Technical Specifications

For

Pent Street / Grosse Avenue Drainage and Roadway Improvements

Pinellas County, Florida

TASK WORK ORDER STN02-03

PREPARED FOR:

City of Tarpon Springs

PREPARED BY:

ICON
CONSULTANT GROUP
INCORPORATED

10006 North Dale Mabry Highway, Suite 201
Tampa, Florida 33618
Certification of Authorization No. 8230

February 2020

SIGNATURE PAGE
PROFESSIONAL ENGINEER'S SEAL

Technical Specifications for
Pent Street / Grosse Avenue Roadway and Drainage Improvements
Pinellas County, Florida

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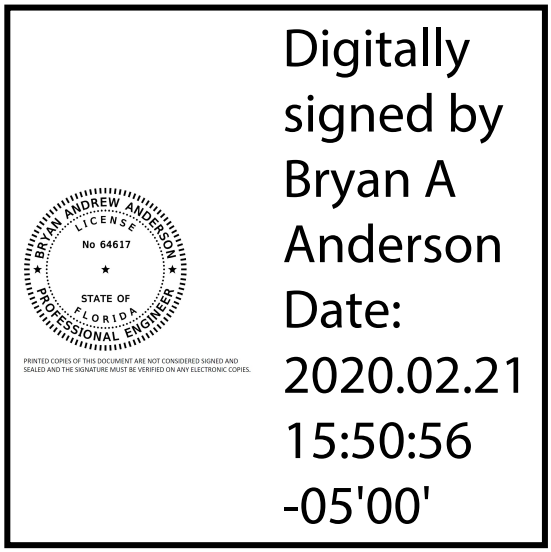

Technical Specifications

CITY OF TARPON SPRINGS

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TECHNICAL SPECIFICATIONS

MOBILIZATION

The work specified under this Section shall consist of the preparatory work and operations necessary to mobilize and begin work on the project, in accordance with the requirements of Section 101 of the Florida Department of Transportation (FDOT) *Standard Specifications for Road and Bridge Construction, July 2019 edition,* except as amended herein. This shall include but is not limited to those operations necessary for the movement of personnel, equipment, supplies and incidentals to the project site(s), buildings, safety equipment and first aid supplies, sanitary and other facilities required by these Contract Documents and all applicable federal, state and local regulations.

The cost of bonds and any other required insurance, consideration for indemnification to the Owner and the Engineer, and any other pre-construction expenses necessary for the start of the work, excluding the cost of construction materials, shall also be included in this Section.

PAYMENT

a. The work specified under this Section shall be paid for under the pay item for **Mobilization**.

PAY QUANTITY

a. The pay quantity for the work specified under this Section shall be one **lump sum** quantity for **Mobilization** and shall include all work and materials described and specified herein.

BASIS OF PAYMENT

a. The work specified under this Section shall be paid for at the contract **lump sum** price for **Mobilization** and shall be in accordance with the following schedule:

MOBILIZATION **BASIS OF PAYMENT SCHEDULE**	
Percent of Original Allowable CONTRACT AMOUNT EARNED	**Percent of the Lump Sum Price for Mobilization**
5%	25%
10%	50%
25%	75%
50%	100%

Partial payments shall be limited to ten percent (10%) of the original contract amount for the project. Any remaining amount will be paid upon completion of all work on the project, including final punch list work items.

MAINTENANCE OF TRAFFIC

The work specified under this Section consists of the maintaining of traffic within the limits of the project for the duration of the construction period, in accordance with the requirements of Section 102 & 103 of the Florida Department of Transportation (FDOT) *Standard Specifications for Road and Bridge Construction, July 2019 edition,* except as amended herein.

The Contractor shall furnish, erect and maintain all necessary traffic control and safety devices, in accordance with the Florida Department of Transportation (FDOT) *Roadway and Traffic Design Standards,* applicable edition, and the State of Florida *Manual of Traffic Control and Safe Practices for Street and Highway Construction, Maintenance and Utility Operations,* applicable edition, and shall take all necessary precautions for the protection of the work and the safety of the public for the duration of the construction period.

