SIGN MATERIALS

- A. Structure and Framing: May be new or used, wood or metal, in sound condition, structurally adequate and suitable for specified

finish.

- B. Sign Surfaces: Exterior softwood plywood with medium density overlay, standard large sizes to minimize joints.

1. Thickness: As required by standards to span framing members, to provide even, smooth surface without waves or buckles.

C. Rough Hardware: Galvanized.

D. Paint: Exterior quality.

PART 3 - EXECUTION

3.01 PROJECT IDENTIFICATION SIGNS

- A. Paint exposed surface of supports, framing and surface material; one coat of primer and one coat of exterior paint.
- B. Paint graphics in styles, sizes, and colors selected.

3.02 MAINTENANCE

- A. Maintain signs and supports in a neat, clean condition; repair damages to structures, framing or signs.

END OF SECTION

BUILDING A BETTER CITY WITH THIS CIP PROJECT

PROJECT NAME

Project Value: Construction Bid Price

Design Professional:
NAME OF CONSULTING FIRM
PERSON'S NAME, Project Manager

Contractor:
NAME OF CONTRACTOR
PERSON'S NAME, Project Manager



Month, Year

Steven B. Grant, Mayor
Justin Katz, Vice Mayor District 1
Mack, McCray, Commissioner District 2
Christina Romelus, Commissioner District 3
Joe Casello, Commissioner District 4

Lori LaVerriere, City Manager

Name & Title, Project Manager

Signs to be 4 feet high by 8 feet wide with 1 ½-inches blue border, white infield and blue lettering (to match border). Sign title line to be 4-inch letter size, project information to be 3-inch letter size, City information to be 1-inch letters. The City approval of the sign (specifically the City logo) is required after fabrication but prior to installation. Each sign to be mounted on a minimum of two (2) 4x4 posts with white PVC sleeves and white PVC top caps. Contractor to provide two (2) signs.



SECTION 01600 - MATERIAL AND EQUIPMENT

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work: Material and equipment incorporated into the Work:

1. Manufactured and fabricated products:
 - a. Design, fabricate and assemble in accord with the best engineering and shop practices.
 - b. Manufacture like parts of duplicate units to standard sizes and gauges, to be interchangeable.
 - c. Two (2) or more items of the same kind shall be identical, by the same manufacturer.
 - d. Products shall be suitable for service conditions.
 - e. Equipment capacities, sizes and dimensions shown or specified shall be adhered to unless variations are specifically approved in writing.
2. Do not use material or equipment for any purpose other than that for which it is designed or specified.

1.02 MANUFACTURER'S INSTRUCTIONS FOR INSTALLATION

A. When Contract Documents require that installation of Work shall comply with manufacturer's printed

instructions. Contractor shall obtain and distribute copies of such instructions to parties involved in the installation, including five (5) copies to the Consultant.

1. Maintain one (1) set of complete instructions at the job site during installation and until completion.

B. Contractor shall handle, install, connect, clean, condition and adjust products in strict accord with such instructions and in conformity with specified requirements.

1. Should job conditions or specified requirements conflict with manufacturer's instructions, consult with Consultant for further instructions.

2. Do not proceed with Work without clear instructions.

C. Contractor shall perform work in accordance with manufacturer's instructions. Do not omit any preparatory step or installation procedure unless specifically modified or exempted by Contract Documents.

1.03 TRANSPORTATION AND HANDLING

A. Contractor shall arrange deliveries of products in accordance with progress schedules, coordinate to avoid conflict with work and conditions at the site.

1. Deliver products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact



and legible.

2. Immediately on delivery, inspect shipments to assure compliance with requirements of Contract Documents and approved submittals, and that products are properly protected and undamaged.

- B. Contractor shall provide equipment and personnel to handle products by methods to prevent soiling or damage to products or packaging.

1.04 STORAGE AND PROTECTION

- A. The Contractor shall furnish a covered, weather-protected storage structure providing a clean, dry, non-corrosive environment for all mechanical equipment, valves, architectural items, electrical and instrumentation equipment, and special equipment to be incorporated into this Project. Storage of equipment shall be in strict accordance with the "instructions for storage" of each equipment supplier and manufacturer including connection of heaters, placing of storage lubricants in equipment, etc. Corroded, damaged or deteriorated equipment and parts shall be replaced before acceptance of the Project. Equipment and materials not properly stored will not be included in a payment estimate.

- B. Contractor shall store products in accord with manufacturer's instructions, with seals and labels intact and legible.

1. Store products subject to damage by the elements in weather-tight enclosures.
2. Maintain temperature and humidity within the ranges

required by manufacturer's instructions.

3. Store fabricated products above the ground, on blocking or skids, prevent soiling or staining. Cover products which are subject to deterioration with impervious sheet coverings, provide adequate ventilation to avoid condensation.

4. Store loose granular materials in a well-drained area on solid surfaces to prevent mixing with foreign matter.

- C. All materials and equipment to be incorporated in the Work shall be handled and stored by the Contractor before, during and after shipment in a manner to prevent warping, twisting, bending, breaking, chipping, rusting, and any injury, theft or damage of any kind whatsoever to the material or equipment.

- D. Contractor shall store under a roof or off the ground cement, sand and lime, and shall be kept completely dry at all times. All structural and miscellaneous steel, and reinforcing steel shall be stored off the ground or otherwise to prevent accumulations of dirt or grease, and in a position to prevent accumulations of standing water and to minimize rusting. Beams shall be stored with the webs vertical. Precast concrete beams shall be handled and stored in a manner to prevent accumulations of dirt, standing water, staining, chipping or cracking. Brick, block and similar masonry products shall be handled and stored in a manner to reduce breakage, chipping, cracking and spalling to a minimum.



E. All materials, which, in the opinion of the Consultant, have become so damaged as to be unfit for the use intended or specified, shall be promptly removed by the Contractor from the site of the Work, and the Contractor shall receive no compensation for the damaged material or its removal.

F. Contractor shall arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions, and free from damage or deterioration.

G. Protection After Installation: Contractor shall provide substantial coverings as necessary to protect installed products from damage from traffic and subsequent construction operations. Remove covering when no longer needed.

H. The Contractor shall be responsible for all material, equipment and supplies sold and delivered to the CITY under this Contract until final inspection of the Work and acceptance thereof by the CITY. In the event any such material, equipment and supplies are lost, stolen, damaged or destroyed prior to final inspection and acceptance, the Contractor shall replace same without additional cost to the CITY.

I. Should the Contractor fail to take proper action on storage and handling of equipment supplied under this Contract within seven (7) days after written notice to do so has been given, the CITY retains the right to correct all deficiencies noted in previously transmitted written notice and deduct the cost associated with these

corrections from the Contractor's Contract. These costs may be comprised of expenditures for labor, equipment usage, administrative, clerical, engineering and any other costs associated with making the necessary corrections.

1.05 STORAGE AND HANDLING OF EQUIPMENT ON SITE

A. Because of the long period allowed for construction, special attention shall be given to the storage and handling of equipment on site. As a minimum, the procedure outlined below shall be followed by Contractor:

1. All equipment having moving parts such as gears, electric motors, etc. and/or instruments shall be stored in a temperature and humidity controlled building approved by the Consultant, until such time as the equipment is to be installed.

2. All equipment shall be stored fully lubricated with oil, grease, etc. unless otherwise instructed by the manufacturer.

3. Manufacturer's storage instructions shall be carefully studied by the Contractor and reviewed with the Consultant by him. These instructions shall be carefully followed and a written record of this kept by the Contractor.

4. Moving parts shall be rotated a minimum of once weekly to insure proper lubrication and to avoid metal-to-metal "welding". Upon installation of the equipment, the Contractor shall start the equipment, at



least half the load, once weekly for an adequate period of time to insure that the equipment does not deteriorate from lack of use.

5. Lubricants shall be changed upon completion of installation and as frequently as required thereafter during the period between installation and acceptance. Mechanical equipment to be used in the Work, if stored for longer than ninety (90) days, shall have the bearings cleaned, flushed and lubricated prior to testing and startup, at no extra cost to the CITY.
6. Prior to acceptance of the equipment, the Contractor shall have the manufacturer inspect the equipment and certify that its condition has not been detrimentally affected by the long storage period. Such certifications by the manufacturer shall be deemed to mean that the equipment is judged by the manufacturer to be in a condition equal to that of equipment that has been shipped, installed, tested and accepted in a minimum time period. As such, the manufacturer will guarantee the equipment equally in both instances. If such a certification is not given, the equipment shall be judged to be defective. It shall be removed and replaced at the Contractor's expense.

1.06 SPARE PARTS

- A. Spare parts for certain

equipment provided under Divisions 11: Equipment; 13: Special Construction; 15: Mechanical; and 16: Electrical have been specified in the pertinent sections of the Technical Specifications. The Contractor shall collect and store all spare parts so required in an area to be designated by the Consultant. In addition, the Contractor shall furnish to the Consultant an inventory listing all spare parts, the equipment they are associated with, the name and address of the supplier, and the delivered cost of each item. Copies of actual invoices for each item shall be furnished with the inventory to substantiate the delivered cost.

1.07 GREASE, OIL AND FUEL

- A. All grease, oil and fuel required for testing of equipment shall be furnished with the respective equipment. The CITY shall be furnished with a year's supply of required lubricants including grease and oil of the type recommended by the manufacturer with each item of equipment supplied.
- B. The Contractor shall be responsible for changing the oil in all drives and intermediate drives of each mechanical equipment after initial break-in of the equipment, which in no event shall be any longer than three (3) weeks of operation.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION



SECTION 01630 - SUBSTITUTIONS AND PRODUCT OPTIONS

PART 1 – GENERAL

1.04 CONTRACTOR'S OPTIONS

1.01 REQUIREMENTS INCLUDED

- A. Contractor shall furnish and install products specified under options and conditions for substitutions stated in this Section.

1.02 RELATED REQUIREMENTS

- A. Information for Bidders and General Conditions.
- B. Section SC01410: Testing Laboratory Services.
- C. Section SC01650: Start-up.
- D. Section SC01700: Contract Closeout.

1.03 PRODUCTS LISTED

- A. Within thirty (30) days after award of Contract, submit to Consultant six (6) copies of complete list of major products which are proposed for installation.
- B. Tabulate products by specification section number and title.
- C. For products specified only by reference standards, list for each such product:
 - 1. Name and address of manufacturer.
 - 2. Trade name.
 - 3. Model or catalogue designation.
 - 4. Manufacturer's data:
 - a. Reference standards.
 - b. Performance test data.

- A. For products specified only by reference standard, select product meeting that standard, by any manufacturer.
- B. For products specified by naming several products or manufacturers, select any one of those products and manufacturers named which complies with Specifications.
- C. For products specified by naming only one or more products or manufacturers and stating "or equal", select one of those named products or manufacturers. After award of Contract, submit a request as for substitutions, for any product or manufacturer which is not specifically named.
- D. For products specified by naming only one product and manufacturer, there is no option and no substitution will be allowed.

1.05 SUBSTITUTIONS

- A. Within a period of thirty (30) days after award of Contract, Consultant will consider formal requests from the Contractor for substitution of products in place of those specified:
 - 1. After the end of that period, the request will be considered only in case of product unavailability or other conditions beyond the control of the Contract Documents:
- B. Submit a separate request for each substitution. Support each request with:



1. Complete data substantiating compliance of the proposed substitution. Support each request with:
 - a. Product identification, including manufacturer's name and address.
 - b. Manufacturer's literature; identify:
 - 1) Product description.
 - 2) Reference standards.
 - 3) Performance and test data.
 - c. Samples, as applicable.
 - d. Name and address of similar projects on which product has been used, and the date of each installation.
 2. Itemized comparison of the proposed substitution with product specified; list significant variations.
 3. Data relating to changes in the construction schedule.
 4. Any effect of the substitution on separate contracts.
 5. List of changes required in other work or products.
 6. Accurate cost data comparing proposed substitution with product specified.
 7. Designation of required license fees or royalties.
 8. Designation of availability of maintenance services and sources of replacement materials.
- C. Substitutions will not be considered for acceptance when:
 1. They are indicated or implied on Shop Drawings or product data submittals without a formal request from Contractor.
 2. They are requested by anyone other than Contractor.
 3. Submitted without data relating to changes in construction schedule.
 4. Any effect of substitution on separate contracts is not included.
 5. A list of changes required in other work or products is not included.
 6. Accurate cost data comparing proposed substitution with product specified is not included.
 7. Designation of required license fees or royalties is not included.
 8. Designation of availability of maintenance services, sources of replacement materials is not included.
 9. Acceptance will require substantial revision of Contract Documents.
 - D. Substitute products shall not be ordered or installed without written acceptance of Consultant.
 - E. Consultant will determine the acceptability of proposed substitutions. Contractor shall pay all costs associated with Consultant's review.



1.06 CONTRACTOR'S REPRESENTATION

A. In making formal request for substitution Contractor represents that:

1. It has investigated the proposed product and has determined that it is equal to or superior in all respects to that specified.
2. It will provide same warranties or bonds for substitution as for product specified.
3. It will coordinate installation of accepted changes as may be required for the Work to be complete in all respects.
4. It waives claims for additional costs caused by substitution which may subsequently become apparent.
5. It will pay all costs, resulting under separate contracts, which result from the substitution.

6. It will pay all engineering costs for redesign or revision of the Contract Documents.

7. Cost data is complete and includes related costs under this Contract, but not:

- a. Costs under separate contracts.
- b. Consultant's costs of redesign or revision of Contract Documents.

1.07 CONSULTANT DUTIES

A. Review Contractor's requests for substitutions with reasonable promptness.

B. Notify Contractor in writing of decision to accept or reject requested substitution.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION



SECTION 01700 - CONTRACT CLOSEOUT

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Scope of Work: Contractor shall comply with requirement stated in Conditions of the Contract and in specifications for administrative procedures in closing out the Work.
- B. Related Requirements Described Elsewhere:
1. Cleaning: Section SC01710
 2. Project Record Documents: Section SC01720
 3. Operating and Maintenance Data: Section SC01730
 4. Warranties and Bonds: Section SC01740.

1.02 SUBSTANTIAL COMPLETION

- A. The Work will not be substantially complete, and Contractor may not request substantial completion inspection unless the following submittals and work is completed:
1. All work specified herein and shown on the drawing is complete.
 2. Project Record Documents have been submitted and reviewed to the requirements of Section SC01720.
 3. All deficiencies noted on inspection reports or non-conformances are corrected or the correction plan approved.
 4. Contractor to submit

evidence of compliance with the requirements of governing authorities.

- B. When the conditions of paragraph 1.02 A. are met the Contractor shall submit to the Consultant:

1. A written notice that it considers the Work, or portion thereof, is substantially complete, and request an inspection.

- C. Within a reasonable time after receipt of such notice, the Consultant will make an inspection to determine the status of completion.

- D. When the Consultant finds that the Work is substantially complete, Consultant will:

1. Attend a Substantial Completion walk-through of the facility to include the CITY, Contractor and Consultant and/or Engineer of Record to determine the completeness of the Project and readiness of the facility for occupancy.
2. Prepare and deliver to CITY a Certificate of Substantial Completion with the punchlist of items to be completed or corrected before final inspection.

1.03 FINAL INSPECTION

- A. Prior to Contractors request for a final inspection the following submittals and Work must be complete:
1. Project Record Documents must be approved.



2. Equipment and systems have been tested in the presence of the CITY's representative and are operational and training, when applicable.
3. All punchlist items have been corrected.

B. The Consultant will, within reasonable time, make an inspection to verify the status of completion with reasonable promptness after receipt of Contractor's request.

C. Should the Consultant consider that the Work is incomplete or defective:

1. The Consultant will promptly notify the Contractor in writing, listing the incomplete or defective work.
2. Contractor shall take immediate steps to remedy the stated deficiencies, and send another written certification to the Consultant that the Work is complete.
3. The Consultant will within a reasonable amount of time, reinspect the Work and the Contractor shall be liable for reinspection fees as described in paragraph 1.04.

D. When the Consultant finds that the Work is acceptable under the Contract Documents, the Contractor may make closeout submittals.

1.04 REINSPECTION FEES

A. Should the Consultant perform reinspections due to failure of the Work to comply with the claims of status of completion

made by the Contractor:

1. Contractor will compensate the CITY for such additional services.
2. CITY will deduct the amount of such compensation from the final payment to the Contractor.

1.05 CONTRACTOR'S CLOSEOUT SUBMITTALS

A. Warranties and Bonds: To requirements of Section SC01740.

B. Evidence of Payment and Release of Liens: To requirements of General and Supplementary Conditions.

C. Certificate of Insurance for Products and Completed Operations.

D. Final Application for Payment

E. Certificate of Substantial Completion.

F. Certificate of Final Inspection, Testing, and Acceptance

G. Closeout of all applicable permits:

1. State or other jurisdictional permits (as applicable):
 - a. FDOT
 - b. LWDD
 - c. SFWMD
 - d. USACE
 - e. FEC
 - f. CSX
2. PBC ROW/MOT
3. PBC Health Department
4. PBC Building Department
5. City of Boynton Beach – Right-of-Way (ROW)
6. City of Boynton Beach Building Department

1.06 FINAL ADJUSTMENT OF ACCOUNTS



- A. Submit a final statement of accounting to the Consultant.
- B. Statement shall reflect all adjustments to the Contract Sum:
 - 1. The original Contract Sum.
 - 2. Additions and deductions resulting from:
 - a. Previous change orders or written amendment.
 - b. Allowances.
 - c. Unit prices.
 - d. Deductions for uncorrected work.
 - e. Deductions for liquidated damages.
 - f. Deductions for reinspection payments.
 - g. Other adjustments.
 - 3. Total Contract Sum, as adjusted.
 - 4. Previous payments.
 - 5. Sum remaining due.
- C. Consultant will prepare a final Change Order, reflecting approved adjustments to the Contract Sum which were not previously made by Change Orders.

1.07 FINAL APPLICATION FOR PAYMENT

- A. Contractor shall submit the final Application for Payment in accordance with procedures and requirements stated in the Conditions of the Contract.

1.08 RECORD DOCUMENT

SUBMITTAL REQUIREMENTS

- A. Submit data on 8 ½ x 11inch pages in three-ring binders with durable covers.
- B. Prepare binder cover and binder spine with printed title "RECORD DOCUMENT MANUAL", title of project, and subject matter of binder when multiple binders are required.
- C. Internally subdivide the binder contents with permanent page dividers and tabs.
- D. Contents: Prepare a Table of Contents as follows:
 - 1. Part 1: Directory, listing names, addresses, and telephone numbers of Engineer, Contractor, Subcontractors and major equipment suppliers.
 - 2. Part 2: Project documents and certificates, including the following:
 - a. Certificate of Substantial Completion with signed-off Substantial Completion punchlist.
 - b. Certificate of Final Acceptance.
 - c. Warranty of Title, form WT-1
 - d. Final Release of Lien
 - e. Pre- and Post-construction videos and photographs on DVD or CD.
 - f. Certifications of closeout of all applicable permits (NPDES, PBC Health Department, SFWMD, LWDD, PBC or CBB Building Permits, etc.)
- E. Submit Operation and Maintenance (O & M) Manuals for all equipment. The O&M Manuals shall include the



following information:

- a. Manufacturer's name, address, and telephone number.
 - b. List of equipment
 - c. Parts list for each component
 - d. Operating instructions
 - e. Maintenance instructions for equipment and systems.
- F. Submit to the CITY, one (1) draft copy of the RECORD DOCUMENT MANUAL fifteen (15) days prior to the request for Final Inspection, Testing and Acceptance. This copy will be reviewed and returned prior to Final Inspection, Testing and Acceptance, with the CITY's comments. Revise content of all document sets as required.
- G. Submit one (1) revised FINAL RECORD DOCUMENT MANUAL and six (6) sets for all Operation and Maintenance Manuals, within ten (10) days after Final Inspection, Testing and Acceptance. .
- A. Submit written certification that the Work has been completed in accordance with Contract Documents and is ready for the Substantial Completion and/or Final Completion walk-throughs.
- B. Provide submittals to the Consultant and the CITY that are required by governing or permitting authorities such as Palm Beach County Health Department, Palm Beach County Traffic/Land Development, FDOT, etc. in order to closeout the project.
- C. Submit final Application for Payment identifying total adjusted Contract Sum, previous payments, and full release of retainage.
- D. Final payment and release of retention with NOT be made until the RECORD DOCUMENT MANUALS, Operation and Maintenance Manuals, and the "AFTER" photographic survey, video, and photographs on DVD/CD have been received and accepted by the CITY.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 CLOSEOUT PROCEDURES

END OF SECTION



SECTION 01705 - RECORD DRAWING REQUIREMENTS

PART 1 GENERAL

1.01 The terms "Record Drawing" and "As-Built Drawing" shall be synonymous. However, it is the CITY's preference to refer to these drawings as "Record Drawings". The Record Drawings are prepared by the Contractor and are used to document the actual construction and other conditions noted in the Contract Documents.

1.02 REQUIREMENTS INCLUDE

- A. Contractor shall maintain at the site, a record copy of:
 - 1. Drawings
 - 2. Approved Shop Drawings, Product Data and Samples
 - 3. Field Test Records

1.03 RELATED SECTIONS:

- A. Measurement and Payment – Section SC01025
- B. Shop Drawings, Work Drawings, and Samples – Section SC01340
- C. Testing Laboratory Services – Section SC01410
- D. Substitutions and Product Options – Section SC01630

1.04 RELATED REQUIREMENTS

- A. The completed final Record Drawings shall be certified by a Florida Registered Land Surveyor. This certification shall consist of the surveyor's embossed seal bearing his/her registration number, the surveyor's signature and date (of the survey) on each sheet of the drawing set (including the cover and key sheet). Standard Detail sheets are not required to be included in the Record Drawing set. In addition, all Record Drawing sheets shall list the company name, business address, and telephone number of surveyor. Additionally, the Record Drawings shall meet all

Minimum Technical Standards (MTS) requirements.

- B. AutoCAD computer generated progress Record Drawings are required to be submitted with each Application for Payment.

1.05 MAINTENANCE OF RECORD DRAWINGS

- A. The Contractor shall maintain full size (24"x36") field drawings to reflect the installed / accepted items of work as the Work progresses. Upon completion of the Work, the Contractor shall submit two (2) sets of full size, signed and sealed Record Drawings and one (1) CD or DVD with the electronic PDF and AutoCAD files (AutoCAD 2010 or newer format). All Record Drawings shall be generated with AutoCAD, and conversions from any other CAD platform to AutoCAD once the drawings are finished are not allowed. Points collected shall be generated with AutoCAD Land Desktop or AutoCAD Civil 3D. An electronic set of the design drawings (including all pertinent XREF's, CTB files, images, etc.) will be furnished to the Contractor by the design engineer at no cost.
- B. Contractor shall label each document, "PROJECT RECORD DRAWING" in neat large printed letters, or by rubber stamp.
- C. Contractor shall maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
- D. Record information must be created concurrently with construction progress. Contractor shall not conceal any work until required information is recorded.
- E. Contractor shall make documents and samples available for inspection by CITY and CONSULTANT at all times.



1.06 RECORD DRAWINGS

- A. Survey/GPS Points: All points shall be collected via NAD83 FL State Plane coordinates and elevations collected via the NAVD88 vertical datum. All drawings shall be in the proper coordinate base, coordinates shall be called out on the drawings, and all field collected data shall be submitted in comma delimited text electronic format.
- B. Record Drawings shall include complete as installed information including paving and drainage relative to pavement location; concrete curb; gutter and sidewalks; elevations of surface drainage flows to insure proper routings of storm water runoff; location of inlets, manholes, outfalls, endwalls and control structures; as well as pipe inverts, top of grates, rim elevations, and other features that were constructed in the Project.
- C. The Record Drawings shall include complete as installed information of the utility systems, (water, sanitary sewer and storm water systems) including service laterals, sample points, valves, backflow preventers, information relative to location of manholes, valve pits (enclosures), wet wells, lift stations, as well as the inverts and rim elevations, and any other features that were either constructed as part of the project or discovered during the construction of the project. Any and all As-Built utilities that vary from the design drawing set shall be moved spatially to its correct locations and reflected accordingly in the AutoCAD, PDF, and hard copy Record Drawings.
- D. Dimensional ties to water lines shall be provided, both horizontal and vertical, at a minimum of every 200 linear feet (lf). Each water line dimensional tie shall include centerline stationing and be referenced to the nearest edge of roadway paving with elevation of the top of the pipe.
- E. Contractor's Record Drawings shall include the key sheet / key map with exact system pipe line and valve locations indicated including GPS coordinates.
- F. Computer generated Record Drawings shall be submitted; data in tabular form will not be accepted.
- G. Additionally, Station & Offset and GPS coordinates certified by the surveyor, shall be provided for:
 - 1. Water Mains (including raw water as applicable): Valves, fittings, fire hydrants, permanent sample points, service taps and meters.
 - 2. Sanitary Sewers: - Manholes and cleanouts.
 - 3. Stormwater systems: Inlets, manholes and outfalls (including MES).
 - 4. Force Mains: Valves and fittings.
 - 5. Reuse Mains: Valves, fittings, permanent sample points, service taps and meters.
 - 6. Wellfields: Wellheads and valves
 - 7. General: Street light poles, hand-holds and pull boxes
- H. Representative items of work that shall be shown on the Record Drawings as verified, changed or added are shown below:
 - 1. Plans:
 - a. Structure types, location with grade of rim and flow-line elevations.
 - b. Piping system type (water main, gravity sewer, etc.), length, size and elevations.
 - c. Utility type, length, size and elevation in conflict structures



- d. All maintenance access structures, valve pits, valves and hydrants within right-of way.
 - e. Critical spot elevations at high or low intersections and the midpoint of all intersections.
 - f. Sewer laterals.
 - 2. Pavement Marking and Signing Plans: Sign location where installed if different from plans.
- I. Record Drawing shall include the following criteria at a minimum.
 - 1. Record Drawings of water lines shall include the following information:
 - a. Top of pipe elevations and horizontal location every 100 linear feet (lf).
 - b. Separation callouts between water main, sanitary sewer mains and laterals, reclaimed water and storm drainage piping and structures.
 - c. Final elevations of surface feature including roadway crown, edge of pavement (roadway and sidewalk) and swale elevations every 200 liner feet (lf).
 - d. Station and Offset, GPS locations and elevations of fittings, valves, fire hydrants, permanent sample points and water service taps and meters.
 - e. All tie-ins to existing lines shall be shown in an enlarged detail of the tie-in configuration.
 - f. All water services
 - 2. Record Drawings of all gravity sanitary sewer lines include the following information:
 - a. Rims, inverts and length of piping between structures as well as slopes.
 - b. Separation callouts between water main, sanitary sewer mains and laterals and storm drainage piping and structures.
 - c. The stub ends of all sewer laterals shall be located via GPS and if there are any cleanouts installed on the sewer laterals then the invert elevation of these cleanouts need to be obtained.
 - d. Lift station Record Drawings shall consist of top of wet well elevation, invert elevation of the incoming line, bottom of the wet well and of the compound area.
 - 3. Force main Record Drawings shall be prepared the same as the water line Record Drawings.
 - 4. Reclaimed water Record Drawings shall be prepared the same as the water line Record Drawings.
 - 5. Record Drawings of all storm water drainage systems shall include the following information:
 - a. Structures, grate elevations, inverts and diameter and length of pipe line between structures, type of drainage system (conveyance and/or exfiltration) and weir elevations if applicable.
 - b. Separation callouts between water main, sanitary sewer mains and laterals and storm drainage piping and structures.



- c. Cross section (ROW to ROW) every 50 feet or critical change in elevation and at each inlet showing sidewalk, inlet grate and/or top and bottom of swale/slope, edge of roadway, roadway crown, edge of roadway, grate and sidewalk elevations.
- 6. All rock and asphalt Record Drawings for parking lot, roadways and swales areas shall consist of the following:
 - a. Rock elevations at all high and low points, and at enough intermediate points to confirm slope consistency and every 50' for roadways.
 - b. Rock elevations shall be taken at all locations where there is a finish grade elevation shown on the design plans.
 - c. All catch basin and manhole rim / grate elevations shall be shown.
 - d. Elevations around island areas are required.
 - e. As constructed elevations shall be taken on all paved and unpaved swales prior to placement of asphalt and/or topsoil/sod, at enough intermediate points to confirm slope consistency and conformance to the plan details.
- 7. Lake and canal bank Record Drawings shall include a key sheet of the lake for the location of cross sections. Lake and canal bank cross sections shall be plotted at a minimum of every 100 linear feet (lf) and the top and bottom of slope/edge of water around the lake or canal, unless otherwise specified. Record Drawings shall consist of the location and elevation of the top of bank, edge of water and

the deep cut line, with the distance between each shown on the drawing. If there are contours indicated on the design plans, then they shall be recorded as well.

- a. Retention area Record Drawings elevations shall be taken at the bottom of the retention area and at the top of bank. If there are contours indicated on the design plans, then they shall be recorded as well.
- b. If a change is made via field order or deviation to any structure, pipeline, etc., a new location shall be noted on the Record Drawings. The Consultant may request additional Record Drawing information to verify horizontal or vertical locations.