The work specified under this Section shall include the furnishing, erection and maintenance of all temporary traffic control devices of whatever type required, and for such duration as may be required by the Engineer, and shall include also all materials and construction necessary for temporary connections, driveway maintenance, side street maintenance, variable message signs, construction signs, covering of existing signs, detours, barricades, removal of existing markings, temporary pavement, temporary pavement markings, temporary reflective pavement markers, signalization maintenance, other items as noted in the Plans, maintenance/removal of temporary work items and restoration.

The Contractor shall notify all local law enforcement prior to a lane closure that will exceed two hours.

The Contractor shall use temporary reflective pavement markers in conjunction with temporary pavement markings unless otherwise approved.

The applicable edition of the governing documents referenced herein shall be that edition of the respective documents specified on the plans.

PAYMENT

a. The work specified under this Section shall be paid for under the pay items for **Maintenance of Traffic**.

PAY QUANTITY

a. The pay quantity for **Maintenance of Traffic** shall be one **lump sum** quantity, which shall include all work and materials described and specified herein.

BASIS OF PAYMENT

a. The work specified under this Section shall be paid for at the contract **lump sum** price for **Maintenance of Traffic**.

EROSION CONTROL

The work specified under this Section consists of the furnishing and application of baled hay, straw, floating turbidity barriers or staked sediment barriers to control erosion on the project and in areas outside of the project right-of-way where work is accomplished in conjunction with the project, in order to prevent the pollution of water, detrimental effects to property and facilities outside the project right-of-way, and damage to work on the project. Erosion Control shall be in accordance with the notes and details shown on the plans and with the requirements of Section 104 of the Florida Department of Transportation (FDOT) *Standard Specifications for Road and Bridge Construction, July 2019 edition*, except as amended herein.

The work shall consist of erosion control across water flow paths, and the placement of barriers around drainage facilities during the construction thereof, to protect against downstream or lateral accumulations of silt and debris. The barriers shall be placed so as to effectively control silt and debris dispersion under the conditions present on the project, or any conditions created during construction activities, which might tend to produce erosion or the accumulation of silt and debris.

The Contractor shall re-establish, at no additional expense to the Owner, all synthetic inlet protection, straw, floating turbidity barriers or staked silt barriers, or sections thereof, which may become damaged, destroyed or otherwise rendered unsuitable for their intended function during the construction of the project.

This section also includes the controlling of dust during construction by wetting, covering, or other means as approved by the Engineer.

The work specified under this Section shall include the installation, re-establishment and maintenance of all required synthetic inlet protection, straw, rock bags, floating turbidity barriers, or staked sediment barriers, all other work required to control effectively the downstream or lateral accumulation of silt and debris, and the removal of all such temporary erosion control facilities upon completion of the project.

PAYMENT

a. The work specified under this Section shall be paid for under the pay items for **SEDIMENT BARRIER, FLOATING TURBIDITY BARRIER,** and **INLET PROTECTION SYSTEM**.

PAY QUANTITY

a. The pay quantity for **Sediment Barrier** and **Floating Turbidity Barrier** shall be **linear foot** quantity, and the pay quantity for **Inlet Protection Systems** shall be **each** quantity, which shall include all work and materials described and specified herein.

BASIS OF PAYMENT

a. The work specified under this Section shall be paid for at the contract price per **linear feet** and per **each.**

CLEARING AND GRUBBING

The work specified under this Section consists of the clearing and preparation of sites for proposed construction, in accordance with the requirements of Section 110 of the Florida Department of Transportation (FDOT) *Standard Specifications for Road and Bridge Construction, July 2019 edition*, except as amended herein.

The work specified under this Section shall include the removal and disposal of all trees (including roots) indicated on the plans to be removed, in the way of construction, or as directed by the Engineer, the removal and disposal of all brush, stumps, roots, rubbish and debris, and all obstructions resting on or protruding through the surface of the existing ground and the surface of excavated areas, the removal and disposal of all existing facilities interfering with construction or as directed by the Engineer, and the removal and disposal of all buildings, asphalt and concrete pavement, base, sub-base, sidewalk, concrete curbs, fences, gates, planters, signs, pipe, rubble, structures, appurtenances, utilities and other facilities within the construction limits necessary to prepare the area for the proposed construction, unless it is indicated specifically on the Plans that such work is to be performed by others.

Included under this Section shall be the removal and disposal of all product and debris except that which is to be salvaged or which is required to complete the construction of the project.

All tree removal shall include stump grinding to a minimum depth of one foot below the proposed ground surface.

The removal and disposal by contractor of pavement, manhole, inlet, and PVC pipe are to be included under this Section.

Included under this Section all labor, materials, and equipment required for relocation and/or replacement of existing mailboxes.

All buildings, structures, utilities and other obstructions indicated on the Plans to remain shall be carefully protected against displacement or damage.

Except as otherwise provided for in these Specifications, the work to be performed under this Section shall also include the clearing and grubbing necessary for the excavation of drainage swales, borrow pits, and the like, and the clearing and grubbing necessary for the construction of designated haul routes. Any required permitting and coordination shall be the responsibility of the contractor prior to any clearing activities. This shall include all necessary tree permits.

The Contractor shall protect trees to be left standing against damage, including unnecessary cutting, breaking or skinning of the roots, skinning and bruising of the bark, and smothering of trees by stockpiled construction materials or excavated materials within the drip line. The Contractor shall provide temporary earth-retaining structures, fences, barricades, and guards as required for the protection of trees to be left standing. The Contractor shall remove only trees that are designated to be removed in the plan, or as directed by the Engineer.

Trees to be left standing that are damaged by construction operations shall be repaired or replaced at no additional cost to the Owner. Tree repair shall be performed by a qualified tree surgeon.

Whenever it is necessary to cut for removal large roots of trees to be preserved, the roots to be cut shall be cleaned prior to cutting, cut with a saw or axe, and the wounds painted with "Tree-Kote" or other approved asphalt-base wound dressing prior to backfilling.

Where excavation is required for construction of pond, storm sewer, sidewalk, all stumps, roots, etc., shall be removed completely from the sidewalk area. All stumps within the project limits shall be removed completely and replaced with compacted backfill before the area is filled. Tree roots in the area of the proposed sidewalk, ramp, or driveway replacement shall be ground out to a depth of six (6) inches below the bottom of the new sidewalk or driveway. All pruned root debris shall be removed from the sub-base material prior to placing concrete, asphalt, or application of other specified materials.

The Contractor shall make his own inspection to determine the character, density and extent of trees, vegetation and other items subject to removal and disposal under these provisions. The attention of the Contractor is directed to the fact that the burning or burial of debris resulting from clearing and grubbing operations will not be permitted unless otherwise noted.

Nothing in these provisions shall be construed to authorize the removal or disturbance of any tree or other form of vegetation, or any marine, land or air creature natural habitat, which may be subject to the jurisdiction of regulatory agencies.

All felled timber, roots, brush, logs, rubble, and other items and debris shall be removed from the site and disposed of by the Contractor at no additional cost to the Owner. Costs of all permits and fees for disposal shall be paid by the Contractor. The Contractor shall be responsible for compliance with all federal, state, and local laws and regulations pertaining to the control of environmental pollution and other regulated practices in the disposal of cleared and grubbed materials.

The work specified under this section shall also include trimming of trees to accommodate construction and disposal of the debris.

PAYMENT

a. The work specified under this Section shall be paid for under the pay items for **Clearing and Grubbing** and **Removal of Existing Concrete**.