1.07 SUBMITTAL

- A. Record Drawings - As a condition precedent to the Contractor's request for Substantial Completion Inspection, the Contractor shall furnish to CITY a complete set of full size paper prints, marked-up Record Drawings with "RECORD DRAWINGS" clearly printed on each sheet for review and approval and acknowledge the receipt of marked up plans, comments that shall be addressed before Final Completion. If there was no change to the drawing, it shall be marked "RECORD DRAWING - NO CHANGE" All final Record Drawing sheets shall be certified, signed and sealed by the Contractor's surveyor.
- B. Additionally, the Contractor shall certify by stamping and signing each Record Drawing sheet indicating the fact that it has been reviewed and accepted.
- C. Initially, two (2) signed and sealed paper prints are to be submitted to the Project Manager for review. Following review by the Consultant and CITY, any comments are to be



addressed. On final submission, the following items shall be provided:

1. Two (2) sets of signed and sealed drawings (24 in. x 36 in.). If sent by mail or courier, the drawings shall be packaged in properly sized shipping tubes.
 2. PDF and AutoCAD electronic files on CD or DVD. All proposed data must be crossed out and the computer generated As-Built data must be easily identified and put on AutoCAD layers other than those used by the Design Engineer, with the text "ASB" preceding the layer name. A bold or different font and line weight may be used. A sample of record data must be added to the legend and shown on each plan/profile sheet.
- D. The electronic files submitted must be in PDF and AutoCAD 2010 or newer format. All digital files are to be copied on CD or DVD. All fonts and line types shall be from the standard AutoCAD library. Any

attachments to drawings (i.e., XREFs, Images, CTB files, or any such attached files) shall be written to CD or DVD. Original layer states shall be saved in AutoCAD prior to making any changes to drawings using the Layer State Manager under the Layer Properties Manager dialog box. As a minimum requirement, electronic files must include all features that were shown on the approved construction plans.

- E. When identified on the Schedule of Bid Items as a separate pay item, Record Drawings shall be paid for once the FINAL project Record Drawings have been submitted to and accepted by the CITY and CONSULTANT.

PART 2 PRODUCTS - Not Used.

PART 3 EXECUTION - Not Used.

END OF SECTION



SECTION 01710 – CLEANING

PART 1 - GENERAL

1.01 DESCRIPTION

- A. Scope of Work: Contractor shall execute cleaning, during progress of the Work and at completion of the Work.

1.02 DISPOSAL REQUIREMENTS

- A. Contractor shall conduct cleaning and disposal operations to comply with codes, ordinances, regulations, and anti-pollution laws.

needed and dispose of at legal disposal areas away from the site.

- C. Contractor shall coordinate and cooperate with the CITY for the routine collection of garbage, debris and recycle materials by assuring access to oversized vehicles. If access to the property owner pick-up points, Contractor shall gather the collection bins, stage them in a pick-up area and then return to the individual property owners after the garbage and/or recycle has been picked-up.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Use only those cleaning materials which will not create hazards to health or property and which will not damage surfaces.
- B. Use only those cleaning materials and methods recommended by manufacturer of the surface material to be cleaned.
- C. Use cleaning materials only on surfaces recommended by cleaning material manufacturer.

3.02 DUST CONTROL

- A. Clean interior spaces prior to the start of finish painting and continue cleaning on an as-needed basis until paint is finished.
- B. Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet or newly-coated surfaces.

3.03 FINAL CLEANING

- A. Employ skilled workmen for final cleaning.
- B. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials from sight-exposed interior and exterior surfaces.
- C. Prior to final completion, or Owner occupancy, Contractor shall conduct an inspection of sight-exposed interior and exterior surfaces and all work areas, to verify that the entire Work is clean.

PART 3 - EXECUTION

3.01 DURING CONSTRUCTION

- A. Execute daily cleaning to keep the Work, the site and adjacent properties free from accumulations of waste materials, rubbish and windblown debris, resulting from construction operations or personal activities.
- B. Remove waste materials, debris and rubbish from the site as

END OF SECTION



SECTION 01720 - PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.01 IN-PROGRESS PROJECT RECORD DOCUMENTS

A. All dimensions and annotations that are noted below shall be included on the progress and final Record Drawings. Contractor shall maintain on site one (1) record copy for the Consultant of the following as it progresses:

1. Drawings:
 - a. Trench bottom elevations
 - b. Top of bedding (when imported bedding is required)
 - c. Pipe invert at each structure
 - d. Station and off-set measurements including grate elevations for structures.
 - e. GPS coordinates/notations
 - f. Mapping of all soil density test results (pass and fail)
2. Specifications
3. Addenda.
4. Change Orders and other modifications of the Contract.
5. Consultant's Field Orders or written instructions.
6. Approved Shop Drawings, Working Drawings and

Samples.

7. Field Test records.
 8. Maintenance of Traffic (MOT) Plans
 9. Construction photographs.
- B. Related Requirements Described Elsewhere:
1. Field Engineering: Section SC01050.
 2. Shop Drawings, Working Drawings and Samples: Section SC01340.
 3. Construction Photographs: Section SC01380.
 4. Video and Photographic Site Survey: Section SC01390

1.02 RECORDING

- A. Label each document "PROJECT RECORD" in neat large printed letters.
- B. Record information concurrently with construction progress.
1. Do not conceal any work until required information is recorded.
- C. Drawings: Legibly mark to record actual construction:
1. Depths of various elements of foundation in relation to finish first floor datum.
 2. Location of existing internal utilities and appurtenances concealed in the construction, referenced to visible and accessible features of the structure.



3. Field changes of dimension and detail.
 4. Changes made by Field Order or by Change Order.
 5. Details not on original Contract Drawings.
 6. Equipment and piping relocations.
- D. Specifications and Addenda: Legibly mark each section to record:
1. Manufacturer, trade name, catalog number of Supplier of each product and item of equipment actually installed.
 2. Product substitutions and alternates utilized.
 3. Changes made by Field Order or by Change Order.

- A. At Contract closeout, deliver Record Documents to the Consultant for the CITY.
- B. Accompany submittal with transmittal letter in duplicate, containing:
 1. Date.
 2. Project title and number.
 3. Contractor's name and address.
 4. Title and number of each Record Document.
 5. Signature of Contractor or his authorized representative.

PART 2 - PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

1.02 SUBMITTAL



SECTION 01730 - OPERATING AND MAINTENANCE DATA

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. Contractor shall compile product data and related information appropriate for CITY's maintenance and operation of products furnished under Contract.
 - a. Prepare operating and maintenance data as specified in this Section and as referenced in other pertinent sections of Specifications.
2. Contractor shall instruct CITY's personnel in maintenance of products and in operation of equipment and systems.

B. Related Requirements Described Elsewhere:

1. Contract Closeout: Section SC01700
2. Project Record Documents: Section SC01720

1.02 QUALITY ASSURANCE

A. Preparation of data shall be done by personnel:

1. Trained and experienced in maintenance and operation of described products.
2. Familiar with requirements of the Section.
3. Skilled as technical writer to the extent required to communicate essential data.
4. Skilled as draftsman competent to prepare required drawings.

1.03 FORM OF SUBMITTALS

- ##### A. Prepare data in form of an instructional manual for use by CITY's personnel.

B. Format:

1. Size: 8-1/2 inches x 11 inches.
2. Paper: 20 pound minimum, white, for typed pages.
3. Text: Manufacturer's printed data, or neatly typewritten.
4. Drawings:
 - a. Provide reinforced punched binder tab, bind in with text.
 - b. Reduce larger drawings and fold to size of text pages but not larger than 14 inches x 17 inches.
5. Provide fly-leaf for each separate product, or each piece of operating equipment.
 - a. Provide typed description of projects and major component parts of equipment.
 - b. Provide identified tabs.
6. Cover: Identify each volume with typed or printed title "OPERATING AND MAINTENANCE INSTRUCTIONS". List:
 - a. Title of Project.
 - b. Identity of separate structure as applicable.
 - c. Identity of general subject matter covered in the manual.

C. Binders:

1. Commercial quality three-post binders with durable and cleanable plastic covers.
2. Maximum post width: 2 inches.



3. When multiple binders are used, correlate the data into related consistent groups.

1.04 CONTENT OF MANUAL

A. Neatly typewritten table of contents for each volume, arranged in systematic order.

1. Contractor, name of responsible principal, address and telephone number.
2. A list of each project required to be included, indexed to content of the volume.
3. List, with each project, name, address and telephone number of:
 - a. Subcontractor or installer.
 - b. A list of each product required to be included, indexed to content of the volume.
 - c. Identify area of responsibility of each.
 - d. Local source of supply for parts and replacement.
4. Identify each product by product name and other identifying symbols as set forth in Contract Documents.

B. Product Data:

1. Include only those sheets which are pertinent to the specific product.
2. Annotate each sheet to:
 - a. Clearly identify specific product or part installed.
 - b. Clearly identify data applicable to installation.
 - c. Delete references to inapplicable information.

C. Drawings:

1. Supplement product data with

drawings as necessary to clearly illustrate:

- a. Relations of component parts of equipment and systems.

- b. Control and flow diagrams.

2. Coordinate drawings with information in Project Record Documents to assure correct illustration of completed installation.

3. Do not use Project Record Documents as maintenance drawings.

D. Written test, as required to supplement product data for the particular installation:

1. Organize in consistent format under separate headings for different procedures.
2. Provide logical sequence of instruction of each procedure.

E. Copy of each warranty, bond and service contract issued.

1. Provide information sheet for CITY's personnel, give:
 - a. Proper procedures in event of failure.
 - b. Instances which might affect validity of warranties or bonds.

1.05 MANUAL FOR MATERIALS AND FINISHES

A. Submit **six (6) copies** of complete manual in final form to the CITY through the CONSULTANT.

B. Content: for architectural products, applied materials and finishes:

1. Manufacturer's data, giving full information on products.
 - a. Catalog number, size, composition.
 - b. Color and texture designations.



- c. Information required for reordering special manufacturing products.
 - 2. Instructions for care and maintenance.
 - a. Manufacturer's recommendation for types of cleaning agents and methods.
 - b. Cautions against cleaning agents and methods which are detrimental to product.
 - c. Recommend schedule for cleaning and maintenance.
 - C. Content, for moisture protection and weather-exposed products:
 - 1. Manufacturer's data, giving full information on products.
 - a. Applicable standards.
 - b. Chemical composition.
 - c. Details of installation.
 - 2. Instructions for inspection, maintenance and repair.
 - D. Additional requirements for maintenance data: Respective sections of Specifications.
- 1.06 MANUAL FOR EQUIPMENT AND SYSTEMS
- A. Submit five (5) copies of complete manual in final form to the CITY through the CONSULTANT.
 - B. Content, for each unit of equipment and system, as appropriate:
 - 1. Description of unit and component parts.
 - a. Function, normal operating characteristics, and limiting conditions.
 - b. Performance curves, engineering data and tests.
 - c. Complete nomenclature
 - and commercial number of replaceable parts.
 - 2. Operating procedures:
 - a. Start-up, break-in, routine and normal operating instructions.
 - b. Regulation, control, stopping, shut-down and emergency instructions.
 - c. Summer and winter operating instructions.
 - d. Special operating instructions.
 - 3. Maintenance procedures:
 - a. Routine operations.
 - b. Guide to "trouble-shooting".
 - c. Disassembly, repair and reassembly.
 - d. Alignment, adjusting and checking.
 - 4. Servicing and lubrication required.
 - 5. Manufacturer's printed operating and maintenance instructions.
 - 6. Description of sequence of operation by control manufacturer.
 - 7. Original manufacturer's parts list, illustrations, assembly drawings and diagrams required for maintenance.
 - a. Predicted life of parts subject to wear.
 - b. Items recommended to be stocked as spare parts.
 - 8. As-installed control diagrams by controls manufacturer.
 - 9. Each contractor's coordination drawings.
 - a. As-installed color coded



 piping diagrams.

10. Charts of valve tag numbers, with location and function of each valve.
11. List of original manufacturer's spare parts, manufacturer's current prices and recommended quantities to be maintained in storage.
12. Other data as required under pertinent sections of specifications.

C. Content, for each electric and electronic systems, as appropriate:

1. Description of system and component parts.
 - a. Function, normal operating characteristics, and limiting conditions.
 - b. Performance curves, engineering data and tests.
 - c. Complete nomenclature and commercial number of replaceable parts.
2. Circuit directories and panelboards.
 - a. Electrical service
 - b. Controls
 - c. Communications
3. As installed color coded wiring diagrams.
4. Operating procedures:
 - a. Routine and normal operating instructions.
 - b. Sequences required.
 - c. Special operating instructions.
5. Maintenance procedures:
 - a. Routine operations.
 - b. Guide to "trouble-

shooting".

- c. Disassembly, repair and reassembly.
6. Manufacturer's printed operating and maintenance instructions.
7. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.
8. Other data as required under pertinent sections of specifications.

- D. Prepare and include additional data when the need for such data becomes apparent during instruction of CITY's personnel.
- E. Additional requirements for operating and maintenance data: Respective sections of Specifications.

1.07 SUBMITTAL SCHEDULE

- A. Submit two (2) copies of completed data in final form to the CITY through the CONSULTANT no later than thirty (30) days following the Consultant's review of the last shop drawing and/or other submittal specified under Section SC01340.
 1. One copy will be returned with comments to be incorporated into final copies.
- B. Submit **six (6) copies** of approved manual in final form directly to the offices of the Consultant, within thirty (30) calendar days of product shipment to the project site and preferably within 30 days after the reviewed copy is received.
- C. Append six (6) copies of addendum to the operation and maintenance manuals as applicable and certificates as specified within thirty (30) days after final inspection and plant start-up test.

1.08 INSTRUCTION OF CITY'S PERSONNEL



- A. Fully instruct CITY's designated operating and maintenance personnel in operation, adjustment and maintenance of products, equipment and systems.
- B. Review operating and maintenance manual with CITY's operating and maintenance personnel in full detail to explain all aspects of operations and maintenance.
- C. A list shall be provided to the CITY detailing the date, time and attendees of all training sessions.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION



SECTION 01740 - WARRANTIES AND BONDS

PART 1 - GENERAL

1.01 DESCRIPTION

A. Scope of Work:

1. Contractor shall compile specified warranties and bonds, as in Article 5 and 13 of the General Conditions and as specified in these Specifications.

B. Related Work Described Elsewhere:

1. General Conditions: Articles 5 and 13
2. Contract Closeout: Section SC01700.

1.02 SUBMITTAL REQUIREMENTS

A. Assemble warranties, bonds and service and maintenance contracts, executed by each of the respective manufacturers, suppliers, and subcontractors.

B. Number of original signed copies required: Two (2) each.

C. Table of Contents: Neatly typed, in orderly sequence. Provide complete information for each item.

1. Product of work item.
2. Firm, with name of principal, address and telephone number.
3. Scope.
4. Date of beginning of warranty, bond or service and maintenance contract.
5. Duration of warranty, bond or service maintenance

contract.

6. Provide information for CITY's personnel:

- a. Proper procedure in case of failure.
- b. Instances which might affect the validity of warranty or bond.

7. Contractor, name of responsible principal, address and telephone number.

1.03 FORM OF SUBMITTALS

A. Prepare in duplicate packets.

B. Format:

1. Size 8-1/2 inches by 11 inches, punch sheets for standard three (3) post binder.

- a. Fold larger sheets to fit into binders.

2. Cover: Identify each packet with typed or printed title "WARRANTIES AND BONDS". List:

- a. Title of Project.
- b. Name of Contractor.

C. Binders: Commercial quality, three (3) post binder, with durable and cleanable plastic covers and maximum post width of two (2) inches.

1.04 WARRANTY SUBMITTALS REQUIREMENTS

A. For all major pieces of equipment, submit a warranty from the equipment



manufacturer. The manufacturer's warranty period shall be concurrent with the Contractor's for one (1) year, unless otherwise specified, commencing at the time of final acceptance by the CITY.

- B. The Contractor shall be responsible for obtaining certificates for equipment warranty for all major equipment specified under technical specifications for Divisions 11: Equipment; 13: Special Construction; 15: Mechanical; and 16: Electrical and which has at least a 1 hp motor or which lists for more than \$1,000. The Consultant reserves the right to request warranties for equipment not classified as major. The Contractor shall still warrant equipment not considered to be "major" in the Contractor's one-year warranty period even though certificates of warranty may not be required.
- C. In the event that the equipment manufacturer or supplier is unwilling to provide a one (1) year warranty commencing at

the start of the Correction Period, the Contractor shall obtain from the manufacturer a two (2) year warranty commencing at the time of equipment delivery to the job site. This two (2) year warranty from the manufacturer shall not relieve the Contractor of the one (1) year warranty.

- D. The CITY shall incur no labor or equipment cost during the guarantee period.
- E. Guarantee shall cover all necessary labor, equipment and replacement parts resulting from faulty or inadequate equipment design, improper assembly or erection, defective workmanship and materials, leakage, breakage or other failure of all equipment and components furnished by the manufacturer.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION



SECTION 01800 - MISCELLANEOUS WORK AND CLEANUP

1 PART 1 - GENERAL

Gravel drives shall be replaced and regraded.

1.01 DESCRIPTION

A. Scope of Work:

1. This Section includes operations which cannot be specified in detail as separate items but can be sufficiently described as to the kind and extent to work involved. The Contractor shall furnish all labor, materials, equipment and incidentals to complete the work under this Section.

- B. The Contractor shall remove, store and replace existing fences during construction. Only the sections directed by the Consultant shall be removed. If any section of fence is damaged due to the Contractor's negligence, it shall be replaced with fencing equal to or better than that damaged, and the work shall be satisfactory to the Consultant.

2. The work of this Section includes, but is not limited to, the following:

- a. Restoring of driveways and fences.
- b. Cleaning up.
- c. Incidental work.

3.02 CLEAN UP

- A. The Contractor shall remove all construction material, buildings, equipment and other debris remaining on the job as the result of construction operations and shall render the site of the work in a neat and orderly condition.

2 PART 2 - PRODUCTS

2.01 MATERIALS

- A. Materials required for this Section shall be of the same quality as materials that are to be restored. Where possible, the Contractor shall reuse existing materials that are removed and then replaced.

3.03 INCIDENTAL WORK

- A. Do all incidental work not otherwise specified, but obviously necessary for the proper completion of the contract as specified and as shown on the Drawings.

END OF SECTION

3 PART 3 - EXECUTION

3.01 RESTORING OF DRIVEWAYS AND FENCES

- A. Existing public and private driveways disturbed by the Contractor shall be replaced. Paved drives shall be repaved to the limits and thickness existing prior to construction.

SECTION 02018
VIBRATION MONITORING

PART 1 - GENERAL

1.1 DESCRIPTION:

- A. Furnish, install, maintain, monitor, and remove vibration-monitoring equipment as specified and as indicated.
- B. Monitor vibrations and noise levels originating from construction operations as indicated or specified.
- C. Modify construction operation procedures if existing operation creates vibration or noise exceeding specified amounts.

1.2 RELATED SECTIONS

- A. Section SC01340 – Shop Drawings, Work Drawings, and Samples
- B. Section SC01700 – Contract Closeout
- C. Section 03415 – Prestressed Concrete Piles

1.3 REFERENCES

Not Used

1.4 UNIT PRICE – MEASUREMENT AND PAYMENT

- A. When this Section is to be implemented, it shall be considered to be incidental to the specific Work scope for the individual Section, i.e., Pre-Cast Concrete Piles.

1.5 SUBMITTALS:

- A. Submit the following:
 - 1. Qualifications of the independent vibration consulting firm's Professional Engineer including the names of the five (5) successful projects with names, current addresses, and telephone numbers of persons in charge of representing the owners or the owners at the time of monitored vibration-inducing operation and noise levels.
 - 2. Qualifications of the vibration consulting firm's personnel to install, operate and interpret the monitoring equipment including the name of the personnel and the names of the three (3) projects per person which they installed, operated, monitored, and interpreted monitoring equipment with names, current addresses and telephone numbers of persons in charge of representing the owners or the owners at the time of monitored vibration-inducing operations and noise levels.
 - 3. Prior to commencement of pile driving or other vibration inducing operations,

submit in writing the plan for monitoring operations and equipment to be used to assure compliance with the vibration and noise limitation. As a minimum, this plan shall provide for the following:

- a. Recommended vibration-limiting methods to meet the specified peak particle velocity limitations and locations for taking measurements.
 - b. Manufacturers' brochures and written operation instructions for seismograph recording equipment intended to be used for each vibration occurrence.
4. Daily reports, while driving sheeting, piles or performing other vibration-inducing operations, detailing each source of vibration, location of monitoring, and the vibration records highlighting peak particle velocities. All daily reports shall be stamped and signed by the Vibration Consulting Firm's Professional Engineer.

PART 2 - PRODUCTS

2.1 EQUIPMENT:

- A. Provide a low frequency sensitive three-component seismic recording instrument with wave paper trace, variable trigger level setting, peak particle velocity memory operation (in inches/second) and sound level readout capability.
- B. Manufacturers:
 1. Sprengnether, St. Louis, MO
 2. Slope Indicator Co., Seattle, WA
 3. D&L Equipment Corp., Spoffard, NH
 4. Or equal

PART 3 - EXECUTION

3.1 QUALITY ASSURANCE:

- A. Provide in accordance with Division 1
- B. Retain the services of an independent vibration consulting firm with the following in-house personnel to conduct the following vibration monitoring requirements:
 1. Preparation, signing and stamping of monitoring plans and daily reports, and overseeing monitoring and interpretation of monitoring equipment shall be performed by personnel with the following qualifications:
 - a. Be a Florida Registered Professional Engineer
 - b. Have a minimum of five (5) years experience in the vibration-consulting field
 - c. Have successfully completed at least five (5) projects with vibration-

inducing operations and noise levels equal to or more severe than those to be encountered

2. Installation, monitoring and interpretation of monitoring equipment shall be performed by personnel with the following qualifications:
 - a. Have at least three (3) years of experience in the operation of monitoring equipment proposed for use and interpretation of records produced by such equipment
 - b. Have installed, operated, monitored and interpreted equipment and records on at least three (3) projects with vibration-inducing operations and noise levels equal to or more severe than those to be encountered

3.2 EXECUTION:

- A. Furnish specified instrumentation to be installed, operated and interpreted by the vibration consulting firm's personnel, as specified below and indicated.
- B. Monitor vibrations and record the entire particle velocity wave train, not just peak velocities. Obtain accurate, legible seismometer records of monitored vibrations.
- C. Perform all pile sheeting, driving, and other vibration-inducing operations so that vibrations reaching adjacent structures and facilities are within specified limits.
- D. Monitor vibrations by measuring the peak particle velocity in the vicinity of work. Peak particle velocity is defined as a maximum of the three velocity components, measured in three mutually perpendicular directions at any point by an instrument and combining the results. The peak particle velocity as measured by the vibration consulting firm's personnel on or at the location as specified in the submitted vibration monitoring plan, for blasting, pile driving, or other vibration-inducing operations, shall not exceed the following:

Type of Concrete	Peak Particle Age of Concrete, hrs.	Velocity in/sec.
Mass Concrete	0-11	1.0
	11 and over	2.0
Concrete Structures	0-11	0.5
	11-24	1.0
	24 and over	2.0
Permanent Structure or Utility		2.0

- E. In the event any recordings indicate that vibration limits are being exceeded, immediately suspend all sheeting, driving and other vibration-inducing operations and submit a report to the Engineer. Revise operations to reduce vibrations and submit a copy of the revised procedure to the Engineer at no additional cost to the City.
- F. If evidence of displacement or damage to utilities, equipment, or structures is observed or reported, immediately notify the Engineer and discontinue operations creating the vibrations. Revise operation to reduce vibrations and submit a copy of the revised procedure to the Engineer.
- G. Restore or replace utilities, equipment, or structures damaged by at no additional cost to

the City.

- H. Monitor and record on chart noise originating from construction activities.
- I. If noise limitations as specified City Ordinance's are exceeded notify the Engineer and discontinue operations creating noise. Revise operation to meet specified noise limitation before continuing.

END OF SECTION

SECTION 02060

AGGREGATE MATERIALS

The Utilities Department uses the Florida Department of Transportation (FDOT) Standard Specifications for Road and Bridge Construction and the FDOT Design Standards latest edition (where applicable) as reference documents. It is the intent of the Utilities Department that this technical specification (02060) shall govern the applicable project work that is typically identified in the following FDOT Specification and Standard sections:

- Section 204 - Graded Aggregate Base
- Section 210 - Reworking Limerock Base
- Section 220 - Shaping and Compacting Local Base Rock
- Section 230 - Limerock Stabilized Base
- Section 911 – Limerock Material for Base and Stabilized Base
- Section 240 - Sand-Clay Base
- Section 250 - Shell Base
- Section 913 – Shell Material
- Section 913A – Shell – Rock Material
- Section 914 – Stabilization Materials
- Section 260 - Shell Stabilized Base
- Section 270 - Soil Cement Base
- Section 901 - Course Aggregate
- Section 902 - Fine Aggregate

In the event that this technical specification (02060) is either silent on an issue or requirement or if it appears to present a conflict with the referenced FDOT Specifications and Standards, it is the responsibility of the Contractor to request clarification or resolution, in writing, from the Project Manager and Engineer.

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Aggregate materials

1.2 RELATED SECTIONS

- A. Section SC01025 - Measurement and Payment
- B. Section SC01340 – Shop Drawings, Work Drawings, and Samples
- C. Section SC01400 - Quality Requirements
- D. Section 02300 - Earthwork
- E. Section 02320 – Trenching and Excavation
- F. Section 02322 – Dewatering and Drainage
- G. Section 02324 – Backfill

- H. Section 02371 - Riprap and Rock Lining
- I. Section 02740 – Subgrade, Base Course and Asphalt

1.3 REFERENCES

- A. Florida DOT Standard Specifications for Road and Bridge Construction cited at the beginning of this section.
- B. AASHTO - M147 - Standard Specification for Materials for Aggregate and Soil-Aggregate Sub base, Base and Surface Courses
- C. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in) Drop
- D. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
- E. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (6,000 ft-lbf/ft³ (2,700 kN-m/m³))
- F. ASTM D2487 - Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System)
- G. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
- H. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)
- I. ASTM D4318 - Standard Test Method for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

1.4 UNIT PRICES - MEASUREMENT AND PAYMENT

- A. Section SC01025 - MEASUREMENT AND PAYMENT
- B. Aggregate (other than required for roadway repair, construction, exfiltration trench and manhole/structure support pad): By the square yard - Includes supplying aggregate materials, stockpiling, placement, compaction and testing.

1.5 SUBMITTALS

- A. Submittals for review and authorization to proceed
 - 1. Materials Source: Submit name of imported materials suppliers
 - 2. Materials: Submit material certificates including proctor and sieve analysis of each type of aggregate supplied

2 PART 2 PRODUCTS

2.1 COARSE AGGREGATE MATERIALS

A. Coarse Aggregate Type FDOT 57 Stone

2.2 FINE AGGREGATE MATERIALS

- A. Fine Aggregate Type FDOT Standard Specification for Road and Bridge Construction Section 902.
- B. ASTM D2487 - Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System).
- C. Materials generated from the on-site excavations or imported from an off-site source may be utilized for backfill of pipeline and associated structure excavations provided the materials consist of relatively clean sands or reasonably well graded, relatively clean sand-gravel mixtures that are free of timber, roots, clods, construction demolition debris, rubbish, trash or other deleterious matter. The materials shall have a maximum size of 1 inch, have not more than 10 percent passing the US Standard No. 200 Sieve and contain no more than 2 percent (by weight) of organic matter.
 - 1. Backfill materials classification shall comply with the Unified Soil Classification System (ASTM D 2487) Group Symbols of SP, SP-SM, GP or GP-GM.
 - 2. The S=Sand, G=Gravel, P=Poorly Graded, and M=Silty all per ASTM D 2487.

2.3 SOURCE QUALITY CONTROL

- A. Coarse Aggregate Material - Testing and Analysis: Perform in accordance with ASTM D1557 or AASHTO T180
- B. Fine Aggregate Material - Testing and Analysis: Perform in accordance with ASTM D1557 or AASHTO T180
- C. If tests indicate materials do not meet specified requirements, change material or material source and retest
- D. Provide materials of each type from same source throughout the Work

3 PART 3 EXECUTION

3.1 QUALITY ASSURANCE

- A. Perform Work in accordance with State of Florida DOT standards

3.2 STOCKPILING

- A. Stockpile materials on site at locations designated by Engineer.
- B. Stockpile in sufficient quantities to meet Project schedule and requirements.
- C. Separate differing materials with dividers or stockpile apart to prevent mixing.
- D. Direct surface water away from stockpile site to prevent erosion or deterioration of materials.

3.3 STOCKPILE CLEANUP

- A. Remove stockpile, leave area in a clean and neat condition. Grade site surface to prevent free-standing surface water.