PAY QUANTITY

a. The pay quantity for work specified under this Section shall be the number of **acres** of **Clearing and Grubbing** and **Square Yards** of **Removal of Existing Concrete** specified in the applicable pay items, actually constructed, accepted and shall include all work described and specified herein.

BASIS OF PAYMENT

a. The work specified under this Section shall be paid for at the contract price per **acre** for **Clearing and Grubbing** and **per square yard** for **Removal of Existing Concrete**.

FILL MATERIAL

The work specified under this Section consists of the placement and compaction of fill material for such purposes as the pond berm, the replacement of unsuitable material, the filling of ditches and channels, and the filling of substantial voids and depressions.

The work specified under this Section shall not involve the construction of side slopes, or the shaping and dressing of material to neat lines conforming to definite geometric configurations, such as required in the construction of embankment. However, the work specified under this Section shall include the shaping, compaction and dressing of material to the condition required for the placement of embankment, pavement, bedding or other material, and where required, to the slopes and tolerances normally associated with final grading operations, such as required for seeding and placement of sod.

Material used for fill material shall consist of suitable earthen material acceptable to the Engineer, and shall be placed, compacted and dressed to the lines and grades shown on the Plans, in accordance with applicable requirements of Section 120 of the Florida Department of Transportation (FDOT) *Standard Specifications for Road and Bridge Construction, July 2019 edition,* except as amended herein, and the notes and details shown on the Plans.

The work specified under this Section shall include the furnishing of all required borrow material. Borrow material shall be furnished from areas provided by the Contractor and shall be approved by the Engineer prior to placement.

The work specified under this Section shall not include the furnishing or placement of bedding or other select material.

No separate payment or measurement will be made for Fill Material. All costs shall be included in Embankment.

PAYMENT

a. No separate measurement or payment will be made for fill material. The cost for fill material shall be included in the cost of other applicable pay items.

EXCAVATION AND EMBANKMENT

All work specified under this section shall conform to the requirements of Sections 110 and 120 of the Florida Department of Transportation (FDOT) *Standard Specifications for Road and Bridge Construction, July 2019 edition,* except as amended herein.

Except for that work excluded under other provisions of this Section, and except as provided for under other Sections of these Specifications, the work to be performed under this Section shall consist of all excavation, the furnishing, placement and compaction of all embankment and fill material, all grading of roadway shoulders and ditches, the construction or re-channelization of all ditches and swales, all graded road connections, the shaping or reshaping of slopes, all final dressing, and all other earthwork operations required for the completion of the project.

Unless otherwise provided for, all borrow and suitable fill material required for the completion of work performed under this Section and as indicated on the plans shall be furnished by the Contractor from areas provided by the Contractor.

When the project includes the construction of Soil Cement Base, the work performed under this Section shall also include the furnishing and compaction of all embankment material required between existing ground and the bottom of the Soil Cement Base.

The work to be performed under this Section shall not include the excavation of unsuitable material, or the furnishing, placement and compaction of fill material as replacement for unsuitable material, or other items of work for which separate payment is to be made.

All suitable material shall remain the property of the Owner until all earthwork requirements for the project have been fulfilled. Except as otherwise provided for on the Plans and Specifications, all surplus material and other items not claimed by the Owner shall become the property of the Contractor and shall be disposed of by the Contractor in areas provided by the Contractor.

The contract price for the work to be performed under this Section shall not include the cost of all work specified under other Sections of these Specifications. The cost thereof is specified to be included in the pay items provided for the work specified under those Sections.

PAYMENT

a. The work specified under this Section shall be paid for under the pay items for **Regular Excavation** and **Embankment**.

PAY QUANTITY

a. The pay quantity for work specified under this Section shall be the number of **cubic yards** of **Regular Excavation** and **Embankment** specified in the applicable pay items, actually constructed, accepted and shall include all work described and specified herein.