END OF SECTION

SECTION 02082

PUBLIC MANHOLES AND STRUCTURES

The Utilities Department uses the Florida Department of Transportation (FDOT) Standard Specifications for Road and Bridge Construction and the FDOT Design Standards, latest edition where applicable) as reference documents. It is the intent of the Utilities Department that this technical specification (02082) shall govern the applicable project work that is typically identified in the following FDOT Specification and Standard sections:

- Section 400 - Concrete Structures
- Section 415 - Reinforcing Steel
- Section 416 – Installing Adhesive-Bonded Anchors and Dowels for Structural Applications
- Section 417 - Epoxy Coating of Reinforcing Welded Wire Fabric
- Section 425 - Inlets, Manholes, and Junction Boxes

In the event that this technical specification (02082) is either silent on an issue or requirement or if it appears to present a conflict with the referenced FDOT Specifications and Standards, it is the responsibility of the Contractor to request clarification or resolution, in writing, from the Project Manager and Engineer.

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Modular precast concrete manhole and inlet sections with tongue-and-groove joints, risers, transition to lid, frames, covers, anchorage, and accessories.

1.2 RELATED SECTIONS

- A. Section SC01025 - Measurement and Payment
- B. Section SC01340 – Shop Drawings, Work Drawings, and Samples
- C. Section SC01400 – Quality Requirements
- D. Section SC01700 – Contract Closeout
- E. Section 02060 – Aggregate Materials
- F. Section 02320 – Trenching and Excavation
- G. Section 02322 – Dewatering and Drainage
- H. Section 02324 – Backfill
- I. Section 02513 – Public Water & Reclaimed Water Distribution Systems
- J. Section 02536 – Force Mains
- K. Section 02538 - Sanitary Sewer System
- L. Section 02630 – Storm Drainage

M. Section 02740 – Subgrade, Base Course and Asphalt

1.3 REFERENCES

Not Used.

1.4 UNIT PRICE - MEASUREMENT AND PAYMENT

A. Refer to Section SC01025 – MEASUREMENT AND PAYMENT

The replacement of existing irrigation (public or private) in the Public ROW as the result of public manholes and structures installation is NOT a pay item. Replacement of existing ROW irrigation (to match existing quality, quantity and size) shall be incidental to the Unit Price of the pipeline, structure or swale development.

1.5 SUBMITTALS FOR REVIEW AND AUTHORIZATION TO PROCEED

A. Shop Drawings: Indicate location and size of reinforcing steel, manhole locations, inlet locations, elevations, piping, conduit, and any weir control structures, sizes and elevations of penetrations for the following:

1. Precast Manhole (including reinforcing and joint), including Frame and Cover and all brickwork.
2. Precast Structure / Inlet (including reinforcing and joint) including Frame and Cover / Grate (all grates for storm water inlets shall be reticulate with a traffic rating of H-20) and all brickwork.
3. Precast Junction Box and conflict structure (including reinforcing and joint), including Frame and Cover and all brickwork.

1.6 PROJECT RECORD DOCUMENTS

A. Refer to Section SC01700 CONTRACT CLOSEOUT for additional requirements.

B. Refer to Section SC01720 PROJECT RECORD DOCUMENTS for additional requirements.

1.7 DELIVERY, STORAGE AND HANDLING

A. Comply with precast concrete manufacturer's instructions for unloading, storing and moving precast manholes and drainage structures. Cracks or broken ends due to improper handling will not be acceptable. Lift holes will not be allowed.

B. Store precast concrete manholes and drainage structures to prevent damage to Owner's property or other public or private property. Repair property damaged from materials storage.

C. Mark each precast structure by indentation or waterproof paint showing date of manufacture, manufacturer, and identifying symbols and numbers shown on Drawings to indicate its intended use.

2 PART 2 PRODUCTS

2.1 MANHOLES (SANITARY)

A. Materials

1. Concrete: 4,000 psi
2. Reinforcement:
 - a. All reinforcement shall be A.S.T.M A615, Grade 60 or 65 ksi welded wire fabric, either smooth or deformed.
 - b. Except when ACI hooks are specifically required, reinforcement top and slab shall be straight embedment.
 - c. All steel bars shall have 1-1/2" minimum cover unless otherwise shown except for precast circular units manufactured under ASTM C-76 or ASTM C-478. Horizontal steel in rectangular structures shall be lapped a minimum of 24 bar diameters at corners.
3. Flexible Gasket: Ram Neck Seal
4. Sanitary Sewer Manhole Coatings:
 - a. Interior Coating: Manhole interior protection shall consist of the following approved processes: ThoRoc, Mainstay, Sewpercoat, Strong Seal or Refratta HAC 100 coating applied in the field.
 - b. Exterior Coating: CARBOLINE (Koppers) Bitumastic 300M Outside Structure: 1st coat gray or red, 2nd coat black.
5. Manhole Brick: ASTM C32-73 (3-hole) and shall be sound, hard and uniformly burned brick, regular and uniform in shape and size, of compact texture, and satisfactory to the Engineer. Brick shall comply with the ASTM Standard Specification for Sewer and Manhole Brick (made from clay or shale). Grade SS brick shall be used for paved inverts and shelves, and grade MS shall be used for walls.
6. Masonry Mortar: ASTM C270-82, Type M - Type II Cement.
7. Manhole Frame and Cover: Traffic rated, conforming to U.S. Foundry No. 230-AB-MC, or equal.
8. Manhole frames and covers shall be the Utility Department Standard as shown on the project construction drawings and of such quality and composition as will make the metal of the casing strong and tough and of even grain. They shall be smooth, free from scale, lumps, blisters and sand holes. No plugging or filling will be allowed. The words "SANITARY SEWER" shall be cast in the cover so as to be plainly visible. Frames and covers shall have a protective coating of black paint. All covers shall have a non-penetrating or concealed type pick hole.

B. Construction

1. Manholes shall be constructed of precast reinforced concrete. Reinforcing for the base section and top shall be as shown on the drawings. Reinforcing for

the wall sections shall be as specified in ASTM C478 and shall extend into the tongue and groove of the joints. There shall be a #4 continuous rebar hoop around openings. The base shall be monolithic with the first wall section using a water stop between base and first wall section. Adjustable riser rings are preferred for all manholes.

2. Water stop shall be manhole manufacturer's standard. If the manufacturer does not have a standard, use a 4-inch wide, #10 gauge steel sheet, welded continuous through the joint.
3. Joints shall be tongue and groove suitable for flexible Ram Neck seal gasket.
4. Lifting hooks shall be used throughout. Lift holes will not be allowed.
5. Components of the manhole shall be free of fractures, cracks, and undue roughness. Concrete shall be free of defects that indicate improper mixing or placing, and surface defects such as honeycomb or spalling. The Owner reserves the right to inspect manholes at the factory.

2.2 INLETS, JUNCTION BOXES, MANHOLES (STORM)

A. Materials

1. Concrete: 4,000 psi.
2. Reinforcement: As stated above.
3. Sizing
 - a. Standard structure bottoms 4'-0" diameter and smaller (Alt. A) and 3'-6" square (Alt. B) are designated Type P. Larger standard structure bottoms are designated Type J. Adjustable riser rings are preferred for all structures.
 - b. Walls of circular structures (Alt. A) constructed in place may be of non-reinforced concrete or brick or reinforced concrete. Precast and rectangular structures (Alt. B) shall be constructed of reinforced concrete only.
 - c. Wall thickness and reinforcement are for either reinforced cast-in-place or precast concrete units except that precast circular units may be furnished with walls in accordance with either ASTM C-478 (up to 96" diameter) or ASTM C-76 Class III B Wall, modified where the elliptical steel cage area is placed in the center one-third of the wall.
 - d. Top and floor slab thickness and re-enforcement are precast and cast-in-place construction. Top and floor slabs shall be of Class II concrete. Concrete as specified in ASTM C-478 (4,000 psi) may be used in lieu of Class I and Class II concrete in precast items manufactured in plants which are under the 'Standard Operating Procedures' for the inspection of precast drainage products.
 - e. Structure bottoms may be used in conjunction with curb inlet tops Types 1,2,3,4,5,6,9, and 10, and any manhole or junction box unless otherwise shown in the plans or other standard drawings. Alt. B structure bottoms may be used in conjunction with curb inlet Types 7 &

8, or any ditch bottom inlet unless otherwise shown in the plans or other standard drawings.

- f. Rectangular structures may be rotated as directed by the Engineer in order to facilitate connections between the structure walls and storm sewer pipes.
- g. The corner fillets shown are necessary for rectangular structures used with circular risers and inlet throats and used on skew with rectangular risers, inlet and inlet throats. Fillets will be required in lieu of the bottom slab of the Alt. B riser when used with the Alt. A box. Each fillet shall be reinforced with 2- #5 bars.

4. Frames, Covers and Grates:

- a. All grates for storm water inlets shall be reticulate with a traffic rating of H-20 as shown on FDOT Standard Index No.232.
- b. Inlet throats, riser or manhole tops shall be secured to structures as shown on FDOT Standard Index No. 201.
- c. For manhole and junction box tops for frames and covers, and for supplementary details, see same FDOT Standard Index No. 201.

3 PART 3 EXECUTION

3.1 FIELD QUALITY CONTROL

- A. Field inspection will be performed under provisions of Section SC01400 QUALITY REQUIREMENTS.

3.2 EXAMINATION

- A. Verify items provided by other sections of Work are properly sized and located.
- B. Verify that the Project is ready to receive the structures.
- C. Verify excavation for manholes is correct.

3.3 REPARATION

- A. Coordinate placement of inlet and outlet pipe or duct sleeves required by other sections.

3.4 MANHOLE INSTALLATION (WASTEWATER)

- A. Trenches and excavations shall be kept dry while work is in progress. Excavations for manholes and other structures shall be over-excavated and plastic filter fabric (Geotextile), of a sufficient size to envelope the rock support bed shall be placed in the bottom of the excavation, then place a 12 inch thick (or as specified on the project construction drawings)rock support bed of FDOT 57 rock and then install the structure.

The manhole invert shall be carefully shaped to conform to the pipe flow channel. Flow channels within the manholes involving changes of direction or slide slopes shall smoothly direct the flow in accordance with detail drawings. All concrete irregularities shall be plastered with cement mortar in such a manner as to give neat and watertight

job. Manholes shall be core-drilled to provide pipe opening when precast hole is not available.

- B. "Ram-nek" or equivalent shall be used at all riser joints. Structures with any leakage will not be accepted.

3.5 INSTALLATION OF PIPE INTO MANHOLE (WASTEWATER)

- A. Trenches and excavations shall be kept dry while work is in progress. All pipe penetrations shall be supplied with NPC KOR-N-SEAL flexible pipe-to-manhole connector. Base slab and wall thickness for precast manholes shall be as shown on the detail drawings. Invert shall be constructed as shown on the detail drawings. Steep slopes outside the invert channels shall be avoided. Changes in size and grade shall be made gradually and evenly. Changes in the direction of the sewer and entering branch or branches shall have a true curve; of as large a radius as the size of the manhole will permit. Manhole inverts may be constructed prior to installation by grouting pipe in place with cement mortar and approved joint mix.

3.6 INLET / STRUCTURE INSTALLATION (STORMWATER)

- A. Trenches and excavations shall be kept dry while work is in progress. Appurtenance shall be set to the pipe grade firm and plumb in the location(s) shown on the project construction drawings. Excavations for inlets and other stormwater structures shall be over-excavated and plastic filter fabric (Geotextile), of a sufficient size to envelope the rock support bed shall be placed in the bottom of the excavation, then place a 12 inch thick rock support bed of FDOT 57 rock and then install the structure. Joints shall be cleaned, primed and the required gasket or sealant applied as recommended by the manufacturer. Voids remaining in the joint shall be caulked with anhydrous cement grout on both the inside and outside to make a smooth watertight seal.

3.7 INSTALLATION OF CONDUIT INTO INLET / STRUCTURE

- A. Trenches and excavations shall be kept dry while work is in progress. The diameter for the pipe opening in the structure shall be 6 inches larger than the outside diameter of the pipe. Pipe shall penetrate the inside wall of the inlet/structure a minimum of 2-inches and a maximum of 4-inches. After pipe is set, the space between the pipe and inlet/structure wall shall be filled with 3-holes brick and hydraulic cement or sealed in accordance with the project construction drawings. Refer to Section 02538 SANITARY SEWER SYSTEM and 02630 STORM DRAINAGE for discipline specific requirements. Base slab and wall thickness for precast structures shall be as shown on the detail drawings. Slopes within the inlet / structure bottom shall be avoided.
- B. If inlet / structure contains a weir or other water elevation control structure, the weir wall shall incorporate the bleed down orifice with the opening bottom set at the normal control elevation. The top of the weir wall shall be set at the design elevation that shall be between 6" and 12" below the bottom of the structure top slab or inlet grate.

3.8 FRAMES AND COVERS

- A. The manhole, inlet and structure frames and covers shall be set firmly in mortar so that the top of cover will be flush with the finished grade in paved areas (following the cross slope / slope of roadways and/or driveways) and 1-inch above the finished grade in unpaved areas, unless shown otherwise on the project construction drawings.

END OF SECTION

SECTION 02270

SEDIMENTATION AND EROSION CONTROL

1 PART 1 GENERAL

1.1 DESCRIPTION

- A. Furnish all labor, materials, equipment and incidentals required and perform all installation, maintenance, removal and area cleanup related to erosion and sedimentation control work as shown on the Drawings and as specified herein. The work shall include, but not necessarily be limited to; installation of temporary access ways and staging areas, silt fences, stone filter boxes, stone filter berms, sediment removal and disposal, device maintenance, removal of temporary devices, temporary mulching, excelsior matting installation and final cleanup. CONTRACTOR is responsible for providing effective temporary erosion and sediment control measures during construction or until final controls become effective.

1.2 RELATED WORK

- A. Section SC01110 – Environmental Protection Procedures
- B. Section SC01568 – Temporary Erosion and Sedimentation Control
- C. Section SC01340 - Shop Drawings, Work Drawings, and Samples
- D. Section 02300 - Earthwork
- E. Section 02924 - Seed, Mulch and Fertilizer
- F. Section 02925 - Sodding

1.3 SUBMITTALS

- A. Submit, in accordance with Section SC01340 SHOP DRAWINGS, WORK DRAWINGS, AND SAMPLES, within 10 days after award of Contract, technical product literature for all commercial products, including straw mulch tackifier, to be used for erosion and sedimentation control.

1.4 QUALITY ASSURANCE

- A. Be responsible for the timely installation and maintenance of all sedimentation control devices necessary to prevent the movement of sediment from the construction site to off site areas or into the stream system via surface runoff or underground drainage systems. Measures in addition to those shown on the Drawings necessary to prevent the movement of sediment off site shall be installed, maintained, removed, and cleaned up at the expense of the CONTRACTOR. No additional charges to the OWNER will be considered.
- B. Sedimentation and erosion control measures shall conform to the requirements outlined in the drawings and in The Florida Development Manual.

1.5 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. The Lump Sum item for NPDES Compliance shall include all Sediment and Erosion Control efforts included in this section with measurement and payment in accordance with Section SC01025 - MEASUREMENT AND PAYMENT.

2 PART 2 PRODUCTS

2.1 MATERIALS

- A. Crushed stone for sediment filtration devices, access ways and staging areas shall conform to FDOT "Standards and Specifications for Highway and Bridges".
- B. Berm structural stone shall be rip-rap as follows:
 - 1. Rip-rap shall be sound, durable rock which is roughly rectangular shape and of suitable quality to insure permanence in the condition in which it is to be used. Rounded stones, boulders, sandstone or similar soft stone will not be acceptable. Material shall be free from overburden, spoil, shale and organic material, meet the ENGINEER's approval and be well graded within the following limits:

<u>Weight of Stone</u>	<u>Percent Finer by Weight</u>
40 lb	100
12 lb	50
3 lb	0

- C. Sediment Fence
 - 1. Sediment fence shall be a prefabricated commercial product made of a woven, polypropylene, ultraviolet resistant material such as "Envirofence" by Mirafi Inc., Charlotte, NC or equal.
- D. 1/4-in woven wire mesh for filter boxes shall be galvanized steel or hardware cloth.
- E. Straw mulch shall be utilized on all newly graded areas to protect areas against washouts and erosion. Straw mulch shall be comprised of threshed straw of oats, wheat, barley, or rye that is free from noxious weeds, mold or other objectionable material. The straw mulch shall contain at least 50 percent by weight of material to be 10-in or longer. Straw shall be in an air-dry condition and suitable for placement with blower equipment.
- F. Latex acrylic copolymer, or organic tackifier shall be a commercial product specifically manufactured for use as straw mulch tackifier.
- G. An asphalt tackifier shall only be used when temperatures are too low to allow the use of a latex acrylic copolymer and only with prior written approval from the Project Manager and Engineer.
- H. Erosion control blanket shall be installed in all seeded drainage swales and ditches as shown on the Drawings or as directed by the ENGINEER. Erosion control blanket shall be 100 percent agricultural straw matrix stitch bonded with degradable thread between two photodegradable polypropylene nettings, such as Model S150 Double Net Short-Term Blanket (10 months) by North American Green, Evansville, IN or equal.

3 PART 3 EXECUTION

3.1 INSTALLATION

- A. Sediment Fence Installation
 - 1. Sediment fences shall be positioned as indicated on the Drawings and as necessary to prevent off site movement of sediment produced by construction activities as directed by the Project Manager and Engineer.

2. Dig trench approximately 6-in wide and 6-in deep along proposed fence lines.
 3. Drive stakes, 8-ft on center (maximum) at back edge of trenches. Stakes shall be driven 2-ft (minimum) into ground.
 4. Hang filter fabric on posts carrying to bottom of trench with about 4-in of fabric laid across bottom of trench. Stretch fabric fairly taut along fence length and maintain secure both ways.
 5. Backfill trench with excavated material and tamp.
 6. Install pre-fabricated silt fence according to manufacturer's instructions.
- B. Construct filter boxes as detailed on the Drawings, from 1/4-in woven wire mesh or hardware cloth and wood. Fill with crushed stone and place over all drop inlets and manholes to storm drain system as each inlet is completed. This should be done prior to setting casting, if there is a delay between installation of inlet structures or drain manholes and setting of castings. An alternate method is to ring each inlet with a sediment fence.
- C. Stone Filter Berm Installation
1. Place berm structural stone across channel just below lower sandbag wall at work area. Face upstream side of structural berm with crushed stone.
- D. Staging areas and access ways shall be surfaced with a minimum depth of 4-in of crushed stone.

3.2 MAINTENANCE AND INSPECTIONS

- A. Inspections
1. The CONTRACTOR shall make a visual inspection of all erosion and sedimentation control devices once per week and promptly after every rainstorm. If such inspection reveals that additional measures are needed to prevent movement of sediment to offsite areas, promptly install additional devices as needed. Sediment controls in need of maintenance shall be repaired promptly.
- B. Device Maintenance
1. Sediment Fences
 - a. Remove accumulated sediment once it builds up to 1/2 of the height of the fabric.
 - b. Replace damaged fabric, or patch with a 2-ft minimum overlap.
 - c. Make other repairs as necessary to ensure that the fence is filtering all runoff directed to the fence.
 2. Filter Boxes
 - a. Replace crushed stone when it becomes saturated with silt.
 3. Stone Filter Berm
 - a. Muck out trapped silt from dewatering operations when it has built up to within 6-in of the top of the berm.

- b. Replace crushed stone filter when saturated with silt.
- 4. Add crushed stone to access ways and staging area as necessary to maintain a firm surface free of ruts and mudholes.

3.3 TEMPORARY MULCHING

- A. Apply temporary mulch to areas where rough grading has been completed but final grading is not anticipated to begin within 30 days of the completion of rough grading.
- B. Straw mulch shall be applied at rate of 100 lbs/1000 sq ft and tackified with latex acrylic copolymer at a rate and diluted in a ratio per manufacturer's instructions.

3.4 EROSION CONTROL BLANKETS

- A. Erosion control blankets shall be installed in all seeded drainage swales and ditches as shown on the Drawings and as directed by the Project Manager and Engineer in accordance with manufacturer's instructions. The area to be covered shall be properly prepared, fertilized and seeded with permanent vegetation before the blanket is applied. When the blanket is unrolled, the netting shall be on top and the fibers in contact with the soil over the entire area. The blankets shall be applied in the direction of water flow and stapled. Blankets shall be placed a minimum of three rows (of 4-ft) wide (total approx. 12-ft width) within the drainage swale/ditch and stapled together in accordance with manufacturer's instructions. Side overlaps shall be 4-in minimum. The staples shall be made of wire, .091-in in diameter or greater, "U" shaped with legs 10-in in length and a 1-1/2-in crown. Commercial biodegradable stakes may also be used with prior approval by the Project Manager and Engineer. The staples shall be driven vertically into the ground, spaced approximately two linear feet apart, on each side, and one row in the center alternately spaced between each side. Upper and lower ends of the matting shall be buried to a depth of 4-in in a trench. Erosion stops shall be created every 25-ft by making a fold in the fabric and carrying the fold into a silt trench across the full width of the blanket. The bottom of the fold shall be 4-in below the ground surface. Staple on both sides of fold. Where the matting must be cut or more than one roll length is required in the swale, turn down upper end of downstream roll into a slit trench to a depth of 4-in. Overlap lower end of upstream roll 4-in past edge of downstream roll and staple.
 - 1. To ensure full contact with soil surface, roll matting with a roller weighing 100 lbs/ft of width perpendicular to flow direction after seeding, placing matting and stapling. Thoroughly inspect channel after completion. Correct any areas where matting does not present a smooth surface in full contact with the soil below.

3.6 PERFORMANCE

- A. Should any of the temporary erosion and sediment control measures employed by the Contractor fail to produce results which comply with the requirements of the State of Florida or the Federal Government, Contractor shall immediately take whatever steps are necessary to correct the deficiency at his own expense.

3.5 REMOVAL AND FINAL CLEANUP

- A. Once the site has been fully stabilized against erosion, remove sediment control devices and all accumulated silt. Dispose of silt and waste materials in proper manner. Re-grade all areas disturbed during this process and stabilize against erosion with surfacing materials as indicated on the Drawings.

END OF SECTION

SECTION 02300

EARTHWORK

The Utilities Department uses the Florida Department of Transportation (FDOT) Standard Specifications for Road and Bridge Construction and the FDOT Design Standards, latest edition, as reference documents. It is the intent of the Utilities Department that this technical specification (02300) shall govern the applicable project work that is typically identified in the following FDOT Specification and Standard sections:

- Section 110 - Clearing and Grubbing
- Section 120 - Excavation and Embankment

In the event that this technical specification (02300) is either silent on an issue or requirement or if it appears to present a conflict with the referenced FDOT Specifications and Standards, it is the responsibility of the Contractor to request clarification or resolution, in writing, from the Project Manager and Engineer.

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Soil Materials
- B. Execution
- C. Examination
- D. Preparation
- E. Project Conditions
- F. Excavation
- G. Placement and Compaction
- H. Frequency of Tests
- I. Finish / Final Grading
- J. Protection of Finished Work
- K. Layout and As-Built Survey

1.2 RELATED SECTIONS

- A. Section SC01010 – Summary of Project
- B. Section SC01025 - Measurement and Payment
- C. Section SC01400 - Quality Requirements
- D. Section SC01700 – Contract Closeout

1.3 REFERENCES

- A. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in) Drop.
- B. ASTM D1556 - Standard Test Method for Density of Soil in Place by the Sand-Cone Method.
- C. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (6,000 ft-lbf/ft³ (2,700 kN-m/m³)).
- D. ASTM D2922 - Standard Test Method for Density of Soil and Soil Aggregate in Place by Nuclear Methods (Shallow Depth).
- E. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).

1.4 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Refer to Section SC01025 - MEASUREMENT AND PAYMENT

Material that is excavated for the purpose of installing water mains and service connections, force mains, sanitary sewers and laterals or storm drainage piping and their associated public manholes and structures and then reused as bedding and/or backfill material are not subject to this UNIT PRICE - MEASUREMENT AND PAYMENT provision. This backfill material shall be considered as incidental to the item installation.

1.5 SUBMITTALS

- A. As specified in Part 2 below.

2 PART 2 PRODUCTS

2.1 SOIL MATERIALS

- A. All fill material shall be approved by the Project Manager and Engineer. Contractor shall notify the Project Manager and Engineer 1 week in advance of providing imported material, shall provide a 1 cubic yard sample and the results of a signed and sealed proctor test for the material.
- B. Satisfactory soil materials are defined as those complying with ASTM D2487 soil classification groups GW, GP, GM, SM, SW, and SP.
- C. Unsatisfactory soil materials are defined as those complying with ASTM D2487 soil classification groups GC, SC, ML, MH, CL, CH, OL, OH, and PT.
- D. Coarse Aggregate shall conform to FDOT Specification 901 with the exception that slag or crushed slag shall not be used. Stone size shall be No. 57.
- E. Fine Aggregate shall conform to FDOT Specification 902.

- F. Subbase, Backfill, and Fill Materials: Satisfactory soil materials free of clay, debris, waste, vegetation, rock or gravel larger than 2 inches in any dimension, and other deleterious matter.

2.2 ACCESSORIES

- A. Geotextile Fabric: Non-biodegradable, woven per FDOT specification Section 514.

3 PART 3 EXECUTION

3.1 FIELD QA/QC

- A. Verify that survey benchmark and intended elevations for the Work are as indicated.

3.2 PREPARATION

- A. Identify required lines, levels, contours, and datum.
- B. Locate, identify (stake and flag), and protect utilities that remain, from damage.
- C. Notify utility owner to remove and/or relocate utilities if required and not part of the project.
- D. Protect bench marks, survey control point, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.

3.3 PROJECT CONDITIONS

- A. Site Information: Subsurface soil investigation report (if performed) will be made available for review. Data on indicated subsurface conditions is not intended as representative or a warranty of accuracy or continuity between soil borings. It is expressly understood that Owner will not be responsible for interpretations or conclusions drawn there from by Contractor. Data is made available only for convenience of 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.

- B. Existing Utilities: Locate existing underground utilities in areas of excavation work. If utilities are indicated to remain in place, provide adequate means of support and protection during earthwork operations.

Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult with Project Manager and utility owner (ex. Bell South, FPL, FPUC, Comcast) or Sunshine State One Call immediately for directions.

Uncharted or incorrectly charted underground utilities that are discovered during construction shall be incorporated into the project As-Builts with vertical and horizontal coordinates.

Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.

Do not interrupt existing utility services except when permitted in writing by Project Manager and then only after acceptable temporary utility services have been provided.

- C. Use of Explosives: Use of explosives is not permitted.
- D. Protection of Persons and Property: Barricade open excavations occurring as part of this work and post with warning lights.

Operate warning lights as recommended by authorities having jurisdiction.

Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.

Perform excavation by hand within drip line of large trees to remain. Protect root systems from damage or dry out to the greatest extent possible. Maintain moist condition for root system and cover exposed roots with moistened burlap.

3.4 EXCAVATION

- A. Excavation is unclassified and includes excavation to subgrade elevation indicated, regardless of character of materials and obstructions encountered.

3.5 PLACEMENT AND COMPACTION

- A. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum density, in accordance with AASHTO T-180 specifications or ASTM D1557:

Structures, (10' outside building lines) Building Slabs and Steps: Compact top 24 inches of subgrade and each layer of backfill or fill material to 98% of the modified proctor maximum dry density.

Pavements: Compact top 12" of subgrade and each layer of backfill or fill material to 98% of the modified proctor maximum dry density.

Lawn or Unpaved Areas: Compact top 6 inches of subgrade and each layer of backfill or fill material to 95% of the modified proctor maximum dry density.

Walkways: Compact top 6 inches of subgrade and each layer of backfill or fill material to 95% of the modified proctor maximum dry density.

3.6 FREQUENCY OF TESTS

- A. Berms: Every 200 feet per lift.
- B. Swales: For areas that have been built-up and a swale cut-in every 200 feet; otherwise, density testing of swales cut-in to existing ground does not require density testing.
- C. Proof roll compacted fill surfaces under slabs-on-grade, pavers, paving, and other appurtenances as required.
- D. The Contractor is to "map" all density test results on the Record Drawings on each day when field tests are performed. Contractor's testing laboratory shall leave a copy of the day's density testing results on site.

- E. Contractor is to instruct their Testing Lab to copy the Project Manager on all Test Reports.

3.7 FINAL AND FINISH GRADING

- A. Final grading shall be performed and the grades shaped to match existing. Except as otherwise indicated or specified, finish grades shall be flush with the edges of existing paving, etc. Excess materials not utilized for final and finish grading shall be removed from the site and disposed of off site at suitable and appropriate disposal areas.
- B. Upon project completion all areas of the site limits and adjacent areas affected by the project shall be completely cleaned of all debris.

3.8 PROTECTION OF FINISHED WORK

- A. Reshape and re-compact fills subjected to vehicular traffic.
- B. Reconditioning Compacted Areas: Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify surface, reshape, 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.

3.9 LAYOUT AND "AS BUILT" SURVEY

- A. Tolerances:
 - 1. Top surface of backfill for site clearing and general earthwork shall be plus or minus 0.10 foot from required elevations.
 - 2. Top surface of berms or other stormwater containment earthworks shall be plus 0.10, minus 0.00 foot of the required elevations.
- B. Layout for all construction improvements, paved and surface areas and other appurtenances to be constructed shall be performed by Contractor in strict accordance with drawings and work performed shall ensure true lines, angles, and elevations. All angles, lines, grades, and elevations shall be thoroughly checked by Contractor.
- C. Upon completion of placement of construction improvement, paved and surfaced areas, the Contractor shall provide Owner and Engineer with a complete and accurate "As-Built" Survey. A surveyor registered in State of Florida shall perform "As-Built" Survey. "As-Built" Survey shall indicate exact horizontal and vertical location (relative to property lines and N.G.V.D.) of buildings, concrete and asphalt surfaces and all drainage features including lakes, detention areas, berms, embankments, and swales. All of the spot elevations shown on the paving and drainage plans shall be measured and the individual "As-Built" grades shall be included on the "As-Built" Survey.
- D. Additionally, where grading between any two elevations on the plan has not been constructed at a uniform slope, then sufficient "As-Built" information shall be included to provide a true representation of the constructed grading conditions. In addition to the

information outlined above, the "As-Built" Survey shall include cross section elevations at 50-foot stations of all swales, lakes, roadways and drainage retention area (including banks, berms, bottom and transitions) constructed or improved. All elevations shown on the "As-Built" Survey shall be accurate to the nearest hundredth of a foot.

END OF SECTION

SECTION 02320

TRENCHING AND EXCAVATION

The Utilities Department uses the Florida Department of Transportation (FDOT) Standard Specifications for Road and Bridge Construction and the FDOT Design Standards, latest edition, as reference documents. It is the intent of the Utilities Department that this technical specification (02320) shall govern the applicable project work that is typically identified in the following FDOT Specification and Standard sections:

- Section 120 - Excavating and Embankment
- Section 125 - Excavation for Structures and Pipe
- Section 160 - Stabilizing
- Section 514 - Plastic Filter Fabric (Geotextile)

In the event that this technical specification (02320) is either silent on an issue or requirement or if it appears to present a conflict with the referenced FDOT Specifications and Standards, it is the responsibility of the Contractor to request clarification or resolution, in writing, from the Project Manager and Engineer.

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Definitions
- B. Field Measurements
- C. Fill Materials
- D. Preparation
- E. Dewatering and Drainage
- F. Excavation
- G. OSHA Safety Compliance
- H. Field Quality Control
- I. Pavement Removal and Replacement

1.2 RELATED SECTIONS

- A. Section SC01010 – Summary of Project
- B. Section SC01025 - Measurement and Payment
- C. Section SC01400 - Quality Requirements
- D. Section 02300 – Earthwork
- E. Section 02322 – Dewatering and Drainage

- F. Section 02324 - Backfill
- G. Section 02740 – Subgrade, Base Course and Asphalt

1.3 REFERENCES

- A. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in) Drop
- B. ASTM C136 - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates
- C. ASTM D1556 - Standard Test Method for Density of Soil in Place by the Sand-Cone Method
- D. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort [6,000 ft-lbf/ft³ (2,700 kN-m/m³)]
- E. ASTM D2321 – Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications
- F. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)
- G. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth)

1.4 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Unit pricing will only be considered for special trenching requirements not associated with utility installations. If required and as approved by Project Manager, a Change Order will be issued to authorize payment to the Contractor for special trenching.

1.5 SUBMITTALS

Not used.

1.6 DEFINITIONS

- A. Excavation consists of removal of material encountered to subgrade elevations indicated and subsequent disposal or reuse of materials removed.
- B. Additional Excavation: If the Engineer believes that the existing soil at subgrade will not support the planned construction, the Engineer may order additional excavation and replacement of the unsuitable material with select material.
- C. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions without specific direction of Engineer. Unauthorized excavation, as well as remedial work directed by Engineer, shall be at Contractor's expense.

Under footings, foundation bases, or retaining walls, fill unauthorized excavation by extending indicated bottom elevation of footing or base to excavation bottom, without altering required top elevation. Lean concrete fill may be used to bring elevations to proper position, when acceptable to Engineer.

In locations other than those above, backfill and compact unauthorized excavations as specified for authorized excavations of same classification, unless otherwise directed by Engineer.

- D. Subgrade: The undisturbed earth or the compacted soil layer immediately below granular subbase, drainage fill, or topsoil materials.
- E. Structure: Buildings, foundations, slabs, tanks, curbs, or other man-made stationary features occurring above or below ground surface.
- F. Utility: Any buried pipe, duct, conduit, cable or structure.

1.7 FIELD MEASUREMENTS

- A. Verify that survey benchmark, control points, and intended elevations for the Work are as shown on drawings.

2 PART 2 PRODUCTS

2.1 FILL MATERIALS

- A. Coarse Aggregate shall conform to FDOT Specification 901 with the exception that slag or crushed slag shall not be used. Stone size shall be No. 57.
- B. Fine Aggregate Type FDOT Specification for Road and Bridge Construction Section 902
- C. ASTM D2487 - Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System) shall be used in the identification, classification and acceptance of fill materials.

- 2.2 Concrete: Lean concrete Class 1 conforming to Section 03300 CAST-IN-PLACE CONCRETE with a compressive strength of 2,500 psi, unless otherwise noted on the construction plans.

2.3 ACCESSORIES

- A. Geotextile Fabric: Non-biodegradable, woven per FDOT specification Section 514.

3 PART 3 EXECUTION

3.1 PROJECT CONDITIONS

- A. Site Information: Subsurface soils investigation report (if performed) has been included in the project bid package for information only. Data on indicated subsurface conditions is not intended as representative or a warranty of accuracy or continuity between soil borings. It is expressly understood that Owner will not be responsible for interpretations or conclusions drawn by Contractor from the soils investigation report. Data is made available only for convenience of 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.

- B. Existing Utilities: Locate existing underground utilities in areas of excavation work. If utilities are indicated to remain in place, provide adequate means of support and protection during earthwork operations.

Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult with Project Manager and utility owner (ex. Bell South, FPL, FPUC, Comcast) or Sunshine State One Call immediately for directions.

Uncharted or incorrectly charted underground utilities that are discovered during construction shall be incorporated into the project Record Drawings with vertical and horizontal coordinates.

Cooperate with Owner and utility companies in keeping respective services and facilities in operation. Repair damaged utilities to satisfaction of utility owner.

Do not interrupt existing utility services except when permitted in writing by Project Manager and then only after acceptable temporary utility services have been provided.

- C. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by earthwork operations.
- D. Use of explosives is not permitted.

3.2 PREPARATION

- A. Identify required lines, levels, contours, and datum locations.
- B. Protect plant life, lawns, rock outcropping and other features remaining as a portion of final landscaping.
- C. Protect benchmarks, existing structures, fences, sidewalks, paving, and curbs from excavating equipment and vehicular traffic.
- D. Maintain and protect above and below grade utilities that are to remain.
- E. Cut out soft areas of subgrade not capable of compaction in place. Backfill with approved materials as specified in Part 2 above.
- F. Dewatering, when and where required due to the groundwater elevation relative to the bottom of the excavation or subgrade (in the case of roadway construction) shall be performed in accordance with Section 02322 DEWATERING AND DRAINAGE.

3.3 EXCAVATION

- A. Prior to commencement of trenching and/or excavation, the Contractor shall physically locate all underground utilities as shown on the project construction drawings or as marked by Sunshine One Call or the underground utility Owners. This information shall be provided to the Project Manager prior to trenching and excavation.
- B. Perform all excavation to depths indicated or as specified. During excavation, pile material suitable for backfilling in an orderly manner a sufficient distance from banks of trench to avoid overloading and to prevent slides or cave-ins. Unsuitable backfill material shall be identified and segregated from suitable backfill material and shall be removed from the project site by the Contractor at no expense to the Owner.

- C. The bottom of the excavations shall be firm and dry and in all respects acceptable to the Project Manager and Engineer.
- D. Excavation and dewatering shall be accomplished by methods which preserve the undisturbed state of subgrade soils. The trench may be excavated by machinery to, or just below the designated subgrade, provided that material remaining in the bottom of the trench is no more than slightly disturbed. Subgrade soils which become soft, loose, "quick", or otherwise unsatisfactory as a result of inadequate excavation, dewatering or other construction methods shall be removed and replaced by screened gravel fill as required by the Project Manager and Engineer at the Contractor's expense.
- E. The length of open trench shall be related closely to the rate of pipe lay. Accurately grade bottom of excavations to provide uniform bearing and support for the item being installed on undisturbed soil at every point along its entire load bearing sections, except for portions of pipe sections where it is necessary to excavate for bell holes and for proper sealing of pipe joints.
- F. Where pipe is to be laid directly on the trench bottom, final excavation at the bottom of the trench shall be performed manually, providing a flat bottom true to grade upon undisturbed or slightly disturbed material.
- G. Grade area to prevent surface water from flowing into trenches or other excavations, and remove any water accumulating therein by pumping or by other approved methods.
- H. Correct areas over excavated in accordance with Section 02300 EARTHWORK or Section 02324 BACKFILL.
- I. Where encountered in trench bed, rock shall be excavated to a depth of 1/4 of the pipe diameter below the bottom of the pipe but in no case less than 4 inches. All undercut excavations shall be backfilled and tamped with materials as specified in accordance with Section 02300 EARTHWORK or Section 02324 BACKFILL.
- J. Dig bell holes and depressions for joints after trench bottom has been graded and only of such length, depth, and width as required for properly making particular type of joint, so that pipe rests on prepared bottom for as nearly to its full length as practicable.
- K. Were wet or unstable soil that is incapable of properly supporting pipe, as determined by Project Manager and Engineer, is encountered in the bottom of trench, the trench bottom shall be excavated to a depth of at least two feet below the specified trench bottom. Place filter fabric in the bottom of the trench and support the filter fabric along the trench walls until the trench stabilization has been placed to the proper grade. The ends of the filter fabric shall be overlapped prior to placing the pipe.
- L. For Public Water Distribution Systems, Force Mains, Sanitary Sewers and Storm Drainage: Provide width of trench, at and below top of the pipe, with a clear space between barrel of pipe and trench wall as required by the pipe manufacturer recommendations. As a minimum, the distance between the pipe barrel and the trench wall shall not be less than 24-inches on both sides. This spacing does not apply to exfiltration trenches and the exfiltration trench width shall be as shown on the project construction drawings. The pipe shall rest firmly on undisturbed soil or pipe bedding material for as nearly to the full length of barrel as proper jointing operations will permit.
- M. Electrical Ducts or Cables: Provide trenches for cables or duct of a depth that will provide not less than 2 feet of cover below finished grade. Cut trenches for cables to an over

depth of not less than 3 inches. Use select backfill material for not less than 3 inches bedding and 3 inches backfill over cable.

- N. Excavation for Appurtenances: Make sufficient excavation for manholes and similar structures to leave at least 18-inches of clearance between their outer surfaces and embankment or timber which may be used to hold and protect banks. Consider any over depth excavation below such appurtenances that has not been directed by Project Manager or Engineer as unauthorized and fill with sand, gravel, or concrete as directed by the Project Manager or Engineer and at expense of Contractor.
- O. Do not interfere with 45° bearing splay of foundations.
- P. Excavations shall not be left open overnight.

3.4 DISPOSAL OF MATERIALS

- A. Excavated material shall be stacked without excessive surcharge on the trench bank or obstructing free access to hydrants and gate valves. Inconvenience to traffic and adjacent property owners/users shall be avoided as much as possible. Excavated material shall be segregated for use in backfilling as specified below.
- B. It is expressly understood that no excavated material shall be removed from the site of the work or disposed of, except as directed by the Project Manager and Engineer. When removal of surplus materials has been approved by the Project Manager and Engineer, dispose of such surplus material in approved designated areas.
- C. Should conditions make it impracticable or unsafe to stack material adjacent to the trench, the material shall be hauled and stored at a location provided. When required, it shall be re-handled and used in backfilling the trench.

3.5 OSHA SAFETY COMPLIANCE

- A. Description: The use of trench box or other approved means to comply with the Florida Trench Safety Act (Chapter 90-96, Laws of Florida), and OSHA Trench Safety Standards, shall be used where excavation exceeds 5 feet in depth. CS/HB 3183 called for the OSHA revised excavation safety standards (29 C.F.R. S 1926.650, Subpart P) to be the safety standards for work under this section.
- B. Requirements: 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.
 - 2. Written assurance that such Contractor will comply with the applicable trench safety standards.
 - 3. A unit price quotation on the appropriate line item identifying the cost of compliance (as established in the Summary of Bid Items).
 - 4. Slope slides of excavations to comply with local codes, ordinances, and requirements of agencies having jurisdiction. Shore and brace where sloping is not possible because of space restrictions or stability of material excavated. Maintain sides and slopes of excavations in safe condition until completion of backfilling.

C. Execution by Contractor

1. The Contractor performing trench excavation shall, as a minimum, comply with the excavation safety standards, which are applicable to this project.
2. Adhere to any special shoring requirements, if any, of the State or other political subdivisions, which may be applicable to such a project.
3. The Contractor shall consider all geotechnical information, including his own site investigation, in his design of the trench safety system he will employ on the project. The Contractor shall submit his design to the Project Manager at the Pre-Construction Conference.
4. Trenches and excavations shall not be left open overnight without the written authorization of the Project Manager. All trenches and excavations within 6-feet of the edge of roadway shall be backfilled and properly compacted or trench-plated by the Contractor. In either case, the Contractor shall place type II lighted barricades and snow fence around the trench/excavation at the end of each working day.
5. Trenches or excavations that reduce the roadway or travel lane width shall be backfilled with suitable sub-grade material and road rock. If the temporary reinstatement is to be in place longer than 48 hours, the roadway shall backfilled and trench-plated by the Contractor. In either case, the Contractor shall place type II lighted barricades adjacent to the roadway impact area(s).

3.6 SHEETING AND BRACING

- A. 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 during backfilling operations. Removal of shoring for structures shall be done in such a manner as not to disturb or mar finished masonry or concrete surfaces.
- B. When moveable trench bracing such as trench boxes, moveable sheeting, shoring or plates are used to support the sides of the trench, care shall be taken in placing and moving the boxes or supporting bracing to prevent movement of the pipe, or disturbance of the pipe bedding and backfill.
- C. When installing pipe, trench boxes, moveable sheeting, shoring or plates that extend below the mid diameter of the pipe shall be raised to the mid diameter of the pipe before they are moved forward or removed from the excavation. As trench boxes, moveable sheeting, shoring or plates are raised and moved, suitable backfill material shall be placed to fill any voids created and the backfill shall be re-compacted and density tested to provide and confirm uniform side support for the pipe. Refer to Section 02324 BACKFILL for additional information and requirements.
- D. The cost for use of trench boxes and/or steel sheeting will be included in the bid items for pipe and structures and shall include full compensation for driving, bracing and later removal of sheeting.
- E. All sheeting and bracing shall be carefully removed in such manner as not to endanger the construction of other structures, utilities, or property, whether public or private. All voids left after withdrawal of sheeting and/or bracing shall be immediately refilled with

suitable backfill materials by ramming with tools especially adapted to that purpose. Compaction and density verification testing is required.

3.7 PROTECTION OR REMOVAL OF UTILITY LINES

- A. Prior to construction the Contractor shall locate for physical location, elevation and dimensions and adequately uncover existing utilities, (within the path of his proposed work), to determine possible conflicts. By starting underground constructions, the Contractor has agreed that they are fully responsible for any and all damages and/or delays that may arise from not having adequately locating the underground utilities. This applies to underground utilities that are shown on the project construction drawings and those that have been physically marked in the field by the various locating organizations or agencies.
- B. Information provided on the plans may be used as an approximate guide to assist the Contractor, however, the Contractor shall rely on actual field investigation to assure that all of the existing utilities are accurately located prior to commencement of his work.
- C. Existing structures reflect the best available information, but it shall be the Contractor's responsibility to acquaint him with all information and to avoid conflict with existing conditions. Protect all existing utility lines that are to be retained, or utility line constructed during excavation operations, from damage during excavation and backfilling; if damaged, repair at Contractor's expense.
- D. Existing Utility Lines to be Retained: Repair damaged lines that are not shown on drawings, or locations of which are not known to Contractor in sufficient time to avoid further damage.
- E. Uncharted or incorrectly charted underground utilities that are discovered during construction shall be incorporated into the project As-Builts with vertical and horizontal coordinates.
- F. Prior to commencement of any excavation, the Contractor shall comply with Florida Statute 553.851 for the protection of underground gas lines and underground telecommunication lines.

3.8 BACKFILL

- A. Refer to Section 02324 BACKFILL for backfill, compaction and density testing requirements.

3.9 FIELD QUALITY CONTROL

- A. Section SC01400 QUALITY REQUIREMENTS.
- B. Compaction testing will be performed in accordance with ASTM D1556 or AASHTO T180.
- C. If tests indicate Work does not meet specified requirements, remove Work, replace, compact, and retest. Refer to Section SC01025 MEASUREMENT AND PAYMENT.
- D. Frequency of Density Tests: Refer to Section 02324 BACKFILL.

3.10 PROTECTION OF FINISHED WORK

- A. Maintain the elevations and contours of berms, ponds and embankments during construction.
- B. Reshape and re-compact fills subjected to vehicular traffic during construction.

3.11 PAVEMENT, REMOVAL, AND REPLACEMENT

- A. Removal: Where it is necessary to cut existing pavement, curbs, gutters, make saw cut with neat, parallel straight lines, at least 2 feet wider than trench width on each side of trench; approved dust control measures shall be implemented by the Contractor when cutting roadways and curbs.
- B. Replacement: Replace pavement, curbs and gutters, and sidewalks to same cross section as original, except when otherwise detailed on the project construction drawings, using materials same as original construction. Replace no pavement until trench has been backfilled, compacted and accepted as specified herein.
- C. Temporary Surfaces: For temporary road surface, use temporary asphalt (preferred) or crushed stone (to be watered at least 3 times a day including weekends), as approved. One-way traffic must be maintained at all times and street must be fully opened to traffic as quickly as possible. The temporary surface or permanent pavement shall be placed no later than 2 days after the trench backfilling. Completely remove temporary materials and dispose when permanent pavement is replaced.

* SPECIAL NOTE:

The Owner retains the option to utilize up to 20% of the excess material from excavation and trenching operations. If the Owner exercises this option, Contractor shall stockpile the excess material and deliver to the Owner's facility as directed by the Project Manager.

END OF SECTION

SECTION 02322

DEWATERING AND DRAINAGE

The Utilities Department uses the Florida Department of Transportation (FDOT) Standard Specifications for Road and Bridge Construction and the FDOT Design Standards, latest edition, as reference documents. It is the intent of the Utilities Department that this technical specification (02322) shall govern the applicable project work that is typically identified in the following FDOT Specification and Standard sections:

- Section 120 - Excavating and Embankment
- Section 125 - Excavation for Structures and Pipe
- Section 160 - Stabilizing
- Section 514 - Plastic Filter Fabric (Geotextile)

In the event that this technical specification (02322) is either silent on an issue or requirement or if it appears to present a conflict with the referenced FDOT Specifications and Standards, it is the responsibility of the Contractor to request clarification or resolution, in writing, from the Project Manager and Engineer.

1 PART 1 GENERAL

1.1 STATUTORY REQUIREMENTS

- A. Contractor is responsible to obtain and pay for all permits required for temporary dewatering and drainage systems as required by the appropriate authorities having jurisdiction over the work.
- B. Original permits shall be prominently displayed on the site prior to constructing dewatering and drainage systems.

1.2 SCOPE OF WORK

- A. Furnish, install, operate, monitor, maintain and remove temporary dewatering and drainage systems as required and lower and maintain groundwater levels a minimum of 2 feet below sub-grades of excavations. Continuously maintain excavations free of water, regardless of source, and until backfilled to final grade. Prevent surface water runoff from entering or accumulating in excavations.
- B. Furnish the services of a licensed professional engineer registered in the State of Florida, to prepare dewatering and drainage system designs and submittals.
- C. Collect and properly dispose of all discharge water from dewatering and drainage systems in accordance with State and local requirements and permits. As a minimum, no discharge or run-off of groundwater or surface water that is contaminated with any petroleum products (gasoline, diesel fuel, oil, grease, hydraulic fluid, etc.) and/or sanitary waste shall be made to surface water systems such as lakes, rivers, streams, the Intracoastal Waterway or "on-site" retention ponds that secondarily discharge to these surface water systems.
- D. Repair damage caused by dewatering and drainage system operations.
- E. Remove temporary dewatering and drainage systems when no longer needed. Restore all disturbed areas.

- F. Furnish, install, monitor, maintain and remove groundwater observation wells (piezometers) as specified herein.]

1.3 RELATED SECTIONS

- A. The pre-design Geotechnical report is being provided for “reference only” and to provide the Contractor with the bore hole locations and general findings of subsurface materials. Refer to Section 02320 TRENCHING AND EXCAVATION for additional clarification.
- B. Section SC01010 – Summary of Project
- C. Section SC01110 – Environmental Protection Procedures
- D. Section SC01025 - Measurement and Payment
- E. Section SC01400 - Quality Requirements
- F. Section 02300 – Earthwork
- G. Section 02320 – Trenching and Excavation
- H. Section 02324 - Backfill

1.4 UNIT PRICE – MEASUREMENT AND PAYMENT

- A. There is no unit pricing for this work and all on-site dewatering and drainage shall be considered to be incidental to the cost of the associated pay item(s).
- B. If identified in the Schedule of Bid Items, the cost of securing a General Water Use Permit from the South Florida Water Management District shall be reimbursed as an Allowance in accordance with Section SC01025 MEASUREMENT AND PAYMENT.

1.5 SUBMITTALS

- A. Submit, in accordance with Section SC01340 SHOP DRAWINGS, WORK DRAWINGS, AND SAMPLES the temporary dewatering and drainage system plan and design. At the discretion of the Owner, dewatering and drainage system designs shall be prepared by a licensed professional engineer, registered in the State of Florida, having a minimum of 5 years of professional experience in the design and construction of dewatering and drainage systems. The submittal will be for authorization to make formal permit application to the South Florida Water Management District for the General Water Use Permit. The Contractor shall be responsible for adequacy and safety of construction means, methods and techniques.

1.6 DEFINITIONS

- A. Wellpoint: A dewatering system utilizing wellpoints to extract surrounding groundwater in the area of trenching/excavating in order to maintain the operation in a dry condition for preparation of the trench bottom, for pipe laying, placement of bedding material and/or backfill, compaction and density testing.
- B. A dry excavation / trench: Shall be defined as the in situ soil moisture content is no more than two percentage points above the optimum moisture content for that general soil.

2 PART 2 PRODUCTS

2.1 Pump Drivers

- A. Noise levels emitted by diesel and/or gasoline pump drivers shall be controlled by the use of a “quiet-pack” muffler system or other suitable sound attenuation methods and shall not exceed 60 dB for daytime use and 55 dB for night time use at the nearest “receiving” property line. Contractor shall demonstrate, measure and record the dB levels at the time of initial set-up. The Contractor shall record dB levels weekly. The City’s Code Compliance Division of the Boynton Beach Police Department shall have jurisdictional control over the Contractor’s compliance with the City’s Noise Ordinance.

3 PART 3 EXECUTION

3.1 GENERAL

- A. Protection of Property - Contractor shall make an assessment for dewatering induced settlement and shall provide devices or systems, including but not limited to re-injection wells, infiltration trenches and cutoff walls, necessary to prevent damage to existing facilities, completed Work and adjacent facilities.
- B. Control surface water and groundwater such that excavation to final grade is made in the dry, and bearing soils are maintained undisturbed. Prevent softening, or instability of, or disturbance to, the sub-grade due to water seepage.
- C. Provide protection against flotation for all work.
- D. The impact of anticipated subsurface soil/water conditions shall be considered when selecting methods of excavation and temporary dewatering and drainage systems. Through the use of groundwater observation wells (piezometers), where groundwater levels are found not to be at least 2 feet below the proposed bottoms of excavations, a pumped dewatering system is required for pre-drainage of the soils prior to excavation and for maintenance of the lowered groundwater level until construction has been completed to such an extent that the foundation, structure, pipe, conduit, or fill will not be floated or otherwise damaged. Type of dewatering system, spacing of dewatering units and other details of the work are expected to vary with soil/water conditions at a particular location.
- E. Wellpoints shall not be set in such a way that undermines or jeopardizes paved areas; if the setting of wellpoints undermines or impacts paved areas, the impacted areas shall be removed and restored equal to or better than their original condition at the expense of the Contractor.
- F. Pipe and conduit shall not be installed in water or allowed to be submerged prior to backfilling. Pipe and conduit which becomes submerged shall be removed and the excavation dewatered and restored to proper conditions prior to reinstalling the pipe and conduit

3.2 SURFACE WATER CONTROL

- A. Control surface water runoff to prevent flow into excavations. Provide temporary measures such as dikes, ditches and sumps.

3.3 GROUNDWATER OBSERVATION WELLS (PIEZOMETERS)

- A. Groundwater observation wells (piezometers) shall be installed for monitoring groundwater levels before and during construction / installation of pipelines, foundations and structures that are below or just above the existing groundwater table. A minimum of one well for every 100 feet of pipeline and two wells at each foundation or structure in locations accepted by the Engineer. Observation wells shall be designed and installed in such a manner as to provide an accurate and reliable indication of the groundwater levels adjacent to the pipelines, foundations and structures.
- B. Each observation well shall be installed in a 2½ inch diameter bore hole extending at least 4-ft below the invert of the pipeline, foundation or structure. Backfill the annular space surrounding the intake and casing with filter sand especially processed for this purpose. Cap the top of the well to prevent infiltration of surface water.
- C. Maintain observation wells until pipelines, foundations and structures are backfilled. Observe and record daily the groundwater elevation in each well. Furnish measurements daily to the Project Manager. Periodically verify observation well accuracy by adding water to the well and recording the drop in level from the time the water was added. Redevelop plugged observation wells to maintain accuracy and reliability of groundwater level indication.
- D. Excavation work shall not be performed until the readings obtained from the observation wells indicate that the groundwater has been lowered at least 2 feet below the bottom of the sub-grade within the limits of excavation.

3.4 DISPOSAL OF DRAINAGE WATER

- A. All water discharged from temporary dewatering and drainage systems shall be disposed of in accordance with the sedimentation and control plans as specified in Section SC01110 ENVIRONMENTAL PROTECTION PROCEDURES. Existing or new sanitary sewer systems shall not be used to dispose of drainage without written authorization from the Project Manager.
- B. Collect and properly dispose of all discharge water from dewatering and drainage systems in accordance with State and local requirements and permits. As a minimum, no discharge or run-off of groundwater or surface water that is contaminated with any petroleum products (gasoline, diesel fuel, oil, grease, hydraulic fluid, etc.) and/or sanitary waste shall be made to surface water systems such as lakes, rivers, streams, the Intracoastal Waterway or “on-site” retention ponds that secondarily discharge to these surface water systems.

3.5 DEWATERING

- A. All State and local permits associated with dewatering are the responsibility of the Contractor.
- B. Dewatering systems shall be designed to allow for localized variations in the depths of the excavations.
- C. Prevent surface water and subsurface or groundwater from flowing into excavations and from flooding project site and surrounding areas. All pumping and drainage shall be done with no damage to property or structures and without interference with the rights of the public, owners of private property, pedestrians and vehicular traffic.

- D. Do not allow water to accumulate in excavations. Remove water to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to stability of sub-grades and foundations. Provide and maintain pumps, well points, sumps, suction and discharge lines, and other dewatering system components necessary to convey water away from excavations.
- E. Establish and maintain temporary drainage ditches and other diversions outside excavation limits to convey rainwater and water removed from excavations to collecting or runoff areas. Do not use trench excavations as temporary drainage ditches.
- F. Dewatering shall be accomplished well enough in advance of excavation to ensure that groundwater is already lowered prior to completing the final excavation to finish grade.
- G. Lower and maintain groundwater level a minimum of two (2) feet below bottom of excavation during placement and compaction of bedding material and foundation soils and during placement and compaction of fill and back-fill material.
- H. Excavations for foundations and structures shall be maintained in-the-dry for a minimum of 4 days after concrete placement. In no event shall water be allowed to enter an excavation and rise to cause unbalanced pressure on foundations and structures until the concrete or mortar has set at least 24 hours.
- I. Dewatering and drainage operations shall at all times be conducted in such a manner as to preserve the natural undisturbed bearing capacity of the sub-grade at the bottom of the excavation. If the sub-grade becomes disturbed for any reason, the unsuitable sub-grade material shall be removed and replaced with concrete, compacted granular fill, or other approved material to restore the bearing capacity of the sub-grade to its original undisturbed condition at no additional cost to the Owner.