BASIS OF PAYMENT

a. The work specified under this Section shall be paid for at the contract price per **cubic yard**.

CONCRETE

Class I (NS), II, II or IV

The work specified under this Section consists of the construction of concrete related work. This shall include, but shall not be limited to, concrete structures, concrete plugs, sidewalks, driveways, concrete ditch pavement, or other concrete related work as shown on the plans or directed by the Engineer, unless otherwise provided for under separate Section of these Specifications.

The concrete construction shall conform to the requirements of Section 346, 347, 350, 415, 430, 522, and 524 of the Florida Department of Transportation (FDOT) *Standard Specifications for Road and Bridge Construction, July 2019 edition*, except as amended herein, the details and notes shown on the Plans, and, when specified herein or on the Plans, applicable drawings of the Florida Department of Transportation (FDOT) *Standard Plans for Road and Bridge Construction (FY2018 – 2019).*

Fiber Reinforced Concrete (FRC), when specified on the plans, shall consist of polyester monofilament fiber reinforcement additive conforming to ASTM C-1116 standards. The fiber reinforcement shall be applied at a rate of one-pound per cubic-yard or as approved by the Engineer.

Unless otherwise specified, concrete sidewalk for pedestrian traffic shall be constructed to a minimum thickness of four (4) inches, with no reinforcement.

The work specified under this Section includes the furnishing and construction of all necessary forms, and the furnishing and placement of all required Welded Wire Fabric or Reinforcing Steel.

Concrete pavement not subjected to vehicular traffic or other forces of unusual magnitude shall be constructed to a minimum thickness of four inches. Concrete pavement which will be subjected to vehicular traffic or other forces of unusual magnitude shall be constructed to a minimum thickness six inches as detailed on the Plans or as approved by the Engineer.

The work specified under this Section shall include all services and materials required for construction of concrete related work, including forms and falsework, bracing, expansion joint materials, welded wire fabric, reinforcing steel, flowable fill, concrete collars, weep holes, the setting of anchor bolts, dowels and all required clearing and grubbing, excavation, compaction, backfilling and cleanup.

PAYMENT

a. The work specified under this Section shall be paid for under the pay items for **Concrete Sidewalk and Driveways** (types specified), **Concrete Class IV** (types specified), **Pipe Filling & Plugging**, **Concrete Ditch Pavement** (types specified) & **Mitered End Section** (types specified).

PAY QUANTITY

a. The pay quantity for the work specified under this Section shall be the number of **square yards** of **Concrete Sidewalk and Driveways** (types specified) and **Concrete Ditch Pavement** (types specified) specified in the applicable pay items, actually constructed and accepted. The pay quantity for work specified under this section for **Concrete Class IV** (types specified) & **Pipe Filling & Plugging** shall be the number **cubic yards** of the structures identified in the applicable pay items, satisfactorily completed and accepted. The pay quantity for work specified under this section for **Mitered End Section** (types specified) shall be the number **each** of the structures identified in the applicable pay items, satisfactorily completed and accepted.

BASIS OF PAYMENT

a. The work specified under this Section shall be paid for at the contract price per **square yard**, **cubic yard**, and **each.**

PAVEMENT

Asphalt Concrete, Crushed Concrete Base and Stabilization

Asphalt pavement shall meet the requirements of Section 334 of Florida Department of Transportation (FDOT) *Standard Specifications for Road and Bridge Construction, July 2019 edition,* except as amended herein.

Type B Stabilization shall meet the requirements of Section 160 of Florida Department of Transportation (FDOT) *Standard Specifications for Road and Bridge Construction, July 2019 edition,* except as amended herein.