3.6 DAMAGE RESTORATION

- A. Damage restoration: The Contractor shall be responsible for any heaving, settlement and/or separation of pavement that results from the dewatering operations. A damage restoration/remediation plan will be required for review and authorization to proceed.

3.7 RESTORATION OF DEWATERING ACTIVITIES

- A. As the wellpoints are withdrawn, the locations of the voided areas shall immediately backfilled by jetting approved backfill material into the voids until they are completely filled. These restored wellpoint voids are subject to random density verification testing.

END OF SECTION

SECTION 02324

BACKFILL

The Utilities Department uses the Florida Department of Transportation (FDOT) Standard Specifications for Road and Bridge Construction and the FDOT Design Standards, latest edition, as reference documents. It is the intent of the Utilities Department that this technical specification (02324) shall govern the applicable project work that it typically identified in the following FDOT Specification and Standard sections:

- Section 125 - Excavation for Structures and Pipe
- Section 514 - Plastic Filter Fabric (Geotextile)

In the event that this technical specification (02324) is either silent on an issue or requirement or if it appears to present a conflict with the referenced FDOT Specifications and Standards, it is the responsibility of the Contractor to request clarification or resolution, in writing, from the Project Manager and Engineer.

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Materials
- B. Execution
- C. Examination
- D. Preparation
- E. Bedding
- F. Backfilling
- G. Field Quality Control
- H. Compaction
- I. Frequency of Tests

1.2 RELATED SECTIONS

- A. Section SC01025 - Measurement and Payment
- B. Section SC01340 – Shop Drawings, Work Drawings, and Samples
- C. Section SC01400 - Quality Requirements
- D. Section 02060 – Aggregate Materials
- E. Section 02300 – Earthwork
- F. Section 02320 – Trenching and Excavation

- G. Section 02322 – Dewatering and Drainage
- H. Section 02371 - Riprap and Rock Lining
- I. Section 02740 – Subgrade, Base Course and Asphalt

1.3 REFERENCES

- A. AASHTO T180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54-kg (10-lb) Rammer and a 457-mm (18-in) Drop.
- B. ASTM D1556 - Standard Test Method for Density of Soil in Place by the Sand-Cone Method.
- C. ASTM D1557 - Standard Test Method for Laboratory Compaction Characteristics of Soil Using Modified Effort (6,000 ft-lbf/ft³ (2,700 kN-m/m³)).
- D. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth).
- E. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth).
- F. ASTM D 2487-06 – Standard Classification of Soils for Engineering Purposes (Unified Soil Classification System)

1.4 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Material that is excavated for the purpose of installing water mains and service connections, force mains, sanitary sewers and laterals or storm drainage piping and their associated public manholes and structures and then reused as bedding and/or backfill material are not subject to this UNIT PRICE - MEASUREMENT AND PAYMENT provision. The use of the in-situ material as backfill material shall be considered as incidental to the item installation.
- B. Fill Type – Fine Aggregate : By the cubic yard. Includes excavating existing subsoil, supplying fill materials, stockpiling, scarifying substrate surface, placing where required, and compacting.
- C. Structural Fill Type – Course Aggregate : By the cubic yard. Includes supplying fill material, stockpiling, scarifying substrate surface, placing where required, and compacting.
- D. Concrete (Flowable) Fill: For “areas”, by the cubic yard, and for grout filling of abandoned pipe, by the linear foot. Includes supplying materials, forming, mixing, and placing (and curing where required).

2 PART 2 PRODUCTS

2.1 FILL MATERIALS - GENERAL

- A. All fill material shall be approved by the Project Manager and Engineer. Contractor shall notify the Project Manager and Engineer 1 week in advance of providing imported material,

shall provide a 1 cubic yard sample and the results of a signed and sealed proctor test and material classification report for the material to the Project Manager and Engineer.

- B. Materials generated from the on-site excavations or imported from an off-site source may be utilized for backfill of pipeline and associated structure excavations provided the materials consist of relatively clean sands or reasonably well graded, relatively clean sand-gravel mixtures that are free of timber, roots, clods, construction demolition debris, rubbish, trash or other deleterious matter. The materials shall have a maximum size of 1 inch, have not more than 10 percent passing the US Standard No. 200 Sieve and contain not more than 2 percent (by weight) of organic matter.
- C. Satisfactory soil materials are defined as those complying with ASTM D 2487 soil classification groups GW, GP, SW, and SP.
- D. Unsatisfactory soil materials are defined as those complying with ASTM D 2487 soil classification groups GC, GM, SC, SM, ML, MH, CL, CH, OL, OH, and PT.
- E. Coarse Aggregate shall conform to FDOT Specification 901 with the exception that slag or crushed slag shall not be used. Stone size shall be No. 57.
- F. Fine Aggregate shall conform to FDOT Specification 902.
- G. Subbase, Backfill, and Fill Materials: Satisfactory soil materials free of clay, debris, waste, vegetation, rock or gravel larger than 2 inches in any dimension, and other deleterious matter.

2.2 ACCESSORIES

- A. Geotextile Fabric: Non-biodegradable, woven per FDOT Specification Section 514.

3 PART 3 EXECUTION

3.1 EXAMINATION

- A. Inspect the area to be backfilled to assure that all preceding work activities have been completed and accepted, otherwise, the Contractor will be "at risk" until the preceding work has been accepted by the Project Manager.

3.2 DEFINITION OF BACKFILL ZONES

- A. Lowest Zone: The lowest zone is backfilled for deep undercuts up to within 6-inches of the bottom of the pipe.
- B. Bedding Zone: The zone above the lowest zone is the Bedding Zone. Usually it will be backfill which is the 6-inches, or the thickness identified on the project construction drawings, of soil below the bottom of the pipe. If the bedding zone has been constructed (vs. undisturbed in-situ material), the Bedding Zone shall be placed in lifts no greater than 6-inches (compacted thickness).
- C. Cover Zone: The next zone is backfill that is placed after the pipe has been laid and will be called the Cover Zone. This zone extends to 12-inches above the top of the pipe. The Cover Zone and the Bedding Zone are considered the Soil Envelope for the pipe. The Cover Zone shall be placed in lifts no greater than 6-inches (compacted thickness).

- D. Top Zone: The Top Zone extends from 12-inches above the top of the pipe to the base or final grade. The Top Zone shall be placed in lifts no greater than 12-inches (compacted thickness).

3.3 BACKFILL FOR PIPELINES

A. LOWEST ZONE

- 1. When over-excavation is required due to unforeseen site conditions backfill of the over-cut shall have a minimum thickness of 6-inches and shall be manually or mechanically tamped to simulate comparable density to that of the native soils.

B. BEDDING ZONE

- 1. Excavate pipe trench in accordance with Section 02320 TRENCHING AND EXCAVATION for work of this Section. Hand trim excavation for accurate placement of pipe to elevations indicated.

If a trench box is used for the installation of the piping, it shall be raised to an elevation even with the top of the pipe before the Bedding Zone materials are placed. Once the trench-box has been moved upward, forward or removed from the excavation, the voids created by this action shall receive supplemental backfill material and re-compacted to 98% of modified proctor where applicable.

- 2. If required, bedding material shall be placed to provide uniform support along the bottom of the pipe and to place and maintain the pipe at the proper elevation. The initial layer of bedding placed to receive the pipe shall be brought to the grade and dimensions indicated on the project construction drawings. All bedding shall extend the full width of the trench bottom. The pipe shall be placed and brought to grade by tamping the bedding material or by removal of the excess amount of the bedding material under the pipe. Adjustment to grade line shall be made by scrapping away or filling with bedding material. Wedging or blocking up of pipe is not permitted. Applying pressure to the top of the pipe, such as with a backhoe bucket, to lower the pipe to the proper elevation or grade shall not be permitted.
- 3. Were wet or unstable soil that is incapable of properly supporting pipe, as determined by Project Manager and Engineer, is encountered in the bottom of trench, the trench bottom shall be excavated to a depth of at least two feet below the specified trench bottom. Place filter fabric in the bottom of the trench and support the filter fabric along the trench walls until the over-excavation has been backfilled, in two (2) 1-foot lifts (as applicable based on the backfill material; structural backfill or FDOT rock). The ends of the filter fabric shall be overlapped prior to placing the pipe.

C. COVER ZONE

- 1. Haunching: Initial backfill/haunching material shall be carefully placed by hand until one third of the pipe diameter has been covered. The Contractor shall use non-mechanical means to tamp the backfill/haunching material to form unified initial support for the pipe for each lift.
- 2. After haunching of the pipe, carefully and evenly backfill trenches on all sides with suitable backfill materials and thoroughly and carefully tamped each lift until the backfill material reaches the same elevation as the top of the pipe.

If a trench box is used for the installation of the piping, it shall be raised to an elevation even with the top of the pipe before the Cover Zone backfill materials are placed. Once the trench-box has been moved upward, forward or removed from the excavation, the voids created by this action shall receive supplemental backfill material and re-compacted to 98% of modified proctor.

3. To prevent longitudinal movement of the pipe, dumping backfill material into the trench and then spreading will not be permitted until approved material has been placed and compacted to a level 1-foot over the pipe.

D. TOP ZONE

1. For the remaining lifts of backfill, the material shall be placed in 12-inch lifts and compacted. Compact each layer to a density of 98% of modified proctor in paved areas and 95% of modified proctor in landscaped and open areas.
2. For all non-metallic pipeline installations, detection tape shall be buried 4 to 10-inches beneath the ground surface directly over the top of the utility. Should detection tape need to be installed deeper, the Contractor shall provide 3-inch wide tape. In no case shall detection tape be buried greater than 20-inches from the finished grade surface. Detection tape shall be appropriately identified based on the specific utility installation.

3.4 FOR STRUCTURES:

- A. All structures shall be marked and numbered with gradient lines, by the Contractor, to indicate the required lift thickness.
- B. Carefully backfill around all sides in a continuous and progressive manner in lifts no greater than 6-inches (compacted thickness) with excavated materials approved for backfilling, free from large clods of earth and stones and compact to 98% of modified proctor in all areas.
- C. For the sides of the structure where there is pipe penetration, the compacted backfill shall be brought up to a point where the pipe, at the correct invert elevation, is resting on compacted backfill. A bell-hole, extending no further than 1-foot from the structure, may be left around the penetration point for mudding-up around the pipe.

3.5 GENERAL BACKFILL

- A. All backfill operations shall be done in the dry. The dry condition shall be maintained during placement, compaction and density testing.
- B. As soon as practicable after the pipe has been laid and jointed, backfilling shall begin and thereafter be prosecuted expeditiously.
- C. Flooding of backfill (with potable water) will only be permitted when so directed in writing by the Project Manager.
- D. Reopen improperly backfilled trenches, or trenches where settlement occurs, to depth required for proper compaction, as determined by the Engineer, then refill and compact, with surface restored to required grade and compaction, mounded over and smoothed off.

- E. Backfill open trenches across roadways or other areas to be paved as specified above, backfill entire depth of trench in 6-inch layers, and compact each layer to a density of 98% of modified proctor, so that paving can proceed immediately after backfilling is completed.
- F. Grade ground to reasonable uniformity along all other portions of trenches and leave mounding over trenches in a uniform and neat condition, to the satisfaction of Engineer.
- G. Except as otherwise indicated, top of all piping and conduit to be 36" below finish grade (keeping project swale development in mind) unless incased in concrete. Concrete encasement to consist of a minimum of 4" thick concrete base slab placed prior to installation of piping or conduit and a minimum 4" thick concrete encasement (sides and top) placed after installation and testing of piping or conduit.
- H. Backfill excavations as promptly as work permits, but not until completion of the following:
 - 1. Acceptance of construction below finish grade including, where applicable, damp proofing, waterproofing, and perimeter insulation.
 - 2. Inspection, testing, approval, and recording locations of underground utilities have been performed and recorded.
 - 3. Removal of concrete formwork.
 - 4. Removal of trash and debris from excavation.
- I. Backfill areas to contours and elevations with approved materials.
- J. Systematically backfill to allow maximum time for natural settlement. Do not backfill over porous, wet or spongy subgrade surfaces.
- K. Place geotextile fabric over Class A-7 material existing prior to placing next lift of fill (if approved).
- L. Employ a placement method that does not disturb or damage other work.
- M. Maintain optimum moisture content of backfill materials to attain required compaction density.
- N. Backfill against supported foundation walls and concrete structures. Do not backfill against unsupported foundation walls.
- O. Backfill simultaneously on each side of unsupported foundation walls until supports are in place.
- P. Slope grade away from building minimum 2 inches in 10 ft, unless noted otherwise.
- Q. Make gradual grade changes. Blend slope into level areas.
- R. Remove surplus backfill materials from site as directed by the Project Manager and/or Engineer.
- S. Leave fill material stockpile areas free of excess fill materials.
- T. TOLERANCES:

1. Top surface of backfill for site clearing and general earthwork shall be plus or minus 0.10 foot from required elevations.
2. Top surface of backfill for the creation of or improvements to berms or other stormwater containment earthworks shall be plus 0.10 foot, minus 0.00 foot from required elevations.

3.6 FIELD QUALITY CONTROL

- A. Section SC01400 QUALITY REQUIREMENTS
- B. Compaction testing will be performed in accordance with ASTM D1556 or AASHTO T180 in locations as specified by the Project Manager or Engineer. Project Manager and/or Engineer are to select specific locations and lifts as well as witnessing of all compaction testing.
- C. If tests indicate Work does not meet specified requirements, remove Work, replace and retest.

3.7 COMPACTION

- A. Percentage of Maximum Density Requirements: Compact soil to not less than the following percentages of maximum density, in accordance with AASHTO T-180 specifications or ASTM D1557:
 1. Structures, Building Slabs and Steps: 98% of the modified proctor.
 2. Pipe Bedding Zone and Cover Zone: 98% of the modified proctor.
 3. Driveway aprons, sidewalk sections that form part of a driveway apron, driveways and roadways: As a minimum, compact top 12" of subgrade and each layer of backfill or fill material to 98% of the modified proctor. Roadways may require special subgrade stabilization as specified in the project construction drawings.
 4. Lawn or Unpaved Areas: From 1-foot above the top of the pipe (Top Zone), 95% of the modified proctor; areas around structures shall be 98% of the modified proctor.
 5. Sidewalks and walkways: Compact top 12 inches of subgrade and each layer of backfill or fill material to 95% of the modified proctor.
- B. All subgrade shall be compacted and tested up to 6-inches from the edge of the pavement (asphalt or concrete). If for specific design reasons and the project construction drawings requires an area greater than 6-inches outside the edge of slab to be compacted and tested, then those more stringent requirements shall take precedence.
- C. Frequency of Tests:
 1. Pipelines: In Public Right Of Way, swales and under sidewalks, every 100 feet per lift, for driveway aprons each lift, for road crossings each lift in three (3) locations, as directed by Engineer or Project Manager. Additionally, in the event of low production, density verification testing shall be performed on each day's work as directed by the Project Manager or Engineer.

2. In utility easements, every 200 feet per lift.
 3. Public Manholes and Structures: Each lift around structure; all sides shall be tested in random order. In addition, the final lift under pipe penetrations shall be tested.
 4. Berms: Every 200 feet per lift.
 5. Swales: For areas that have been built-up and a swale cut-in every 200 feet; otherwise, density testing of swales cut-in to existing ground does not require density testing.
- D. The Contractor's Test Lab is to "map" all density test results (pass and fail) on the Record Drawings on each day when field tests are performed. Contractor's Testing Lab shall leave a copy of the day's density testing results on site.
- E. Contractor is to instruct their Testing Lab to directly mail signed and sealed copies of all Test Reports (Proctor, Density, Water Quality, etc.) to the Project Manager and Engineer on a weekly basis.

END OF SECTION

SECTION 02513

PUBLIC WATER & RECLAIMED WATER DISTRIBUTION SYSTEMS

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Submittals
- B. Products
- C. Installation Readiness
- D. Installation
- E. Connections to Existing Systems
- F. Cleaning and Testing
- G. PBC HD Clearance
- H. Restoration

1.2 RELATED SECTIONS

- A. Section SC01025 - Measurement and Payment
- B. Section SC01340 – Shop Drawings, Work Drawings, and Samples
- C. Section SC01400 – Quality Requirements
- D. Section SC01700 – Contract Closeout
- E. Section 02082 – Public Manholes and Structures
- F. Section 02320 – Trenching and Excavation
- G. Section 02322 – Dewatering and Drainage
- H. Section 02324 - Backfill
- I. Section 02516 - Disinfection of Water Distribution Systems
- J. Section 02740 – Subgrade, Base Course and Asphalt
- K. Section 02960 – Restoration of Surface Improvements
- L. Section 03300 – Cast-in-Place Concrete

1.3 REFERENCES

- A. AWWA C600

1.4 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Refer to Section SC01025 MEASUREMENT AND PAYMENT.

When existing Right-Of-Way (ROW) irrigation must be disturbed due to pipeline installation or swale development, any existing irrigation lines shall be marked on the Contractors drawings prior to or at the time of temporary cutting-&-capping. The replacement of existing irrigation in the Public Right-Of-Way as a result of pipeline installation or swale development is NOT a pay item. Replacement of existing ROW irrigation (to match existing quality, quantity and size) shall be incidental to the Unit Price of the pipeline or swale development.

1.5 SUBMITTALS FOR REVIEW AND AUTHORIZATION TO PROCEED

- A. Shop and manufacturer's drawings and catalog cut sheets for all pipe system components. Refer to Section SC01340 – SHOP DRAWINGS, WORK DRAWINGS, AND SAMPLES.
- B. Contractor shall prepare and submit to the Project Manager a Flushing, Pressure Testing and Disinfection Phasing Plan prior to the start of the pipe installation.

1.6 SUBMITTALS AT PROJECT CLOSEOUT

- A. Refer to Section SC01700 CONTRACT CLOSEOUT and SC01720 PROJECT RECORD DOCUMENTS for requirements.

2 PART 2 PRODUCTS

- 2.1 All materials are to be ***MADE IN THE UNITED STATES OF AMERICA***. Allowable exceptions are ductile iron fittings supplied by American Cast Iron Pipe Company from Brazil, Sigma Corporation from China, and Star Pipe Products from the United States and China, and Tyler Union from United States and China; and Electronic Marking System (EMS) full-range markers by 3M from Mexico.

2.2 DUCTILE IRON PIPE

A. For Aboveground Installation:

- 1. Ductile iron pipe for aerial canal crossings installations shall conform to ANSI A21.15 and be flanged. Thickness class shall be Class 350. Flanges shall conform to ANSI A21.15. All pipe supports, clamps and/or cradles shall have a minimum ¼ inch neoprene liner between the pipe and support.

B. For Underground Installation:

- 1. In general, thickness class shall be Class 350. Ductile iron pipe shall conform to ANSI A21.51. Pipe shall have a wall thickness designed in compliance with ANSI 21.50, "American National Standard for the Thickness Design of Ductile Iron Pipe.
- 2. Joints shall be push-on rubber gaskets unless identified otherwise in the project construction drawings.
- 3. Restrained joints shall be as specified in 2.6, Restrained Mechanical Joints.

2.3 POLYVINYLCHORIDE (PVC) PIPE AND FITTINGS

- A. Pipe shall be unplasticized polyvinyl chloride (PVC) plastic pipe with integral bell containing a locked-in ring and spigot joints 4-inch through 12-inch.

- B. Pipe shall be the requirements of AWWA C900 or C905 "Polyvinyl Chloride (PVC) Pressure Pipe", Class 150 and shall meet the requirements of SDR-18. PVC compound for pipe and fittings shall meet the requirements of ASTM D1784.
- C. Fittings shall be DIP of the appropriate and corresponding pressure rating as the main line pipe and as specified in 2.4, Ductile Iron Fittings.
- D. Restrained joints shall be as specified in 2.6, Restrained Mechanical Joints.

2.4 DUCTILE IRON FITTINGS

- A. Fittings for ductile iron pipe shall be manufactured of ductile iron shall conform to the requirements of ANSI A21.10 (AWWA C110) or ANSI A21.53 (AWWA C153).

Fittings shall be compatible with the pipe and designed for 350 psi working pressure. The lining and coating of the fittings shall be as specified for the pipe.

Joints for fittings 16-inches in diameter and under shall be mechanical joint, except above ground fittings shown on the drawings, shall be flanged. Joints for fittings 18-inches in diameter and above shall be restrained type in accordance with the schedule shown on the Standard Detail Drawing. Gaskets for the flanged joints shall be "Tourseal, TM" or approved equal.

- B. Lining Pipe and Fittings:

- 1. DIP and fittings for water mains and reclaimed water mains shall be cement lined in accordance with ANSI A21.4 (AWWA C104).

- C. Exterior Finish:

- 1. Potable Water and Reclaimed Water Mains: For aboveground installation, the exterior surfaces of pipe and fittings shall be painted **BRIGHT WHITE** for potable water systems and **PANTONE PURPLE** for reclaimed water systems with a coating system approved by the Engineer. A three (3)-coat system with a polyurethane topcoat is required.
- 2. For underground potable water systems, all pipe and pipe fittings installed under this project will be color coded or marked in accordance with subparagraph 62-555.320(21)(b) 3, F.A.C., using blue as the predominant color. Underground plastic pipe shall be solid-wall blue pipe, will have a co-extruded blue external skin, or will be white or black pipe with blue stripes incorporated into, or applied to, the pipe wall.
- 3. For underground reclaimed/reuse water systems, all pipe and pipe fittings installed under this project will be color coded or marked in accordance with subparagraph 62-555.320(21)(b) 3, F.A.C., using pantone purple as the predominant color. Underground plastic pipe for reclaimed/reuse water systems shall be solid-wall pantone purple pipe, will have a co-extruded pantone purple external skin, or will be white or black pipe with pantone purple stripes incorporated into, or applied to, the pipe wall.

Pipe striped during manufacturing of the pipe will have continuous stripes that run parallel to the axis of the pipe wall, that are located at no greater than 90-degree intervals around the pipe, and that will remain intact during and after installation of the pipe. If paint is used to stripe the pipe during the installation of the pipe, the paint will be applied in a continuous line that runs parallel to the axis of the pipe and that is located along the top of the pipe; for pipe with an internal

diameter of 24 inches or greater, paint will be applied in continuous lines along each side of the pipe as well as along the top of the pipe.

2.5 BALL CORPORATION STOP - UP TO 2 INCHES

- A. Brass body, teflon coated brass ball, rubber seats and stem seals, Tee stem pre-drilled for control rod, AWWA inlet threads end, compression transition outlet, with control rod, extension box and valve key. Teflon tape (minimum of two (2) wraps) shall be applied to the threads prior to installation.

2.6 RESTRAINED MECHANICAL JOINTS

- A. All pipe-to-pipe, branch connections, valves and all change of direction fittings shall be restrained with EBAA Iron MEGALUG products or approved equal. A second form of restraint, either thrust blocks or tie rods, may be required in certain cases as directed by the Project Manager and Engineer.
- B. All valves and change of direction fittings 16" diameter and larger shall have two (2) forms of restraint. The valve and fittings shall have mechanical joints with EBAA Iron MEGALUG products or approved equal, and either thrust blocks or tie rods. If tie-rods are approved, the tie-rods shall be in a "mid-span" configuration utilizing EBAA Iron products or approved equal.
- C. Any line terminated as a construction phase that is a known future extension, shall have a valve placed at the end, and restrained with EBAA Iron MEGALUG products or approved equal to the last two (2) pipe joints.
- D. Flex-Ring Restrained Joint Ductile Iron pipe supplied by American Cast Iron Pipe Company (ACIPCO) and TR Flex Restrained Joint Ductile Iron pipe supplied by U.S. Pipe & Foundry, LLC may be used as approved by the Project Manager and Engineer. Self restraining push-on gaskets are allowed for Jack & Bore applications only as approved by the Project Manager and Engineer.

2.7 WATER SERVICE

- A. The tapping saddle shall be a stainless steel double strap service saddle of the size required with an epoxy coated ductile iron body and AWWA threads. Neoprene gaskets shall be cemented in place.
- B. The corporation ball valve, "Y" Branch if necessary, compression by yoke curb stop(s), yoke bar, expansion nut, female iron pipe tail/outlet pieces, lock nuts, meter adapters, washers, and other fittings required to make a complete installation shall be brass as shown on the drawings and the project construction drawings, and as manufactured by the Ford Meter Box Co., or approved equal. Internal pipe and tube sleeves shall be stainless steel.
- C. Sleeves under minor highways, residential streets and rural roads may be PVC Sch. 80 as approved by Engineer and Project Manager.

2.8 POLYETHYLENE PIPE AND TUBE

- A. Materials used for the manufacture of polyethylene pipe and fittings shall be PE3408 high density polyethylene meeting cell classification 345434C or 345434E per ASTM D3350; and meeting Type III, Class B or Class C, Category 5, Grade P34 per ASTM D1248; shall be listed in the name of the pipe and fitting manufacturer in Plastic Pipe Institute TR-4, Recommended Hydrostatic Strengths and Design Stresses for Thermoplastic Pipe and Fittings Compounds, with a standard grade rating of 1600 psi at 73°F. The manufacturer shall certify that the materials used to manufacture pipe and fittings meet these requirements.

- B. Polyethylene pipe shall be manufactured in accordance with ASTM D3035, Polyethylene (PE) Plastic Pipe (DR-PR) Based on Controlled Outside Diameter and AWWA C906 and shall be so marked. Each production lot of pipe shall be tested for (from material or pipe) melt index, density, % carbon, (from pipe) dimensions and ring tensile strength.
- C. Polyethylene pipe (PE) shall be Drisco pipe 3408 1", 1½" & 2" or approved equal.
- D. All PE pipe shall be color coded to match the water system type; blue for potable water and pantone purple for reclaimed water.

2.9 SERVICE IDENTIFICATION STRIPES

- A. Refer to paragraph 2.4.C. above for color-coding requirements.

2.10 MISCELLANEOUS

- A. Electronic Marking System (EMS) full-range markers shall be by 3M. Full-range markers shall be blue for potable water and pantone purple for reclaimed water. The Contractor shall install the full-range markers in accordance with the manufacturer's and City's standards. The full-range markers shall be placed at the following locations:
 - 1. Fittings, bends, reducers, tees, crosses, deflections, valves, and air release valves (ARV).
- B. The installation of the full-range markers shall be field verified by the Project Manager and Engineer prior to the certification of the work.
- C. For the installation of the pipe segments and/or structures where moderate to significant root intrusion could be a factor, the Contractor shall furnish and install BioBarrier (or approved equal) as a root barrier as directed by the Project Manager and Engineer. Furnishing and installing a root barrier is considered as an incidental cost.

3 PART 3 EXECUTION

3.1 INSTALLATION READINESS

- A. Prior to the start of underground excavations, Contractor shall examine the project construction drawings and have repair materials on site to effect repairs to all sizes of existing water mains, branch and/or service connections. Typical repair materials include, but are not limited to:
 - 1. Full encirclement repair clamps
 - 2. Fittings (DIP and brass)
 - 3. Poly tubing
 - 4. All-thread

3.2 EXAMINATION

- A. Verify that trench cut is ready to receive Work as required by this Section and excavations, dimensions, and elevations are as indicated on project construction drawings.

3.3 PREPARATION

- A. When the project drawings indicate, or when it is discovered during the course of the work, that the street or area's sanitary sewer main lines are in front of the properties (and that the new water mains will have to cross), the Contractor shall pothole each sewer lateral prior to beginning installation of the new water mains and provide the individual

sewer lateral depths to the Project Manager and the proposed depth of the new water main before beginning water main installation.

- B. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, and remove burrs.
- C. Remove scale and dirt on inside and outside before assembly.
- D. Prepare pipe connections to equipment with flanges or unions.

3.4 INSTALLATION

A. Pipeline Installation:

- 1. All trenching and excavations associated with the water main and service lines shall conform to the requirements in Technical Specification 02320 – TRENCHING AND EXCAVATION.
- 2. Installation of potable water pipe and associated fittings shall be in accordance with current AWWA and NSF specifications, and manufacturer's requirements for their particular products. All mains shall have a 36" clear cover to finished grade (keeping in mind the project's swale requirements) with pipe being as level as possible. Any variance will require approval by the Project Manager.

Changes in pipe alignment may be accomplished using appropriate fittings or through pipe deflection. Pipe deflection at the joint is allowed with ductile iron pipe only and shall not exceed 75% of the manufacturer's recommended maximum joint deflection.

3M full-range markers are required at all fittings and valves. Regardless of pipeline or pipeline component depth, the full-range markers shall be installed no deeper than 8 feet and shall be directly over the fitting or adjacent to the valve.

- 3. All pipe shall be laid in trenches having a dry and stable bottom. Backfill shall be free of boulders and debris and in accordance with Technical Specification 02324 - BACKFILL. Pipe shall be fully supported along its entire length. Sharp or rocky material encountered in the base shall be replaced with proper bedding. Pipe shall be laid on line and grade as designed.
- 4. All valves shall be placed according to project construction drawings unless relocation is approved by the Project Manager. **After installation, backfill and compaction and where applicable after asphaltting, all valves are to be exercised in the presence of the Project Manager and Engineer.** As-built drawings shall reflect the actual location of all mains, hydrants, services, and valves. All taps must be at least 18" from fitting or bell. Potable water main shall not be laid in fuel contaminated areas.
- 5. Clearance of 18" or one pipe diameter, whichever is greater, shall be maintained between all fittings (bells, valves, flanges, etc.).
- 6. All road crossings, pavement cuttings and restoration shall be in accordance with the requirements of the Owner or Palm Beach County (if project is located in their jurisdiction but within the Department's service area).
- 7. Generally, joints for ductile iron pipe shall be push-on or mechanical type designed in accordance with ANSI A21.11 (AWWA C111) or ANSI A21.53 (AWWA C153). Joint lubrication shall be as furnished by the manufacturer.

B. Valves

1. Valves shall generally be installed at intervals of no greater than 1,000 LF on transmission mains, at intervals of no greater than 700 LF on main distribution loops and feeders, and on all primary branches connected to these lines. In high-density areas, valves shall be installed to minimize the number of persons affected by a break.
2. In all instances, effectiveness of placement shall be primary criteria in determining valve location. Valves placed in curbs will not be accepted. For potable water, all valve boxes require lids be marked as "Water" and painted BLUE. For reclaimed/reuse water, all valve boxes require lids be marked "Reuse" and painted PANTONE PURPLE.

C. Fire Hydrants

1. Fire hydrants shall be installed with the center of the pumper nozzle approximately 18" – 24" above finished grade. Hydrants shall not be placed in sidewalks or traffic areas. It will be the responsibility of the Contractor to move hydrants placed in an unacceptable location and provide protection from traffic damage if necessary, upon the Project Manager's request.
2. Fire hydrant branches (from main to hydrant) shall not be less than 6" ID and be as short as possible to minimize any potential for potable water main stub with no flow. Long branch leads will require a second gate valve. Each branch shall be provided with a gate valve located as close as possible to the main.
3. Hydrants shall be located 5 feet to 10 feet from edge of pavement and no less than 6 feet from driveways with pumper discharge nozzle facing the roadway. Hydrants shall be located so as to minimize their vulnerability to traffic. At the direction of the Project Manager, for potential traffic protection, bollards may be required where minimum distances cannot be met.
4. Fire hydrants shall be placed in an accessible, unobstructed location with 5 feet clearance in all directions (except for protective bollards).
5. Fire hydrants shall be painted two (2) coats of "Fire Engine" or "Safety" red in color (field touch-up or re-paint may be required). Valve box lids for fire hydrant or Siamese connections shall be painted RED.
6. Fire Hydrants shall be provided and installed in accordance with the project construction drawings. Newly installed fire hydrants, prior to being put into service, shall be clearly marked as being "OUT OF SERVICE" with signage.
7. For every five (5) new fire hydrants installed, Contractor shall supply one (1) maintenance kit and supplied by the fire hydrant manufacturer.

D. Corrosion Protection:

1. For protection against corrosive soils in those areas designated by the Engineer and Project Manager, ductile iron pipe and fittings shall additionally be enclosed in a polyethylene sheet or tube and each length joined with 2-inch wide polyethylene adhesive tape. The sheet or tube shall be made from polyethylene resin meeting the requirements of ASTM D1248 and shall be Type I, Class C, Category 5, Grade J-3 with minimum carbon black content of 2.5% and 8 mils thickness. The sheet or tube shall be in accordance with the provisions of ANSI A21.5 (AWWA C105). Methods shall be such as to minimize danger to the sheet also be used to repair tears or punctures.
2. Installation of polyethylene encasement shall be in accordance with ANSI A21.5.

E. Service Connections

1. Water service taps on the water main shall be spaced at a minimum distance of 18" apart. All service lines shall be installed in accordance with the details on the project construction drawings. All long-side service connections shall be sleeved. The sleeve is to be installed by jack & bore to avoid open-cuts across roadways for service connections. The minimum diameter of service connection taps shall be 3/4-inch for 1-inch service connections, 1 3/8-inch for 1 1/2-inch service connections and 1 3/4-inch for 2-inch service connections.
2. Service lines, between the corp stop and curb stop shall be one continuous line without any splices or fittings unless specifically authorized by the Project Manager and Engineer.
3. Services shall not exceed 100 feet to the meter. Services crossing under parking tracts shall have their meters placed prior to the crossing so that the Owner is not responsible for these lines.
4. In developments where the property line is not clearly defined (condominiums and commercial), the meter shall be placed in a readily accessible location.
5. Private services shall not cross potable water main. The Contractor shall coordinate the installation of private service lines with location of meters to deliver potable water to the correct multi-family dwelling unit or bay and shall identify each to the Project Manager.
6. Wet taps equal or larger than one half the pipe diameter require a stainless steel full contact saddle with flange and valve.

F. Connection to Existing System:

1. All connections to existing water main shall be made under the direct supervision of the Project Manager. Based on the existing pipe configuration and materials, the Contractor may be required to provide temporary restraints. All connections to existing water mains shall have double valves unless specifically authorized by the Project Manager. Valves on existing water mains shall be operated by Department personnel or under direct supervision by the Project Manager. Tapping sleeves and their valves shall be pressure tested at 150 psig for 1 hour prior to tapping (entire tapping sleeve shall be bubble tested with a soap solution during the pressure testing).
2. All pipe coupons from tapping sleeve tie-ins shall be saved, labeled and dated by the Contractor and transmitted to the Project Manager.
3. If service must be cut off to existing customers, the Project Manager must have fourteen (14) working days notice to make necessary arrangements. The Contractor shall prepare a Shutdown Request form in accordance with the directions given during the Pre-Construction Meeting.
4. The Contractor shall be ready to proceed with as much material pre-assembled as possible at the site to minimize the length of service interruption. The Project Manager will postpone a service cut-off if the Contractor is not ready to proceed on schedule. Such connections may be made at night to minimize effects. No customer should be without service for more than six (6) hours. Local chlorination, in compliance with ECR II, will be required for all pipe and fittings used to complete connections with potable water.

G. TESTING

Contractor shall prepare a Flushing, Pressure Test, Disinfection and PBC HD Clearance Plan for review and authorization by the Project Manager prior to water main installation. The plan shall include a schematic that indicates swab locations, direction of flush, sample points and affected valves. The PBC HD Clearance requires the Contractor's Pressure Test Report, Disinfection Report, Water Quality Lab Reports and As-Built drawings.

Reclaimed water mains and service connections shall be flushed and pressure tested (per the requirements below) but do NOT require disinfection or PBC HD Clearance.

1. Cleaning and Flushing:

- a. Upon completion of pipe installation, for any section, perform swabbing and cannon flushing in accordance with the Cleaning and Flushing Procedure detail shown on the project construction drawings. The Project Manager must observe the swab being inserted into the line **and** witness the cleaning and flushing process. The swab is to be one (1) pipe size diameter larger than the pipe being cleaned.

2. Pressure:

- a. Prior to conducting the official pressure test, to be witnessed by the Project Manager and Engineer, the Contractor shall conduct and document a preliminary pressure test meeting all of the following requirements.
- b. Potable water shall be supplied to the main and pumped to the minimum of 155 psi. The water main being tested shall be separated from the supply line or isolated by a double valve arrangement.
- c. The Contractor shall prepare a documented test report 24 hours in advance. Each test identifying, date, time, weather, linear foot of pipe being tested, the piping segment tested (station to station), beginning test pressure and time, ending test pressure and time, amount of "make-up" water and a clear "pass / fail" statement. The test report shall be signed by the Contractor, Engineer and Project Manager. After test acceptance, Contractor shall provide copies of the test report to the Project Manager and Engineer and retain the original test report for inclusion in the Project Record Documents.
- d. Contractor shall provide all necessary equipment such as pumps, gages and water measuring tanks, and all necessary work required for pipe pressure and leakage tests. Make pressure and leakage tests between valves and/or connections for each section being tested, using procedure outlined in ANSI/AWWA C-600.
- e. Test lines at a minimum of 150 psi for no less than two (2) hours and test all fire lines at 200 psi for no less than one (1) hour in accordance with NFPA-24.
- f. Allowable leakage not to exceed value derived from following formula:

L = Allowable leakage (gallon per hour)

$$L = \frac{SD\sqrt{P}}{148,000}$$

S = Length of pipe (feet)
D = Nominal diameter of pipe (inches)
P = Average test pressure (PSIG)

- g. Conduct pressure tests with all valves servicing hydrants, services, etc., in open position.
- h. All potable water mains shall be pressure tested before bacteriological acceptability.
- i. The maximum length of line to be tested as one section will be 2,000 linear feet. The test shall be performed as determined in the current AWWA specification. The standard test duration is two (2) hours. The maximum quantity of water that must be supplied into the tested pipe to maintain pressure within 5 psi of the specified test pressure shall not exceed the applicable AWWA C-600 Standard.
- j. Bacteriological testing shall not begin until after the pressure test has been accepted by the Project Manager. Refer to Section 02516 DISINFECTION OF WATER DISTRIBUTION SYSTEM.

H. ABANDONMENT OF EXISTING WATER MAINS

- 1. Existing water mains shall be abandoned in accordance with the project drawings, including temporary restraints, cutting and capping with masonry plugs or mechanical blind flanges, thrust blocks and grout filled (where required).

I. RESTORATION

- 1. Restoration shall be concurrent with the water main installation and shall be performed as required by Section 02960 RESTORATION OF SURFACE IMPROVEMENTS.

END OF SECTION

(SHUTDOWN REQUEST FORM ON FOLLOWING PAGE)

WATER DISTRIBUTION SYSTEM SHUTDOWN REQUEST FORM
(Must be received by Boynton Beach Utilities 14 working/business days in advance)

THIS SECTION IS TO BE COMPLETED BY THE CONTRACTOR							
Requested By : (Signature)		Accepted By : (Signature)					
			Boynton Beach Utilities				
Company Name :		Project Name :					
Contractor is to deliver this form to the Utilities Project Manager			Date/Time Received:				
Contact		Mobile No. :					
Requested Shutdown Date :		Time :		Duration :			
Highlighted Project Drawing (s) attached : (Requests for shutdown will NOT be accepted without drawings)				Number of drawing pages attached :			
<u>Address (Nearest House or Business) :</u>							
<u>Lot No. :</u>		<u>Block:</u>					
<u>Name of Development and/or Neighborhood:</u>							
Distribution for "Heads Up" Only (w/o drawing): Engineering Division Manager, Water Quality/Lab Supervisor, Water Distribution Supervisor							
THIS SECTION TO BE COMPLETED BY UTILITY LOCATIONS/ENGINEERING DIVISION WITHIN 5 WORKING DAYS							
Boil Water Notice :	YES <input type="checkbox"/> NO <input type="checkbox"/>		Houses Affected :	YES <input type="checkbox"/> NO <input type="checkbox"/>			
No. of Valves to be Shutdown :			Number of Houses:				
Businesses Affected : <input type="checkbox"/> YES <input type="checkbox"/> NO	Type	Addresses Affected:					
Special Conditions :							
Locates and Pre-Shutdown Completed : <input type="checkbox"/> YES <input type="checkbox"/> NO		By:			Date :		
After Locations has completed their pre-shutdown and distributed notifications/door hangers, email this form to: Engineering Division Manager, Field Operations Manager, Project Manager, Water Quality/Lab Supervisor, Water Distribution Supervisor, Project Inspector							
Authorized Shutdown Date and Time							
Shutdown Authorized By Project Manager :			Shutdown Date:			Time :	
Upon approval, Project Manager emails this form to: Engineering Division Manager, Field Operations Manager, Water Quality/Lab Supervisor, Water Distribution Supervisor, Project Inspector							

SECTION 02516

DISINFECTION OF POTABLE WATER DISTRIBUTION SYSTEMS

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Submittals
- B. Project Record Documents
- C. Products
- D. Execution
- E. Field Quality Control

1.2 RELATED SECTIONS

- A. Section 02513 – Public Water & Reclaimed Water Distribution Systems

1.3 REFERENCES

- A. ANSI/AWWA C651 – AWWA Standard for Disinfecting Water Mains

1.4 UNIT PRICE – MEASUREMENT AND PAYMENT

- A. The cost of disinfecting the new water distribution system is considered to be incidental to the installation of the water main.

1.5 SUBMITTALS FOR REVIEW AND AUTHORIZATION TO PROCEED

- A. Contractor shall prepare and submit a Flushing, Pressure Testing, Disinfection and PBC HD Clearance Plan to the Project Manager and Engineer for review and authorization prior to the start of pipeline installation.

1.6 PROJECT RECORD DOCUMENTS

- A. Disinfection Report from Contractor shall be signed and dated:
 - 1. Company Name.
 - 2. Type, form and quantity of disinfectant used.
 - 3. Diameters and lengths (in linear feet) of pipe being disinfected.
 - 4. Date and time of disinfectant injection start and time of completion (continuous feed method).
 - 5. Test locations (1 set for every 1,200 lf of pipe, 1 from every branch and 1 from the end of the line).

6. Initial and 24 hour disinfectant residuals (quantity in treated water) in ppm and/or mg/l for each outlet tested.
 - During the 24 hour disinfection process, Contractor shall operate all inline and branch valves and hydrants.
 - At the end of the 24 hour disinfection process the free chlorine residual shall not be less than 25 ppm or 25mg/l.
7. Date and time of flushing start and completion
8. Disinfectant residual after flushing in ppm for each outlet tested.
 - At the conclusion of the Contractor's disinfection and flushing process, the Total Chlorine (in ppm) shall be equal to that of the City's potable water system source point.

B. Bacteriological Report:

1. Date issued, project name, and testing laboratory name, address, and telephone number.
2. Time and date of water sample collection.
3. Name of person collecting samples
4. Sample point numbers and test locations.
5. Initial and 24 hour disinfectant residuals in ppm for each outlet tested.
6. Coliform bacteria test results for each outlet tested
7. Signed certification that water conforms, or fails to conform, to bacterial standards of the Palm Beach County Health Department.

C. Palm Beach County Health Department release

1.7 REGULATORY REQUIREMENTS

- A. Conform to applicable Palm Beach County Health Department rules or regulation for performing the work of this Section.

2 PART 2 PRODUCTS

2.1 Disinfectant:

- A. Liquid chlorine conforming to ANSI/AWWA B301 (100% available chlorine).
- B. Sodium hypochlorite conforming to ANSI/AWWA B300 (5% - 15% available chlorine).
- C. 2.3 Calcium hypochlorite conforming to ANSI/AWWA B300 (65% available chlorine by weight).

3 PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that piping system has been cleaned, inspected, and pressure tested.

3.2 EXECUTION

- A. Install, clean and flush the water distribution piping system in accordance with the project construction drawings. Refer to Section 02513 PUBLIC WATER & RECLAIMED WATER DISTRIBUTION SYSTEMS.
- B. Pressure test the water distribution piping system in accordance with the project requirements. Refer to Section 02513 PUBLIC WATER & RECLAIMED WATER DISTRIBUTION SYSTEMS.
- C. After successful pressure testing, provide and attach required equipment to perform the work of this Section.
- D. Mix (if applicable) and inject treatment disinfectant into piping system.
- E. Maintain disinfectant in system for 24 hours.
- F. Flush, circulate, and clean until required cleanliness is achieved; use municipal domestic water.
- G. Verify disinfection and record results on the Disinfection Report as specified in paragraph 1.6 A above.
- H. After receipt of the Palm Beach County Health Department system or partial system release and the service line transfer by the City are completed, Contractor shall remove the temporary sample points and re-install permanent system devices in accordance with the project construction drawings.

3.3 FIELD QUALITY CONTROL

- A. The Contractor shall assure the accuracy of the disinfection testing and provide a copy of the Contractor's disinfection report to the Project Manager. In the event of a dispute, the Project Manager will schedule the City's Lab for bacteriological testing.

END OF SECTION

SECTION 02538
SANITARY SEWER SYSTEM

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Submittals
- B. Products
- C. Precast Manholes
- D. Sewer Laterals
- E. Bedding
- F. Installation
- G. Inspection and Testing

1.2 RELATED SECTIONS

- A. Section SC01025 - Measurement and Payment
- B. Section SC01700 – Contract Closeout
- C. Section 02060 – Aggregate Materials
- D. Section 02082 – Public Manholes and Structures
- E. Section 02320 – Trenching and Excavation
- F. Section 02322 – Dewatering and Drainage
- G. Section 02324 – Backfill
- H. Section 02740 – Subgrade, Base Course and Asphalt
- I. Section 03300 - Cast-in-Place Concrete

1.3 REFERENCES

- A. ASTM C14 - Standard Specification for Concrete Sewer, Storm Drain, and Culvert Pipe
- B. ASTM C76 - Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
- C. ASTM C443 - Standard Specifications for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets
- D. ASTM D3034 - Standard Specification for Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings

- E. ASTM A746 - Standard Specification for Ductile Iron Gravity Sewer Pipe
- F. ASTM C564 - Standard Specification for Rubber Gaskets for Cast Iron Soil Pipe and Fittings
- G. ASTM D1785 - Standard Specification for Poly (Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80 and 120
- H. ASTM D2922 - Standard Test Method for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth)

1.4 UNIT PRICE – MEASUREMENT AND PAYMENT

- A. Refer to Section SC01025 – MEASUREMENT AND PAYMENT

When existing Right-Of-Way (ROW) irrigation must be disturbed due to pipeline installation or swale development, any existing irrigation lines shall be marked on the Contractors drawings prior to or at the time of temporary cutting-&-capping. The replacement of existing irrigation in the Public Right-Of-Way as the result of pipeline installation or swale development is NOT a pay item. Replacement of existing ROW irrigation (to match existing quality, quantity and size) shall be incidental to the Unit Price of the pipeline or swale development.

1.5 SUBMITTALS

- A. Reinforcing steel, manhole locations, inlet locations, elevations, pipe, conduit, and any weir control structures, sizes and elevations of penetrations.
- B. Submit shop drawings for the following:
 - 1. Precast Manhole (including reinforcing and joint), including Frame and Cover.
 - 2. Precast Junction Box and conflict structure.
- C. Submit for the various types of pipe and fittings will be specified in the in Part 2 PRODUCTS below.

1.6 PROJECT RECORD DOCUMENTS

- A. Refer to Section SC01700 CONTRACT CLOSEOUT and SC01720 PROJECT RECORD DOCUMENTS for additional requirements.

1.7 REGULATORY REQUIREMENTS

- A. Conform to applicable Palm Beach County Health Department rules for installation of the Work of this section.

1.8 FIELD MEASUREMENTS

- A. Verify that field measurements and elevations are as indicated.

2 PART 2 PRODUCTS

- 2.1 All materials are to be **MADE IN THE UNITED STATES OF AMERICA**. Allowable exceptions are ductile iron fittings supplied by American Cast Iron Pipe Company from Brazil, Sigma Corporation

from China, and Star Pipe Products from the United States and China; and Electronic Marking System (EMS) full-range markers by 3M from Mexico.

2.2 SEWER PIPE MATERIALS

A. Polyvinyl Chloride (PVC) Pipe

1. C-900 SDR-18

B. Polyvinyl Chloride (PVC) Pipe Fittings

C. DUCTILE IRON PIPE

1. For Underground Installation:

- a. In general, thickness class shall be Class 350. Ductile iron pipe shall conform to ANSI A21.51. Pipe shall have a wall thickness designed in compliance with ANSI A21.50, "American National Standard for the Thickness Design of Ductile Iron Pipe". Earth loads to be taken from the standard tables in the manual based on a minimum 150 psi working pressure, trench condition 2, width $d + (2 \text{ feet})$ and depth of cover as shown on the profile drawings.
- b. Generally, joints for ductile iron pipe shall be push-on or mechanical type designed in accordance with ANSI A21.11 (AWWA C111) or ANSI A21.53 (AWWA C153). Joint lubrication shall be as furnished by the manufacturer.
- c. At certain locations restrained joints shall be used in accordance with the details on the project construction drawings as approved by the Project Manager and Engineer.
- d. Flex-Ring Restrained Joint Ductile Iron pipe supplied by American Cast Iron Pipe Company (ACIPCO) and TR Flex Restrained Joint Ductile Iron pipe supplied by U.S. Pipe & Foundry, LLC may be used as approved by the Project Manager and Engineer.

2. Fittings for ductile iron pipe shall be manufactured of ductile iron and shall conform to the requirements of ANSI A21.10 (AWWA C110) or ANSI A21.53 (AWWA C153). Fittings shall be compatible with the pipe and designed for 250 psi working pressure. The lining of the fittings shall be as specified for the pipe. Joints for fittings 16-inches in diameter and under shall be mechanical joint, except above ground fittings shown on the drawings, shall be flanged. Joints for fittings 18-inches in diameter and above shall be restrained type in accordance with the schedule shown on the Standard Detail Drawing. Gaskets for the flanged joints shall be "Torseal, TM" or approved equal.

3. Lining:

- a. Smaller than 4-inches: The interior of ductile iron pipe and fittings 4-inches and smaller, shall be lined with a two-component coal tar epoxy. The lining shall be resistant to fatty oils, detergents, sewage generated hydrogen sulfide, and liquids in a pH range of 1-14. The lining shall be guaranteed against peeling. Lining shall meet the requirements of U.S. Corps of Engineers Specification C-200. Lining shall be applied to a

thickness of at least 40 mils, tapering at the pipe ends where it shall be brushed on to at least a 10 mil thickness in the last 2-inches.

- b. 4-inches and larger: The interior of ductile iron pipe and fittings 4-inches and larger shall be ceramic epoxy lined (millage to be according to manufacturer specification) Ductile Iron Pipe (DIP). The epoxy coating shall cover the inner surface of the pipe extending from the plain or beveled end to the rear of the gasket socket.

4. Exterior Finish:

- a. For underground installation pipe and fittings shall have the standard bituminous coat on the exterior.

5. Corrosion Protection:

For protection against corrosive soils in those areas designated by the Project Manager and Engineer, ductile iron pipe and fittings shall additionally be enclosed in a polyethylene sheet or tube and each length joined with 2-inch wide polyethylene adhesive tape. The sheet or tube shall be made from polyethylene resin meeting the requirements of ASTM D1248 and shall be Type I, Class C, Category 5, Grade J-3 with minimum carbon black content of 2.5% and 8 mils thickness. The sheet or tube shall be in accordance with the provisions of ANSI A21.5 (AWWA C105). Methods shall be such as to minimize danger to the sheet also be used to repair tears or punctures.

- a. Installation of polyethylene encasement shall be in accordance with ANSI A21.5.

D. DIP shall be required in the following circumstances:

- 1. Anytime a wastewater line passes under any other pipe with less than 12" clearance. (No joint within 10 feet of crossing potable/reclaimed water lines).
- 2. When a wastewater line passes over any potable/reclaimed water main regardless of separation and over the pipe with less than 12" clearance (No joint within 10 feet of crossing potable/reclaimed water lines).
- 3. When there is less than four (4) feet from finish surface to the invert of the pipe. Four and one half (4.5) feet to invert shall be the standard design depth. Less depth will not be accepted unless it is unavoidable and has prior approval from the Project Manager and Engineer.
- 4. Any time the wastewater line is separated horizontally (wall to wall) from a potable water main by less than six (6) feet or reclaimed water main by less than three (3) feet.
- 5. The last run of pipe into a wet well.
- 6. Inside bore & jack casings (with mechanical / restrained joint).

2.3 PRECAST MANHOLES

A. MANHOLES

1. Materials

- a. Concrete: 4,000 psi
- b. Reinforcement:
 - 1. All reinforcement shall be A.S.T.M A615, Grade 60 or 65 ksi welded wire fabric, either smooth or deformed.
 - 2. Except when ACI hooks are specifically required, reinforcement top and slab shall be straight embedment.
 - 3. All steel bars shall have 1-1/2" minimum cover unless otherwise shown except for precast circular units manufactured under ASTM C-76 or ASTM C-478. Horizontal steel in rectangular structures shall be lapped a minimum of 24 bar diameters at corners.
- c. Flexible Gasket: Ram Neck Seal
- d. Sanitary Sewer Manhole Coatings:
 - 1. Interior Coating: Manhole interior protection shall consist of the following approved processes: ThoRoc, Mainstay, SewperCoat, StrongSeal or Refratta HAC 100 coating applied in the field.
 - 2. Exterior Coating: CARBOLINE (Koppers) Bitumastic 300M Outside Structure: 1st coat red, 2nd coat black. Minimum thickness is 12 – 15 mils per coat or per manufacturer's recommendations.
- e. Manhole Brick: ASTM C32-73, Grade MA, 3-hole.
- f. Masonry Mortar: ASTM C270-82, Type M - Type II Cement.
- g. Manhole Frame and Cover: Traffic rated, conforming to U.S. Foundry No. 230-AB-M or approved equal.
- h. Manhole frames and covers shall be the Utility Department Standard as shown on the project construction drawings and of such quality and composition as will make the metal of the casing strong and tough and of even grain. They shall be smooth, free from scale, lumps, blisters and sand holes. No plugging or filling will be allowed. The words "SANITARY SEWER" shall be cast in the cover so as to be plainly visible. Frames and covers shall have a protective coating of black paint. All covers shall have a non-penetrating or concealed type pick hole.

2. Construction

- a. Manholes shall be constructed of precast reinforced concrete. Reinforcing for the base section and top shall be as shown on the drawings. Reinforcing for the wall sections shall be as specified in ASTM C478 and shall extend into the tongue and groove of the joints. There shall be a #4 continuous rebar hoop around openings. The base shall be

monolithic with the first wall section using a water stop between base and first wall section.

- b. Water stop shall be manhole manufacturer's standard. If the manufacturer does not have a standard, use a 4-inch wide, #10 gauge steel sheet, welded continuous through the joint.
- c. Joints shall be tongue and groove suitable for flexible Ram Neck seal gasket.
- d. Lifting hooks shall be used throughout. Lift holes will not be allowed.
- e. Components of the manhole shall be free of fractures, cracks, and undue roughness. Concrete shall be free of defects, which indicate improper mixing or placing, and surface defects such as honeycomb or spalling. The Owner reserves the right to inspect manholes at the factory.

2.4 SEWER LATERALS AND CLEANOUTS

- A. PVC: Refer to the details on the project construction drawings.

2.5 MISCELLANEOUS

- A. Electronic Marking System (EMS) full-range markers shall be by 3M. Full-range markers shall be green for wastewater. The Contractor shall install the full-range markers in accordance with the manufacturer's and City's standards. The full-range markers shall be placed at the following locations:
 - 1. Fittings, bends, reducers, tees, crosses, deflections, valves, and air release valves (ARV).
- B. The installation of the full-range markers shall be field verified by the Project Manager and Engineer prior to the certification of the work.
- C. The installation of the pipe segments and/or structures, where moderate to significant root intrusion could be a factor, the Contractor shall furnish and install Biobarrier (or approved equal) as a root barrier as directed by the Project Manager and Engineer. Furnishing and installing the BioBarrier is considered to be an incidental cost.

3 PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that trench cut is ready to receive Work as required by this Section and excavations, dimensions, and elevations are as indicated on project construction drawings.

3.2 BEDDING

- A. Excavate pipe trench in accordance with Section 02320 TRENCHING AND EXCAVATION for work of this Section. Hand trim excavation for accurate placement of pipe to elevations indicated. Correct over excavation with fine aggregate.
- B. Place bedding material at trench bottom, level materials in continuous layer not exceeding 6 inches compacted depth, compact to 98 percent modified proctor.

- C. Backfill around sides and to top of pipe with cover fill, tamp in place and compact to 98 percent modified proctor for One (1) foot above the top of pipe. Once this elevation has been achieved continue backfilling in accordance with Section 02324 BACKFILL.

3.3 INSTALLATION

A. Pipe Installation:

1. Gravity wastewater lines shall be laid accurately to both line and grade. The Project Manager will generally not accept any line laid with a slope varying by more than 10% of its design slope especially for lines laid at minimum gradients. For specific instance the minimum acceptable slope of an 8" line shall be 0.40% if the design called for 0.44%. The design slope shall be 0.40% for replacement of existing lines, but in no case shall a replacement line slope be less than the existing slope. The Project Manager reserves the right to independently verify questionable survey results.

Visible leakage deflections, horizontal misalignment, significant bowing, non-constant slopes between manholes and sagging joints shall each be grounds for rejection of lines. Certified verification by televising of line will be required by the Project Manager.

2. The minimum design depth of a PVC gravity wastewater line shall be 4.5 feet to invert. DIP shall be placed for all lengths with less than 4.5 feet to invert in cases where this cannot be met and prior approval is obtained.
3. Trenches and excavations shall be kept dry while work is in progress. The contractor shall be responsible to ensure that all safety requirements are met. Unsuitable excavated material such as boulders, logs, and other deleterious material shall be removed from the site. The pipe barrel shall be uniformly supported along its entire length on undisturbed soil or bedding material. Proper bedding shall be supplied if the existing material includes rock, organic material, or other sharp or unsuitable material.
4. By-passing of sewage during construction shall be minimized. Wherever it is required to connect to existing facilities or test new treatment facilities after flows have been accepted, the work or tests shall be planned and scheduled so as to allow little or no bypassing of sewage. Such plans and schedule shall be submitted to the Engineer for approval by the proper authority before any bypassing takes place. The Contractor shall NOT intentionally discharge any wastewater into an unlined open trench during repairs or tie-in operations.
5. Where connecting to existing lines, it shall be done at such a time in such a manner to cause the least amount of interruption to the customer services and the handling of any "wet sewers" shall be in accordance with the regulations of the Palm Beach County Health Department.