RECYCLED CONCRETE AGGREGATE (I.E., CRUSHED CONCRETE)

The materials used shall conform to the requirements specified in FDOT Section 204, FDOT Section 285 and FDOT Section 901-5 of the Florida Department of Transportation (FDOT) *Standard Specifications for Road and Bridge Construction, July 2019 edition,* except as modified herein. Before any base course material is used it shall first have been tested by the laboratory and approved by the Engineer. Compaction of the crushed concrete base shall meet the requirements of FDOT Section 204.

The crushed concrete base course shall be placed in uniform layers to such a depth that when compacted, the base course will have the thickness shown on the Plans. Spreading by other means shall be permitted only where and as directed by the Engineer.

The depth of any one (1) layer, when compacted, shall not be more than six (6) inches. If the required compaction cannot be obtained for the full depth of the base course spread, the thickness of each course shall be reduced or at the approval of the Engineer, adequate equipment shall be used to compact the aggregate to the required unit weight.

If the subgrade or base course becomes rutted due to the Contractor's operation, the subgrade or base course shall be removed and replaced, acceptable to the Engineer, at the Contractor's expense.

The work specified under this Section shall include the furnishing and placement of all materials, bituminous prime and tack coats, and all grading, compaction and other incidental work not paid for under other pay items. No separate payment will be made for bituminous prime or tack coats.

PAYMENT

a. The work specified under this Section shall be paid for under the pay items for **Type B Stabilization**, **Optional Base Group 01**, **Recycled Concrete Aggregate** (types specified)**,** and **Superpave Asphalt Concrete Traffic B.**

PAY QUANTITY

a. The pay quantity for work specified under this Section shall be the number of **square yards** of **Optional Base Group 01, Recycled Concrete Aggregate** (types specified)**,** and **Type B Stabilization** specified in the applicable pay items, actually constructed and accepted. The pay quantity for work specified under this Section for **Superpave Asphalt Concrete Traffic B** shall be the number of **Tons** actually constructed and accepted.

BASIS OF PAYMENT

a. The work specified under this Section shall be paid for at the contract price per **square yard** and per **ton.**

MILLING & RESURFACING OF EXISTING ASPHALTIC CONCRETE PAVEMENT & ROADWAY BASE

The work specified under this Section consisting of the removal of existing asphaltic concrete pavement and roadway base, and the application of new surface course(s), shall conform to the requirements of Section 327 of the FDOT Specifications, as amended herein.

Milling Operations

A. Equipment

The equipment for the milling operation shall include a machine capable of maintaining a depth of cut and cross slope which will achieve the results specified herein. The machine shall be equipped with automatic grade controls which operate by sensing from one or more skids moving along the pavement surface, and which shall produce, where required, a skid-resistant surface texture. The machine shall be equipped with a means to effectively limit the amount of dust escaping from the removal operation. Special attention is directed to the fact that, if the machine is equipped with preheating devices, local environmental and other regulations governing operation of this type of equipment may vary considerably from place to place. It shall be the Contractor's responsibility to be familiar with, and to comply with, all such local regulations, as well as State and Federal rules, and to obtain all permits required for the operation of such equipment.

B. Construction

The existing pavement and base shall be removed to varying depths in a manner which will restore the pavement surface to a uniform longitudinal profile and cross-section as specified herein. Where indicated in the Plans, removal shall be to a specified depth and shall produce a specified cross slope. The longitudinal profile of the milled surface shall be established by skid sensor on the side of the cut nearest the centerline of the road. The cross slope of the milled surface shall be established by a second skid sensing device near the outside edge of the cut or by an automatic cross slope control mechanism. The Engineer may waive the requirements for the automatic grade or cross slope controls where the situation warrants such action. The milling pattern, in conjunction with the pavement lay-down operation, shall be approved by the Engineer prior to starting each phase.

If approved by the Engineer, the Contractor may elect to make multiple cuts to achieve the required pavement configuration or depth of cut.

The forward speed of the milling machine may be restricted by the Engineer to assure an acceptable finished surface.