B. Manhole Installation:

1. Excavations for manholes and other structures shall be over-excavated and plastic filter fabric (Geotextile) of a sufficient size to envelope the rock support bed shall be placed in the bottom of the excavation. The rock support bed shall be 12-inch thick (or as specified on the project construction drawings) FDOT 57 rock and shall be placed prior to installing the structure. Manholes shall be set according to project construction drawings and shall be precast in accordance with approved shop drawings, specification detail and project construction

drawings for this project. The manhole invert shall be carefully shaped to conform to the pipe flow channel. Flow channels within the manholes involving changes of direction or slide slopes shall smoothly direct the flow in accordance with detail drawings. All concrete irregularities shall be plastered with cement mortar in such a manner as to give neat and water-tight job. Manholes shall be core-drilled to provide pipe opening when precast hole is not available.

2. "Ram-nek" or equivalent shall be used at all riser joints. Structures with any leakage will not be accepted.
3. Brick used for risers, setting frames, and covers shall be 3-hole brick.

C. INSTALLATION OF CONDUIT INTO INLET / STRUCTURE

1. The diameter for the pipe opening shall be 6 inches larger than the outside diameter of the pipe. The pipe shall penetrate the interior wall of the structure a minimum of 2-inches and shall be centered in the opening. After pipe is set, the annular space around the outside of the pipe and the wall of the structure shall be filled with a minimum of one (1) course of 3-hole brick and cement mortar or approved grout mix.

D. Service Lateral Installation

1. Service lines shall be connected to the sewer lines by means of a wye fitting with a branch as shown on the standard drawings. The branch of the wye fitting will be elevated as directed depending on the depth of the sewer and the elevation of the property to be served. Eighth bends shall be used to connect the service line at the wye branch. Service lines shall be installed at such grades as will adequately serve the properties.
2. Service lines shall extend from the sewer main to the property line and be reconnected to the existing building sewer line unless otherwise shown. Service lines shall be 6-inches with adaptors or reducers as required to make the tie in connection.
3. Changes in pipe alignment may be accomplished using appropriate fittings or through pipe deflection. Pipe deflection at the joint is allowed with ductile iron pipe only and shall not exceed 75% of the manufacturer's recommended maximum joint deflection.

E. Cleanouts

1. Material to be the same as service line. Configuration to be shown on the project construction drawings. Cleanouts that must be installed in traffic bearing areas require the approval of the Project Manager and Engineer on a case-by-case basis. When this configuration is approved, cleanouts shall be installed in "mini-manholes".
2. Establish elevations and pipe inverts for cleanout wye inline connection before installation.
3. All road crossings and pavement cuttings shall be in accordance with the requirements of the City or Palm Beach County (if the project is located in their jurisdiction and within the Department's service area).

3.4 INSPECTION AND TESTING

A. VISUAL INSPECTION:

1. Test for Displacement of Sewers: Sewer mains will be checked by Engineer to determine whether any displacement of pipe has occurred, after trench has been backfilled to 2 feet above pipe and tamped as specified. Light will be flashed between manholes, or, if manholes have not as yet been constructed, between locations of manholes, by means of flashlight or by reflecting sunlight with a mirror. If illuminated interior of pipelines show poor alignment, displaced pipe, or any other defects, remedy as determined by the Engineer, the Contractor shall remedy at their expense.
2. Watertight Construction: It is imperative that all sewers and force mains, manholes, and service connections be built watertight and that the Contractor adhere rigidly to the specifications for material and workmanship. All of the sewage will be pumped for treatment and special care and attention must be given to securing watertight construction.

B. STATIC HEAD PRESSURE TEST:

1. Contractor shall test all sewer lines for infiltration/exfiltration using a static-head pressure test. The maximum allowable leakage shall not exceed 200-gallons/inch pipe diameter per mile per 24-hour period. Once a system or system segment has passed the static head pressure test, the Contractor shall generate a Test Report, signed by the Contractor and Project Manager, for inclusion in the Project Record Documents.

C. Final Inspection:

1. Inspection: Contractor shall clean and perform a T. V. inspection with video tape or DVD recording and log of the sewer line. All repairs shown necessary by the T. V. inspection are to be made, all deposits removed and the sewers left true to line and grade, clean and ready for use.

All inspection costs shall be paid for by the Contractor.

END OF SECTION

SECTION 02630

STORM DRAINAGE

The Utilities Department uses the Florida Department of Transportation (FDOT) Standard Specifications for Road and Bridge Construction and the FDOT Design Standards, latest edition, as reference documents. It is the intent of the Utilities Department that this technical specification (02630) shall govern the applicable project work that is typically identified in the following FDOT Specification and Standard sections:

- Section 400 - Concrete Structures
- Section 425 - Inlets, Manholes, and Junction Boxes
- Section 430 - Pipe Culverts and Storm Sewers
- Section 435 - Structural Plate Pipe and Pipe Arch Culverts
- Section 440 – Underdrains
- Section 901 – Course Aggregate

In the event that this technical specification (02630) is either silent on an issue or requirement or if it appears to present a conflict with the referenced FDOT Specifications and Standards, it is the responsibility of the Contractor to request clarification or resolution, in writing, from the Project Manager and Engineer.

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Unit Price – Measurement and Payment
- B. Products
- C. Exfiltration Trench
- D. Installation
- E. Inspection and Testing

1.2 RELATED SECTIONS

- A. Section SC01025 - Measurement and Payment
- B. Section SC01340 – Shop Drawings, Work Drawings, and Samples
- C. Section SC01400 – Quality Requirements
- D. Section SC01700 – Contract Closeout
- E. Section 02300 – Earthwork
- F. Section 02060 – Aggregate Materials
- G. Section 02082 – Public Manholes and Structures
- H. Section 02320 – Trenching and Excavation

- I. Section 02322 – Dewatering and Drainage
- J. Section 02324 - Backfill
- K. Section 02371 - Riprap and Rock Lining
- L. Section 02740 – Subgrade, Base Course and Asphalt
- M. Section 03300 - Cast-in-Place Concrete

1.3 REFERENCES

- A. Florida DOT Standard Specifications for Road and Bridge Construction cited at the beginning of this section.
- B. AASHTO MP6, ASTM D2412, and/or AASHTO M294 Type S, or M252 Polyethylene piping
- C. AASHTO M196 – Standard Specification for Corrugated Aluminum Alloy Culverts and Underdrains
- D. ASTM A444/A444M Steel Sheet, Zinc Coated (Galvanized) by the Hot Dip Process for Storm Sewer and Drainage Pipe
- E. ASTM C14 - Standard Specifications for Concrete Sewer, storm Drain, and Culvert Pipe
- F. ASTM C76 - Standard Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
- G. ASTM C443 - Standard Specifications for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets

1.4 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Refer to Section SC01025 MEASUREMENT AND PAYMENT

When existing Right-Of-Way (ROW) irrigation must be disturbed due to pipeline installation or swale development, any existing irrigation lines shall be marked on the Contractors drawings prior to or at the time of temporary cutting-&-capping. The replacement of existing irrigation in the Public Right-Of-Way as the result of pipeline installation or swale development is NOT a pay item. Replacement of existing ROW irrigation (to match existing quality, quantity and size) shall be incidental to the Unit Price of the pipeline or swale development.

1.5 SUBMITTALS FOR REVIEW AND AUTHORIZATION TO PROCEED

- A. Inlets / Structures – Refer to Section 02082 PUBLIC MANHOLES AND STRUCTURES.
- B. Submit per Section SC01340 SHOP DRAWINGS, WORK DRAWINGS, AND SAMPLES shop and manufacturer's drawings and catalog cut sheets for the various pipe, fittings and gaskets as well as FDOT No. 4 and FDOT No. 57 stone and geotextile as identified in Part 2 PRODUCTS below.

1.6 SUBMITTALS FOR PROJECT CLOSEOUT

- A. Refer to Section SC01700 CONTRACT CLOSEOUT and SC01720 PROJECT RECORD DOCUMENTS for additional requirements.

2 PART 2 PRODUCTS

- 2.1 All materials are to be **MADE IN THE UNITED STATES OF AMERICA**. Allowable exceptions are ductile iron fittings supplied by American Cast Iron Pipe Company from Brazil, Sigma Corporation from China, and Star Pipe Products from the United States and China; and Electronic Marking System (EMS) full-range markers by 3M from Mexico.

2.1 INLETS, JUNCTION BOXES, MANHOLES and CONFLICT STRUCTURES

- A. Refer to Section 02082 PUBLIC MANHOLES AND STRUCTURES.

- 2.2 Reinforced Concrete Pipe (RCP): The pipe shall conform with the requirements of Table III of ASTM C-76-82b, and to the FDOT Specifications, 2010, Section 430. Bell and spigot with round rubber gasket shall be required. Fittings for RCP shall be of the same strength as the adjoining pipe; tongue-and-groove gasketed joints shall comply with ASTM C-443.

- 2.3 Corrugated Metal Pipe (CMP): The pipe shall conform to the requirements of AASHTO M-196 with bituminous coating, and with the FDOT Specifications, 2010, Section 943. If aluminum pipe is used (ALCMP), the pipe shall conform with the requirements of AASHTO M-196 and to the FDOT Specifications, 2010, Section 945.

Installation of Corrugated Metal Pipe: All joints on storm sewer pipe shall be made up with either 1/2" neoprene or 1/4" strip sealant gasketed material. All bands shall have the same corrugated design as the pipe. Width of the bands shall be as follows: 12" up to 48" diameter pipe, 24" over 48" diameter pipe.

- 2.4 High Density Polyethylene Pipe (HDPE): Provide high-density polyethylene smooth interior pipe with annular exterior corrugation. Provide pipe fittings and accessories of same material and weight/class as pipes, with joining method as indicated. For systems identified as "water tight", special pipe-to-structure water-stop gaskets are required and must be included in the applicable shop drawing package.

All materials shall comply with AASHTO MP-6, ASTM D 2412, and/or AASHTO M 294, Type S, or M 252. All pipe and fittings shall be as manufactured by Advance Drainage Systems, Inc., "HI-Q" as manufactured by Hancor, Inc., or as approved by the Project Manager.

2.5 EXFILTRATION TRENCH

- A. The exfiltration trench (or drainfield) may use either slotted concrete pipe, perforated metal pipe or perforated PVC or HDPE pipe as the distribution conduit within the trench. All perforations / slots shall be in conformance with the applicable FDOT index. Perforated / slotted pipe shall terminate five (5) feet from the inlet / structure with the final five (5) feet of pipe being solid.

- B. Trench rock shall be FDOT No. 4 stone **washed**. The trench shall be lined on all sides with a plastic filter fabric (Geotextile) and shall comply with FDOT Specifications.

- 1. FDOT No. 4 Stone (naturally occurring material)

- i) FDOT No. 4 Stone, specified for exfiltration systems shall be purchased as a “washed” stone. Additionally, after being received on site, the material shall be thoroughly washed again to remove all fines adhering to the gravels such that the product has not more than 1% by weight passing the US Standard No. 4 Sieve, and not more than 0.1% passing the US Standard No. 40 Sieve. The site stockpiles shall be monitored and tested to assure that the amount of fines is maintained at or below this threshold.

2. FDOT 57 Stone (naturally occurring material)

2.6 OUTFALLS

- A. Construct cast-in-place or precast concrete as indicated on the project construction drawings, with reinforced headwall or mitered end section, apron, and tapered sides. Provide rip-rap as indicated to prevent washout from outfall discharge.

2.7 BEDDING AND COVER MATERIALS

- A. Refer to Section 02324 BACKFILL

2.8 MISCELLANEOUS

- A. The installation of the pipe segments and/or structures, where moderate to significant root intrusion could be a factor, the Contractor shall furnish and install Bio-Barrier (or approved equal) as a root barrier as directed by the Project Manager and Engineer. Furnishing and installing the BioBarrier is considered to be incidental to the cost.

3 PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that trench cut is ready to receive Work as required by this Section and excavations, dimensions, and elevations are as indicated on project construction drawings. Refer to Section 02320 TRENCHING AND EXCAVATION for trench widths.

3.2 INSTALLATION

- A. Pipelines:
 - 1. Gravity stormwater lines shall be laid accurately to both line and grade. The Project Manager will generally not accept any line laid with a slope varying by more than 15% of its design slope, especially for lines laid at minimum gradients where scouring velocity cannot be achieved. The Project Manager reserves the right to independently verify questionable as-built survey results. Visible leakage (unless designed for a percolation system), deflections, horizontal misalignment, vertical joint sagging shall be grounds for rejection of the storm lines.
 - 2. As soon as the excavation is complete to normal grade of the bottom of the trench, granular material bedding shall be placed and graded to provide continuous support for the pipe. The pipe shall be laid accurately to the lines and grades indicated on the Drawings. Blocking under the pipe will not be permitted.
 - 3. Pipe joints shall be wrapped with an overlapping layer of geotextile material.

4. Initial backfill shall be placed evenly on each side of the pipe in 6-in lifts and hand tools shall be used where needed to give firm continuous support for the pipe. For pipe diameters that are designated as 24-inch and greater, the initial backfill shall be placed in two (2) lifts to the spring-line of the pipe, each lift thoroughly compacted and density tested. The next section to be backfilled shall be to the top of the pipe, in two (2) lifts, thoroughly compacted and each lift density tested.
5. The final backfill to 3 feet above the pipe shall be placed in 1-ft layers and carefully compacted. The compaction shall be done evenly on each side of the pipe and motorized compaction equipment shall not be operated directly over the pipe until sufficient backfill has been placed to ensure that such compaction equipment will not have a damaging effect on the pipe.
6. When moveable trench bracing such as trench boxes, moveable sheeting, shoring or plates are used to support the sides of the trench, care shall be taken in placing and moving the boxes or supporting bracing to prevent movement of the pipe, or disturbance of the pipe bedding and the backfill. Trench boxes, moveable sheeting, shoring or plates shall not be allowed to extend below top of the pipe. If trench boxes, moveable sheeting, shoring or plates have been installed below the top of the pipe, they shall be moved slowly taking care not to disturb pipe, bedding or backfill. As trench boxes, moveable sheeting, shoring or plates are moved, pipe backfill shall be placed to fill any voids created and the backfill shall be re-compacted and density tested to provide and confirm uniform side support for the pipe.
7. The minimum design depth and the minimum cover of a stormwater line shall be as shown on the project construction drawings. Project Manager prior approval shall be obtained if either of these minimums cannot be met.
8. Trenches and excavations shall be kept dry while work is in progress. The Contractor shall be responsible to ensure that all safety requirements are met. Unsuitable material such as boulders and logs shall be removed from the site. The pipe barrel shall be uniformly supported along its entire length on undisturbed soil or bedding material. Proper bedding shall be supplied if the existing material includes rock, organic material or other sharp or unsuitable material.
9. The backfill, compaction and density information provided above is a general narrative of the process, refer to Section 02324 BACKFILL for specific backfill, compaction and density testing procedures and requirements.

B. INLET / STRUCTURE INSTALLATION (STORMWATER)

1. Structures shall be set to the pipe grade firm and plumb in the location(s) shown on the project construction drawings. Excavations for inlets and other stormwater structures shall be over-excavated and plastic filter fabric (Geotextile), of a sufficient size to envelope the rock support bed shall be placed in the bottom of the excavation, then place a 12 inch thick (or as specified on the project construction drawings) FDOT No. 4 or FDOT No. 57 stone support bed, wrap and overlap the geotextile and then install the structure. Joints shall be cleaned, primed and the required gasket or sealant applied as recommended by the manufacturer. Voids remaining in the joint shall be caulked with anhydrous cement grout on both the inside and outside to make a smooth watertight joint seal.

2. Structures shall be located along the center line of the swale and parallel to the edge of roadway and/or sidewalk. In the event of a design "bust", final grate elevation shall be 0.10 of a foot lower than the adjacent final grade of the roadway or sidewalk, whichever is lower.
3. Backfill, compaction and density testing shall be in accordance with Section 02324 BACKFILL.

C. INSTALLATION OF CONDUIT INTO INLET / STRUCTURE

1. The diameter for the pipe opening shall be 6 inches larger than the outside diameter of the pipe. The pipe shall penetrate the interior wall of the structure a minimum of 2-inches and shall be centered in the opening. After pipe is set, the annular space around the outside of the pipe and the wall of the structure shall be filled with a minimum of one (1) course of 3-hole brick and cement mortar or approved grout mix. Drainage systems designated as water tight shall have approved gaskets and/or water-stop fittings at all pipe-to-structure joints.
2. If inlet / structure contains a weir or other water elevation control structure, the weir wall shall incorporate the bleed down orifice with the opening bottom set at the normal control elevation. The top of the weir wall shall be set at the design.

G. FRAMES AND COVERS

1. The manhole, inlet and structure frames and covers shall be set firmly in place with 3-hole brick and cement mortar so that the top of cover will be flush with the finished grade in paved areas (following the cross slope / slope of roadways and/or driveways) and 1" above the finished grade in unpaved areas, unless shown otherwise on the project construction drawings.

- H. Swales shall be developed and/or improved as shown on the project construction drawings.

3.3 INSPECTION AND PIPE TESTING

A. Testing of all HDPE pipe shall be as follows:

1. Allowable Deflection Test
 - a. Pipe deflection measured not less than 45 days after the backfill has been completed as specified shall not exceed 5 percent of the pipe's base inside diameter as defined in AASHTO M-294 and as required by FDOT Section 430.
 - b. Deflection for pipe diameters 36 inches and less shall be measured with a rigid mandrel (Go/No-Go) device cylindrical in shape and constructed with evenly spaced arms or prongs. The dimensions of the mandrel will be field verified by the Engineer. The mandrel shall be hand-pulled through all pipelines. Mandrels used for large diameter pipe need to be modified to be installed within the dimensions of the manhole and manhole openings.
 - c. Any section of pipe not passing the mandrel shall be uncovered at no additional cost to the Owner and the bedding and backfill replaced to prevent excessive deflection. Repaired pipe shall be retested.

B. VISUAL INSPECTION:

1. Upon completion of the installations, the system shall be flushed thoroughly to remove dirt and other foreign matter.
2. Storm drainage conduits shall be internally inspected by any combination of the following methods, i.e., confined space entry and physical measurements taken or lamping. The Contractor shall be responsible for providing all necessary actions and equipment for confined space entry. If the internal inspection shows poor pipe alignment, deflected, deformed or displaced pipe, or any other defects, the Contractor at their expense shall correct these defects.
3. At the Project Manager's discretion, portions of or the entire system may be televised by the Utilities Department. If the televised pipelines show poor alignment, deflected, deformed or displaced pipe or any other defects, the Contractor at their expense shall correct these defects.
4. Upon completion of the storm water improvements and corresponding roadway, under the observation of the Project Manager, the Contractor shall utilize either their water truck or City fire hydrants (with Contractor's temporary water meter installed) to thoroughly flood the roadway to verify drainage flow lines.

Correction of incorrect flow lines (not corresponding to the grades and lines shown on the construction plans) and any birdbaths is the responsibility of the Contractor (at their expense).

END OF SECTION

SECTION 02668

VALVES AND APPURTENANCES

PART 1 – GENERAL

NOTE: THIS SPECIFICATION IS TO BE REVIEWED AND REVISED AS APPROPRIATE BY THE CITY'S DESIGN PROFESSIONAL FOR THE SPECIFIC PROJECT.

1.1 PERFORMANCE

- A. Section generally defines Contractors responsibilities unless otherwise indicated, for the following:
 - 1. Gate Valves
 - 2. Butterfly Valves
 - 3. Air Release Valves
 - 4. Valve Boxes

1.2 RELATED SECTIONS

- A. All of Division 1.
- B. Section 02320 – Trenching and Excavation.
- C. Section 02324 – Backfill.
- D. Section 02446 – Directional Drilling and Pipe Sleeves
- E. Section 02513 – Public Water & Reclaimed Water Distribution Systems
- F. Section 02536 – Force Mains

1.3 REFERENCES

- A. ANSI/AWWA C104/A21.4 (Latest Revision) - Cement mortar lining for ductile iron pipe and fittings for water and reclaimed water.
- B. ANSI/AWWA C110/A21.10 (Latest Revision) - Ductile iron and grey iron fittings 3 inch through 48 inch for water and other liquids.
- C. ANSI/AWWA C111/A21.11 (Latest Revision) - Rubber gasket joints for ductile iron and grey iron pressure pipe and fittings.
- D. ANSI/AWWA C600 (Latest Revision) - Installation of ductile iron water mains and appurtenances.
- E. ANSI/AWWA C153/A21.53 (Latest Revision) – Ductile Iron Compact Fittings for Water and Reclaimed Services.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Gate Valves:

1. Gate valves, unless otherwise specified or approved, shall be ductile iron body, resilient seat gate valves with mechanical joints conforming to the AWWA standard specifications for gate valves for ordinary water works service, designation C509, in so far as applicable.
2. Gate valves shall be as manufactured by Mueller, American or approved equal.
3. Buried gate valves shall be non-rising stem type with 2 inch square cast iron wrench nuts.
4. Face to face dimension shall conform to ANSI standard face to face and end to end dimensions of ferrous valves, (ANSI B16.10) for 125-pound cast-iron valves.
5. Hand wheels or chain wheels shall be turned counter clockwise to open the valves. Hand wheels shall be of ample size and shall have an arrow and the word "open" cast thereon to indicate the direction of opening.
6. Stuffing box follower bolts shall be of brass and the nuts shall be of bronze.
7. Where required, gate valves shall be provided with a box cast in a slab and a box cover.
8. Box cover opening shall be for valve stem and nut. Valve wrenches and extension stems shall be provided by the manufacturer to actuate the valves.

B. Butterfly Valves:

1. Butterfly valves for water working pressures up to 150 psi shall conform to ANSI/AWWA C504 – Rubber Seated Butterfly Valves, subject to the following requirements. Valves shall be of the size and class indicated and, unless otherwise shown, shall be short-bodied. Flanged valves for interior and exposed piping shall have ANSI 125-lb flanges. Valves for buried services shall have mechanical joint body design. Shaft seals shall be designed for use with standard split-V type packing, or other acceptable seal. The interior passage of butterfly valves shall not have any obstructions or stops. The seats shall be positively clamped or bonded into the disc or body of the valve, but cartridge-type seats which rely on a high coefficient of friction for retention shall not be acceptable
2. Manual Actuators: Unless otherwise indicated, all manually-actuated butterfly valves shall be equipped with a 2-inch square actuating nut. Screw-type (traveling nut) actuators will not be permitted for valves 30-inches in diameter and larger.
3. Worm Gear Actuators: Valves 30-inches and larger, as well as all submerged and buried valves, shall be equipped with worm-gear actuators, lubricated and sealed to prevent entry of dirt or water into the housing.
4. Manufacturers, or Approved Equal [shall be per Handbook Exhibit "D"](#):

- ~~_____ a. Mueller Lineseal III~~
- ~~_____ b. M & H 450~~
- ~~_____ c. Keystone 504, 506~~
- ~~_____ d. Pratt Groundhog~~
- ~~_____ e. DeZurik 250B~~

5. All exposed butterfly valves shall be installed with a means of removing the complete valve assembly without dismantling the valve or operator.

C. Air Release Valves:

1. The air release valves shall be installed as shown on the drawings and shall be the automatic type.
2. Air release valves shall have a cast iron body, cover and baffle, stainless steel float, bronze water diffuser Buna-N or Viton seat and stainless steel trim.
3. Air release valves shall be provided with a vacuum check to prevent air from re-entering the line.
4. Air release valve fittings shall be threaded.
5. Air release valves shall be ~~as manufactured by Valmatic, Crispin, Apco or approved equal~~ per Handbook Exhibit "D".
6. Air release valve manholes shall be precast concrete and shall conform to ASTM C478 and ASTM C-76, latest revision, Class II, Wall B, Type II Portland Cement, 4,000 psi. Steel reinforcing shall conform to ASTM A 185. Walls shall be 8" minimum. Manholes shall have a minimum 7 day cure time prior to delivery. Any visible reinforcing or honeycombing shall be cause for rejection. The base slab and first ring of the manhole shall be cast monolithically. The minimum diameter of the MH shall be 48" with a 22-1/4" frame and cover. The interior of the MH shall be coated ~~with the high solids epoxy compound REZCLAD 125S~~ with the high solids epoxy compound REZCLAD 125S in strict accordance with the manufacturer's instructions. The exterior of the MH shall be coated with two coats of an approved coal tar epoxy (Koppers 300-M or approved equal). The frame shall have a 30" opening. The cover shall be two piece and shall have the words "~~POTABLE Water~~ WATER ARV", "RECLAIMED WATER ARV" or "~~Sanitary Sewer~~ FORCE MAIN ARV" (as ~~applicable~~ appropriate) cast into it. Cover and frame shall be US Foundry & Mfg. Corp. Model # 690-AG-M or approved equal. For offset air release valves and/or tangential offset air/vacuum combination valves manholes, use 32" diameter safely ventilated hinged manhole cover by PAMREX or approved equal.

CD. Valve Boxes:

1. All buried valves shall have cast iron two piece valve boxes with cast iron covers.
2. Valve boxes shall be provided with suitable heavy bonnets and will extend to an elevation at or slightly above the finished grade surface as directed by the Engineer.
3. The barrel shall be one or two piece, screw type, having a 5-1/4 inch shaft

diameter.

4. Covers shall have "Water", "~~Reclaimed~~Reuse" or "Sewer" cast into the top and shall be painted the corresponding color (blue, pantone purple or green) for the pipe commodity that they are for.
5. All valves shall have actuating nuts extended to within six inches of the top of valve box cover.

PART 3 - EXECUTION

NOT USED

END OF SECTION

SECTION 02730

MILLING OF EXISTING ASPHALT PAVEMENT

The Utilities Department uses the Florida Department of Transportation (FDOT) Standard Specifications for Road and Bridge Construction and the FDOT Design Standards, latest edition, as reference documents. It is the intent of the Utilities Department that this technical specification (02730) shall govern the applicable project work that is typically identified in the following FDOT Specification and Standard sections:

- Section 327 – Milling of Existing Asphalt Pavement

In the event that this technical specification (02730) is either silent on an issue or requirement or if it appears to present a conflict with the referenced FDOT Specifications and Standards, it is the responsibility of the Contractor to request clarification or resolution, in writing, from the Project Manager and Engineer.

1 PART 1 GENERAL

1.1 SCOPE

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

When milling to improve rideability, an average depth of cut will be specified in the plans.

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

1.2 REFERENCES

Florida Department of Transportation - Standard Specifications for Road and Bridge Construction (Latest Edition).

2 PART 2 EQUIPMENT

2.1 MILLING MACHINE

The milling machine shall be capable of maintaining a depth of cut and cross slope that will achieve the results specified in the plans and specifications. The overall length of the machine (out to out measurement excluding the conveyor) shall be a minimum of 18 feet. The minimum cutting width shall be six feet.

The milling machine shall be equipped with a built-in automatic grade control system that can control the transverse slope and the longitudinal profile to produce the specified results.

Any commercially manufactured milling machine meeting the above requirements will be approved to start the project. If it becomes evident after milling has started that the milling machine cannot consistently produce the specified results, the milling machine will be rejected for further use.

When milling to lower the grade adjacent to existing curb or other areas where it impractical to use the above described equipment, the use of a smaller milling machine will be permitted.

The milling machine shall be equipped with means to effectively limit the amount of dust escaping the removal operation. For complete pavement removal, the use of alternate removal and crushing equipment, in lieu of the equipment specified above, may be approved by the Engineer.

3 PART 3 EXECUTION

3.1 CONSTRUCTION

When milling to improve rideability, the existing pavement shall be removed to the average depth specified in the plans, in a manner that will restore the pavement surface to a uniform cross section and longitudinal profile. The Project Engineer may require the use of a stringline to ensure maintaining the proper alignment.

The contractor may elect to make multiple cuts to achieve the required pavement configuration or depth of cut. The milling machine shall be operated to effectively minimize the amount of dust being emitted from the machine. Pre-wetting of the pavement may be required.

If traffic is to be maintained on the milled surface prior to the placement of the new asphaltic concrete, the pattern of striations shall be such as to produce an acceptable riding surface.

Prior to opening an area which has been milled to traffic, the pavement shall be thoroughly swept with a power broom or other approved equipment to remove to the greatest extent practicable, fine material which will dust under traffic. This operation shall be conducted in a manner so as to minimize the potential for creation of a traffic hazard and to minimize air pollution.

Sweeping of the milled surface with a power broom will be required prior to placing asphaltic concrete.

In urban and other sensitive areas where dust would cause a serious problem, the Contractor shall use a street sweeper (using water) or other equipment capable of removing and controlling dust. Approval of the use of such equipment is contingent upon its demonstrated ability to do the work.

To prevent, to the greatest extent practicable, the infiltration of milled material into the storm sewer system when the milling operation is within the limits of and adjacent to a municipal curb and gutter or a closed drainage system, the sweeping operation shall be performed immediately after the milling operations or as directed by the Engineer.

END OF SECTION

SECTION 02740

SUBGRADE, BASE COURSE AND ASPHALT

The Utilities Department uses the Florida Department of Transportation (FDOT) Standard Specifications for Road and Bridge Construction and the FDOT Design Standards, latest edition, as reference documents. It is the intent of the Utilities Department that this technical specification (02740) shall govern the applicable project work that is typically identified in the following FDOT Specification and Standard sections:

- Section 160 – Stabilizing
- Section 165 - Lime-Treated Subgrade
- Section 200 - Limerock Base
- Section 210 - Reworking Limerock Base
- Section 230 - Limerock Stabilize Base
- Section 250 - Shell Base
- Section 260 - Shell Stabilized Base
- Section 913 – Shell Material
- Section 913A – Shell-Rock Material
- Section 914 – Stabilization Materials
- Section 285 - Optional Base Course
- Section 330 - Hot Bituminous Mixtures - General Construction Requirements
- Section 331 - Type S Asphaltic Concrete
- Section 332 - Type II Asphaltic Concrete
- Section 333 - Type III Asphaltic Concrete
- Section 334 – Superpave Asphalt Concrete
- Section 335 - Sand-Asphalt Hot Mix
- Section 337 - Asphaltic Concrete Friction Courses
- Section 339 - Miscellaneous Asphalt Pavement
- Section 706 – Raised Retro-Reflective Pavement Markers and Bituminous Adhesive
- Section 709 – Traffic Stripes and Markings – Two Reactive Components
- Section 710 – Painting Traffic Stripes
- Section 711 – Thermoplastic Traffic Stripes and Markings

In the event that this technical specification (02740) is either silent on an issue or requirement or if it appears to present a conflict with the referenced FDOT Specifications and Standards, or with specific requirements by the County or FDOT, it is the responsibility of the Contractor to request clarification or resolution, in writing, from the Project Manager and Engineer.

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Unit Price – Measurement and Payment
- B. Submittals
- C. Products
- D. Execution including examination, excavation, subgrades and base course
- E. Overlay Operations

- F. Striping, Reflective Pavement Markers (RPMs) and Roadway Signage
- G. Field Quality Control

1.2 RELATED SECTIONS

- A. Section SC01025 – Measurement and Payment
- B. Section SC01340 – Shop Drawings, Work Drawings, and Samples
- C. Section SC01400 – Quality Requirements
- D. Section SC01410 – Testing Laboratory Services
- E. Section SC01700 – Contract Closeout
- F. Section 02060 – Aggregate Materials
- G. Section 02322 – Dewatering and Drainage

1.3 REFERENCES

- A. The references to "Standard Specifications" shall mean the Florida Department of Transportation Standard Specifications cited above except for those paragraphs referring to Measurement and Payment.
- B. AASHTO M216 - Standard Specification for Lime for Soil Stabilization
- C. AI MS-2 - Mix Design Methods for Asphalt Concrete and Other Hot-Mix Types
- D. ASTM D946 - Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction
- E. ASTM C977 - Standard Specification for Quicklime and Hydrated Lime for Soil Stabilization
- F. TAI - (The Asphalt Institute) - MS-8 Asphalt Paving Manual
- G. NLA (National Lime Association) Bulletin 326 - Lime Stabilization Construction Manual

1.4 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. Refer to Section SC01025 MEASUREMENT AND PAYMENT

1.5 SUBMITTALS FOR REVIEW AND AUTHORIZATION TO PROCEED

- A. The job mix formula including the prime and tack coat, materials (including RPMs), and construction methods shall be submitted to the Engineer for approval before paving begins. Refer to Section SC01340 SHOP DRAWINGS, WORK DRAWINGS, AND SAMPLES for additional requirements.
- B. Rock Record Drawings

1.6 QUALITY ASSURANCE

- A. The Contractor will employ a testing laboratory to evaluate the materials delivered to and placed at the site.
- B. Certificates of material compliance, signed by material supplier and Contractor, may be submitted in lieu of material testing when acceptable to the Engineer and Project Manager.

1.7 PROJECT CONDITIONS

- A. Grade Control: Establish and maintain required lines and elevations.

2 PART 2 PRODUCTS

2.1 MATERIALS

- A. Lime:
 - 1. Lime used as a stabilizing material: ASTM C207 Type N.
- B. Limerock Base:
 - 1. Limerock as stabilizing material or base coarse shall be to a compacted depth of at least 8 inches and shall consist of fossiliferous limestone of uniform quality, and shall not contain hard or flinty pieces that will prevent attainment of a smooth pavement surface free from pits and pockets. At the Contractor's option, either Ocala limerock or Miami Oolite limerock may be used, but only one type may be used on this Project.
 - 2. Limerock shall be composed of not less than 70% of carbonates of calcium and magnesium, and not more than 3% of water-sensitive clay mineral.
- C. Shell Base:
 - 1. Shell as a stabilizing material or base course shall be to a compacted depth of at least 8 inches and shall be of mollusk family (i.e. oysters, mussels, clams, or cemented coquina). Steamed shell will not be permitted.
 - 2. At least 50% (by weight) of the total material shall be retained on a No. 4 sieve. Not more than 7.5 % (by weight) of the total material passing the No. 200 sieve shall be removed by washing and the remainder shall consist of shell particles, chert and sand.
- D. Prime/Tack Coat: The bituminous material to be used for prime/tack coats shall be either Cut-back Asphalt, Grade RC-70 or RC-250, or emulsified asphalt grades as specified in Section 300-2.1 of the "Standard Specifications" and approved by the Engineer. Materials shall conform to "Standard Specifications", Section 916 and the AASHTO requirements specified therein.
- E. Asphaltic Concrete Surface Course:
 - 1. Asphaltic concrete surface course Superpave, Type S, S-I, S-II and S-III shall be composed of a mixture of aggregate, mineral filler and asphalt cement.

Other types will be considered if not specified on the construction plans. Type should match adjacent existing pavement type if the Project requires restoration and not total resurfacing.

2. The job mix formula, size and percent of aggregates shall be as specified in the "Standard Specifications".

3 PART 3 EXECUTION

3.1 EXAMINATION

- A. Contractor must examine the site conditions and assure themselves that all proceeding construction activities are complete and the area is ready, as applicable, for stabilizing, application of base course and/or asphalt.
- B. Paver must examine the areas and conditions under which paving is to be installed. Notify the Contractor 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 a manner acceptable to the Paver.

3.2 EXCAVATION

- A. Excavation shall be as required for the subgrade and cross section as shown on the project construction drawings. All suitable materials removed from the excavation shall be used as far as practicable in the formation of embankments, subgrades, and shoulders, and in such other places as directed by the Engineer. No excavated material shall be wasted without permission and where necessary to waste such material, it shall be disposed of in the locations directed by the Engineer. Muck and other unsuitable material shall be removed and replaced with suitable material. All material used shall be free of stumps, roots, brush, sod, rubbish, rocks or other unsuitable material.

3.3 SUBGRADES

- A. Subgrade construction shall consist of bringing the bottom of excavations and top of embankments of the roadway, between the outer limits of the paving or base course, to a surface conforming to the grades, lines and cross sections shown on the drawings, of uniform density, ready to receive the base course. The entire subgrade in both cuts and fills shall be thoroughly plowed and mixed to a depth of at least 12 inches below grade.
- B. The limits of the roadbed included in the designation of subgrade shall be as shown in the profile shown on the project construction drawings. The lines and grades shall be established by the Contractor as shown on the drawings and shall be maintained by means of grade stakes placed in lines parallel to the centerline of the area to be paved and spaces so that string lines may be stretched between the stakes.
- C. At least 6 inches (loose measurement) of a suitable commercial stabilizing material shall be mixed into the subgrade for stabilization in accordance with the "Standard Specifications", Section 160 and 230. The Florida Bearing Value (FBV) shall be 75 pounds. Density tests will be paid for by Contractor except for additional tests requested by the Project Manager and/or Engineer.

- D. After the subgrade has been prepared, it shall be kept free from ruts, depressions and any damage resulting from the hauling or handling of tools and equipment.

3.4 BASE COURSE

A. Limerock or Shell:

- 1. Base material shall be dumped on the end of the preceding spread without dumping or hauling directly on the sub-grade. Equipment for spreading and grading shall be as specified in Section 200 and 250 of the "Standard Specifications". After the spreading is completed, the entire surface shall be scarified and then shaped to produce the required grade and cross section after compaction. Water shall be added as required to obtain the specified density.

- B. 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.

- C. The completed base course shall be thoroughly cured before the prime coat or wearing surface is laid. The prime coat shall be applied only when the moisture content of the base does not exceed 90% of the optimum moisture for the base material. The Contractor shall maintain the base course to a true and satisfactory surface until the first lift of asphalt is laid.

- D. After completion of compaction, the surface of the base course shall be checked with a template cut to the required crown, and the thickness shall be checked by borings. Any surface irregularities in excess of 1/4 inch or any deficient thickness shall be corrected by scarifying and adding material after which the entire area shall be re-compacted and examined.

3.5 SURFACE PREPARATION

A. Overlay Operations

- 1. Mill all keyways and areas as shown on the project construction drawings.
- 2. Remove all loose material from existing asphalt surface immediately before applying prime coat.
- 3. Tack Coat: Apply at the rate of 0.05 gallon per sq. yd. at a minimum, over existing asphalt surface. Application of tack coat shall be immediately before overlay operations.

B. Roadway Construction

- 1. Proof roll prepared base course surface to check for unstable areas and areas requiring additional compaction.
- 2. Remove all loose material from compacted base surface immediately before applying prime coat.
- 3. Prime Coat: Apply at the rate of 0.35 to 0.40 gallon per sq. yd., over compacted base course. Apply material to penetrate and seal, but not flood,

surface. Apply a light uniform cover of sand and allow to cure. Unless approved by the Project Manager, application of prime coat shall be within 48 hours of the asphaltting operations.

3.6 PLACING ASPHALT

A. General

1. Lay all asphalt, including leveling course, other than adjacent to curb and gutter or other true edges, by the string line method to obtain an accurate, uniform alignment of the pavement edge.

For overlay operations only, an alternative to the initial string line method would be to apply the asphalt overlay, survey and mark the roadway centerline, measure lane width on each side of centerline then string line and saw-cut the edge to match the existing in order to obtain an accurate, uniform alignment of the pavement edge. In no case shall the asphalt overlay material "overhang" the edge of the existing roadway.

2. Place asphalt mixture on clean prepared surface, spread and strike-off. Place inaccessible and small areas by hand. Place each course to required grade, cross-section and compacted thickness.
3. Follow "Standard Specification" Section 330 for general construction of the surface course as applicable to this project.

B. Joints:

1. Make joints between old and new pavements, or between successive days work, to ensure continuous bond between adjoining work.
2. Construct joints to have same texture, density and smoothness as other sections of asphalt concrete course. Clean contact surfaces and apply tack coat.

C. Protection:

1. Immediately after placement, protect pavement from mechanical injury for sufficient time necessary or until surface temperature is less than 140°F.
2. Erect barricades to protect paving from traffic until mixture has cooled and attained its maximum degree of hardness.

3.7 STRIPING (TEMPORARY AND PERMANENT) RAISED PAVEMENT MARKINGS AND SIGNAGE

- A. Once the asphalt has been placed and has achieved its maximum degree of hardness, Contractor shall apply temporary STOP BARS and striping as specified on the project construction drawings or in the applicable FDOT Index (9535 through 17356).

- B. Depending on the chemistry of the thermostripping material, after the final asphalt placement, permanent striping and RPMs shall be applied as specified on the project construction drawings or in the applicable FDOT Index (9535 through 17356). For sanitary and force main ARV manholes located within the grassed right of way (ROW) or swale, green RPMs shall be placed near the center of the roadway on the corresponding side of the yellow line. For sanitary and force main ARV manholes located in the rear easement, green RPMs shall be placed near the corresponding edge of the roadway. Blue RPMs shall be placed in the center on the nearest travel lane directly in front of all fire hydrants.
- C. Roadway signage shall be as specified on the project construction drawings or in the applicable FDOT Index. Street terminations shall be signed as specified in FDOT Index 17349

3.8 FIELD QUALITY CONTROL

- A. Section SC01400 QUALITY REQUIREMENTS
- B. Compaction testing will be performed in accordance with ASTM D1556 or AASHTO T180 in locations as specified by the Project Manager or Engineer. Project Manager and/or Engineer are to select specific locations and lifts as well as witnessing of all compaction testing.
- C. If tests indicate Work does not meet specified requirements, remove Work, replace and retest. In general, the re-test locations shall be as specified in FDOT Standard Specification 125.
- D. Roadway Subgrade Compaction:
 - 1. As a minimum, the top 12-inches of the roadway subgrade shall be compacted to 98% of the modified proctor. Some roadways may require special subgrade stabilization, i.e., LBR 40 or as otherwise specified in the project construction drawings. When special subgrade stabilization is required by the project construction drawings, those requirements shall be superior to this specification requirement.
 - 2. The frequency of density verification testing shall be 3 tests (usually edge of roadway – crown/center – edge of roadway) every 100 linear feet and 1 test for every 100 linear feet of curb.
- E. Roadway Base Course Compaction:
 - 1. Compaction shall be by rolling with a combination of steel wheel and rubber tired rollers until 98% of the maximum density is reached as tested under AASHTO Method T-180. Compaction and finishing shall be in accord with single course base requirements of Paragraph 200-6 AND 250-7 of the "Standard Specifications".
 - 2. The frequency of density verification testing shall be 3 tests (usually edge of roadway – crown/center – edge of roadway) every 100 linear feet and 1 test for every 100 linear feet of curb.
- F. Asphalt Testing/Verification: Test the in-place asphalt courses for compliance with requirements for thickness and surface smoothness. Repair or remove and replace unacceptable paving as directed by Engineer.

- G. Thickness: The compacted thickness of the base or surface courses shall be not less than that shown on the project construction drawings.
- H. Surface Smoothness:
 - 1. Test finished surface of each asphalt course for smoothness, using 15 foot straightedge applied parallel with the centerline of paved area and extended across all joints. Surfaces will not be acceptable if exceeding the following tolerances for smoothness.
 - a. Base Course Surface: 1/4 inch
 - b. Wear Course and Overlay Surface: 1/8 inch
 - 2. Check surfaced areas at intervals as directed by the Engineer
 - 3. Using the Contractors water truck or metered fire hydrant, Contractor shall flood the finished roadway to verify water coursing and flow line. Any ponding or "bird baths" will be cause for rejection.

END OF SECTION

SECTION 02925

SODDING

The Utilities Department uses the Florida Department of Transportation (FDOT) Standard Specifications for Road and Bridge Construction and the FDOT Design Standards, latest edition, as reference documents. It is the intent of the Utilities Department that this technical specification (02925) shall govern the applicable project work that is typically identified in the following FDOT Specification and Standard sections:

- Section 575 – Sodding
- Section 580 – Landscape Installation

In the event that this technical specification (02925) is either silent on an issue or requirement or if it appears to present a conflict with the referenced FDOT Specifications and Standards, it is the responsibility of the Contractor to request clarification or resolution, in writing, from the Project Manager and Engineer.

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. The work consists of establishing a grass covering on slopes, shoulders, lawns, and other areas by sodding as shown on the project construction drawings. Also included are fertilizing, watering and maintenance as required to produce a healthy stand of grass.

The phrase “grassing or sodding” in Section SC01025 MEASUREMENT AND PAYMENT is a generic use of terms that can be applied to a wide variety of field applications such as for a cross-country pipeline corridor (grassing), a pipeline corridor through a park (sodding) and the pipeline corridor in or impacting the neighborhood swales (sodding).

Grassed areas apply to, but are not limited to applications such as bottoms of dry retention ponds, cross-country pipeline corridors, possibly lay down yards (depending on the Contractor agreement with the property owner) and other large and/or expansive areas.

Sodded areas apply to, but are not limited to applications such as neighborhood swales, the sloped sides of a dry and/or wet retention ponds and embankments.

- B. Preparation of subsoil
- C. Fertilizing
- D. Sod installation
- E. Maintenance

1.2 RELATED SECTIONS

- A. Section SC01025 – Measurement and Payment
- B. Section SC01340 – Shop Drawings, Work Drawings, and Samples
- C. Section SC01400 – Quality Requirements

- D. Section 02300 - Earthwork
- E. Section 02924 – Seed, Mulch and Fertilizer
- F. Section 02930 - Exterior Plants
- G. Section 02960 – Restoration of Surface Improvements

1.3 REFERENCES

- A. ASPA (American Sod Producers Association) - Guideline Specifications to Sodding
- B. FS O-F-241 - Fertilizers, Mixed, Commercial

1.4 UNIT PRICE - MEASUREMENT AND PAYMENT

- A. When identified in the Schedule of Bid Items as a separate pay item, sodded areas shall be:
 - 1. Basis of Measurement: By the square yard
 - 2. Basis of Payment: Includes preparation of subsoil, topsoil, placing topsoil, fertilization, sodding, watering and maintenance to specified time limit.
- B. If sodding is NOT identified in the Schedule of Bid Items as a pay item, it shall be considered as incidental and all of the requirements of this Section shall be required.

1.5 SUBMITTALS

- A. Contractor shall submit Certificates of Compliance, with this specification, for the topsoil, sod and fertilizer. Refer to PART 2 PRODUCTS for requirements.
- B. Contractor shall prepare a resident notification letter three (3) weeks prior to placement informing them of the sod replacement criteria and the type of sod identified for the swale (in front of their property) for the review and authorization of the Project Manager. Once authorized, the Contractor shall deliver to each property a copy of the notification letter.

1.6 SOD REPLACEMENT CRITERIA

- A. City, County or State ROW areas, i.e., typically those areas between the edge of the roadway and the property line, that have been disturbed or damaged by project construction activities will be re-sodded. The type of replacement sod, either Argentine Bahia or St. Augustine - Floratam, will be based on the following criteria:
 - 1. If the area has an existing and operational underground irrigation system, the replacement sod shall be St. Augustine - Floratam.
 - 2. If the area does NOT have an existing and operational underground irrigation system, the replacement sod shall be Argentine Bahia.
 - 3. Additionally, based on the Pre Construction Video and Photographic Site Survey, together the Contractor and Project Manager shall determine the replacement sod type.

1.7 DEFINITIONS

- A. Weeds: Includes Dandelion, Jimsonweed, Quackgrass, Horsetail, Morning Glory, Rush Grass, Mustard, Lambsquarter, Chickweed, Cress, Crabgrass, Canadian Thistle, Nutgrass, Poison Oak, Blackberry, Tansy Ragwort, Bermuda Grass, Johnson Grass, Poison Ivy, Nut Sedge, Nimble Will, Bindweed, Bent Grass, Wild Garlic, Perennial Sorrel, and Brome Grass.

1.8 QUALITY ASSURANCE/GUARANTEE

- A. All sodded areas shall be guaranteed for twelve months after date of Final Acceptance.
- B. Replacement of sodded areas that have not produced a well established stand of grass: Any sodded areas showing indication of probably non-survival or lack of health and vigor, or which do not exhibit the characteristics to meet specifications, shall be replaced within 21 days of notice from Project Manager or Engineer.

All replacement sodding shall be furnished/installed at no additional cost to the Owner and shall be guaranteed for twelve months. All replacements shall meet original specifications.
- C. At the end of the guarantee period, all sodded areas that are dead or in unsatisfactory growth shall be replaced within two weeks.

1.9 QUALIFICATIONS

- A. Sod Producer: Company specializing in sod production and harvesting with minimum five (5) years experience, and certified by the State of Florida.
- B. Installer: Company with previous experience with the sod producer.

1.10 DELIVERY, STORAGE, AND HANDLING

- A. Deliver sod on pallets. Protect exposed roots from dehydration.
- B. Do not deliver more sod than can be laid within 24 hours.

2 PART 2 PRODUCTS

2.1 MATERIALS

- A. Sod: ASPA Approved Field grown grade; cultivated grass sod; type indicated in plant schedule on the project construction drawings; with strong fibrous root system, free of stones, burned or bare spots containing less than 2 percent weeds per 1000 sq ft.
 - 1. Argentine Bahia Grass Type: Florida State Plant Board specifications. Sod received at site shall be moist and green. Dry and/or brown sod will NOT be accepted for placement.
 - 2. St. Augustine - Floratam Grass Type: Florida State Plant Board specifications. Sod received at site shall be moist and green. Dry and/or brown sod will NOT be accepted for placement.

- B. Topsoil: Fertile, agricultural soil, typical for locality, capable of sustaining vigorous plant growth, taken from drained site; free of subsoil, clay, or impurities, plants, weeds and roots; pH value of minimum 6.0 and maximum 7.0. Existing topsoil, removed as a result of pipeline or structure installations, shall NOT be re-used without written approval from the Project Manager.
- C. Fertilizer: FS O-F-241, Type I, Grade A (slow release granular); recommended for grass, with fifty percent of the elements derived from organic sources; of proportion necessary to eliminate any deficiencies of topsoil to either of the following proportions: 15-5-15, 25-4-11, 24-2-11 or as approved by the Project Manager.
- D. Water: The water used in the performance of this Contract shall be clean, fresh and free from injurious amounts of oil, acid, alkali, or organic matter that could inhibit vigorous growth of grass and vegetation.

2.2 ACCESSORIES

For terrain sloped at 2:1 or greater, the following accessories will be required:

- A. Wood Pegs: Softwood, sufficient size and length to ensure anchorage of sod on slope.
- B. Wire Mesh: Interwoven hexagonal plastic mesh of 2-inch size.
- C. Edging: Refer to Landscape plan.
- D. Herbicide: Refer to Landscape plan.

2.3 HARVESTING SOD

- A. Machine cut sod and load on pallets in accordance with ASPA Guidelines.
- B. Cut sod in area not exceeding 1 sq yd, with minimum 1-inch and maximum 1-1/2 inch topsoil base.

2.4 TESTS

- A. Provide analysis of topsoil fill under provisions of Section SC01340 SHOP DRAWINGS, WORK DRAWINGS, AND SAMPLES.
- B. Analyze to ascertain percentage of nitrogen, phosphorus, potash, soluble salt content, organic matter content, and pH value.
- C. Testing is not required if recent tests are available for imported topsoil. Submit these test results to the testing laboratory for approval. Indicate, by test results, information necessary to determine suitability.

3 PART 3 EXECUTION

3.1 PREPARATION

- A. Verify that prepared soil base is ready to receive the work of this section.
- B. Preparation of area to be sodded: The ground to be sodded shall be prepared by grading and thoroughly loosening the soil to a depth of 2 inches. The prepared soil shall be loose

and reasonably smooth. It shall be reasonably free of large clods, roots, and other materials that will interfere with the work and subsequent mowing and maintenance operations. Hand picking may be required.

- C. In general, the prepared area, prior to placement of imported topsoil, shall be 5 to 6 inches below the edge of roadway and driveway apron pavement and 3 to 4 inches below the edge of sidewalks.

3.2 PLACING TOPSOIL

- A. Spread imported topsoil to a minimum depth of 2 inches over area to be sodded.
- B. Place topsoil during dry weather and wind velocity not exceeding 15 miles per hour.
- C. Remove vegetable matter and foreign non-organic material from topsoil while spreading.
- D. Grade topsoil to eliminate rough, low or soft areas, and to ensure positive drainage.
- E. Install edging at periphery of sodded areas in straight lines to consistent depth.
- F. After the raking-in of the fertilizer, the topsoil shall be tamped.

3.3 FERTILIZING

- A. The fertilizer shall be mechanically spread at the rate prescribed by the manufacturer just in front of the sod laying activities.
- B. On steep slopes, where the use of a machine for spreading or mixing is not practicable, the fertilizer shall be spread by hand.
- C. With the written authorization of the Project Manager, liquid fertilizer may be used after the sod has been placed. Where fertilizer is applied hydraulically, it need not be worked into the soil.

3.4 LAYING SOD

- A. Moisten prepared surface immediately prior to laying sod.
- B. Lay sod within 24 to 48 hours after harvesting to prevent deterioration.
- C. Lay sod tight with no open joints visible, and no overlapping; stagger end joints 12 inches minimum. Do not stretch or overlap sod pieces. Newly placed sod shall abut existing sod in a straight and even line.
- D. Lay smooth. Align and level with adjoining grass areas.
- E. Place top elevation of sod (top of grass blades) one (1) inch below adjoining edging/edge of pavement for roadways and driveway aprons and level / even for sidewalks. Tolerance shall be plus 0.00 inches and minus 0.05 inches
- F. On slopes 2:1 and steeper, lay sod perpendicular to slope and secure every row with wooden pegs at maximum 2 feet on center. Drive pegs flush with soil portion of sod.
- G. Prior to placing sod, on slopes exceeding 1.5:1 or where indicated, place wire mesh over topsoil. Securely anchor in place with wood pegs sunk firmly into the ground.

- H. Water sodded areas immediately after installation, saturate sod to 4 inches of soil.
- I. After sod and soil have dried, roll sodded areas to ensure good bond between sod and soil and to remove minor depressions and irregularities.

3.5 MAINTENANCE

- A. Mow grass at regular intervals to maintain at a maximum height of 2-1/2 inches. Do not cut more than 1/3 of grass blade at any one mowing. Four (4) complete mowings shall be included in the base price for sodding. The final mowing shall be done just prior to Final Acceptance.
- B. Neatly trim edges and hand clip where necessary.
- C. Immediately remove clippings after mowing and trimming.
- D. Water to prevent grass and soil from drying out.
- E. Control growth of weeds. Apply herbicides in accordance with manufacturer's instructions. Remedy damage resulting from improper use of herbicides.
- F. Immediately replace sod to areas that show deterioration or bare spots.

END OF SECTION

SECTION 02960

RESTORATION OF SURFACE IMPROVEMENTS

1 PART 1 GENERAL

1.1 SECTION INCLUDES

- A. The work includes the restoration of driveway aprons, mail boxes, grassed and sodded areas, trees and plants, roadways, sprinkler systems, sidewalks and any other improvements required as a result of the Work.
- B. Restoration of surface improvements shall be concurrent with the installation of the water main, reclaimed water main, force main, drainage improvements or sanitary sewer; the work includes swale development and improvements on both sides of the streets in the project area. Work includes re-grading, sodding, driveway apron reconstruction, replacement of pre-existing irrigation systems and all surface restoration including trench repair. At no time, shall there be more than 500 linear feet of incomplete surface restoration including "rocked-in" trench repair. The City may (case by case) approve more than this, but never exceeding 1,000 linear feet of incomplete surface restoration.
- C. This section includes furnishing equipment, labor and materials, and performing all necessary and incidental operations to perform the required Work.

1.2 RELATED SECTIONS

- A. Section SC01025 – Measurement and Payment
- B. Section SC01340 – Shop Drawings, Work Drawings, and Samples
- C. Section SC01400 – Quality Requirements
- D. Section 02740 – Subgrade, Base Course and Asphalt
- E. Section 02924 – Seed, Mulch and Fertilizer
- F. Section 02925 – Sodding
- G. Section 02930 – Exterior Plants
- H. Section 03300 – Cast-In-Place Concrete

1.3 REFERENCES

Not Used.

1.4 UNIT PRICE – MEASUREMENT AND PAYMENT

- A. Unless specifically called out in the Schedule of Bid Items, work under this Section shall be considered incidental to the Work as detailed in the related Sections.

When existing Right-Of-Way (ROW) irrigation must be disturbed due to pipeline installation or swale development, the existing lines shall be cut-&-capped during the construction/installation

process. The replacement of existing irrigation in the Public ROW is NOT a pay item. Replacement of existing ROW irrigation shall be incidental to the Unit Price of the specific work item. Replacement material (pipe, fittings and sprinkler heads) shall be equal to or of a better quality, quantity and size than the pre-existing.

2 PART 2 PRODUCTS

2.1 Refer to the individual Sections identified above

3 PART 3 EXECUTION

3.1 RESTORATION ACTIVITIES

- A. Areas affected by the Work shall be restored to a condition equal to or better than the condition existing before the commencement of the Work. Additionally the Contractor shall re-set/replace disturbed and/or damaged mailboxes (all mailboxes shall conform to the current requirements of the US Post Office) and the Contractor shall re-set or replace existing signage.

3.2 BUSH, PLANT, SHRUB AND/OR TREE REMOVAL AND REPLACEMENT CRITERIA

- A. Bushes, plants, shrubs and/or trees that have been planted in the City, County or State ROW by the adjacent property owner and is in direct conflict with a proposed utility improvement that includes swales, shall be removed to allow for the installation of the project improvements and **NOT** replaced.

END OF SECTION