Existing signal loops are to be located in the field prior to milling. Installation of signal loops shall be placed prior to final resurfacing course. Loops shall not be cut into the final surface course. After loop installation is complete, MEG readings shall be performed according to FDOT Specifications. Payment for signal loops shall be included in this Section, unless otherwise provided for in a different Section of this Contract.

Replacement of existing traffic loops shall immediately follow milling operations. Any cut loops shall be replaced within two (2) calendar days. For each day after the two (2) day period that the cut loops are not replaced, the Contractor shall be assessed the amount of one thousand ($1,000.00) dollars per day.

Payment to the County of such sums as may become payable under the provisions of this article shall be made by identifying the said sums as a credit item on the Contractor's final pay estimate.

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.

Prior to opening to traffic an area which has been milled (except for areas in which the roadway base is temporarily exposed), 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 such as to minimize the potential for traffic hazards and pollution to the air.

Sweeping of the milled surface with a power broom shall be required prior to the placement of new surface course.

At the time of paving operations, immediately prior to placement operations, the use of a pick-up sweeper will be required in areas as directed by the Engineer. Special care shall be taken to clean all loose material from the area adjacent to the curb and gutter prior to paving operations.

C. Finished Surface

If the milled surface is to be the final surface of the pavement, it shall have either continuous or intermittent striations or any other preapproved pattern which will provide an acceptable level of skid resistance. If pavement is to be constructed over the milled surface it shall have a texture which will produce good bonding.

The finished surface shall have a reasonably uniform texture, shall be within 1/4 inch of a true profile grade, and shall have no deviation in excess of 1/4 inch from a straight edge applied to the pavement perpendicular to the centerline. Areas varying from a true surface in excess of the above stated tolerance may be accepted without correction if the Engineer determines that they were caused by preexisting conditions which could not reasonably have been corrected by the milling operations. Any unsuitable texture or profile, as determined by the Engineer, shall be corrected by the Contractor at no additional expense to the City.

The Engineer may require the re-milling of any area in which a surface lamination causes a non-uniform texture to occur.

D. Salvageable Materials

All surplus existing materials resulting from milling operations, except those materials designated by the Engineer as deleterious materials, shall remain the property of the City.

All salvageable materials claimed by the City shall be transported to and stockpiled at locations as indicated by the City.

The transporting and stockpiling of salvageable materials shall be performed by the Contractor. The method of handling and stockpiling of salvageable materials shall be approved by the Engineer.

E. Disposable Materials
All surplus materials not claimed by the City shall become the property of the Contractor, and shall be disposed of by the Contractor in areas provided by the Contractor.

F. Coordination of Milling Operations and Paving Operations
No milled surface shall be left open to vehicular or pedestrian traffic for a period greater than five (5) consecutive calendar days. For each day after the five (5) day period that the milled surface is left open to vehicular traffic, the Contractor shall be assessed the amount of two thousand ($2,000.00) dollars per day. Payment to the City of such sums as may become payable under the provisions of this article shall be made by identifying the said sums as a credit item on the Contractor's final pay estimate.

Adjustment of Utilities
All utilities and related structures requiring adjustment shall be adjusted by their owners at the owner's expense. The Contractor shall arrange his schedule to allow utility owners the time required for such adjustments. All utility adjustments shall be completed prior to the commencement of milling and resurfacing operations. Prior to commencing milling operations Contractor shall confirm that proposed milling does not negatively affect a utility.

Resurfacing
After the milled areas are declared by the Engineer to be suitably prepared for resurfacing operations, and all utility adjustments have been completed to the satisfaction of the Engineer, the areas shall be resurfaced in accordance with the materials and thicknesses specified in other applicable Sections of these Specifications. Prior to installation of the resurfacing material, the milled surfaces shall be thoroughly cleaned of all dust and loose material, and a uniform application of tack shall be applied as specified in the Pinellas County Specifications for Hot Bituminous Mixtures, Plant Methods, Equipment and Construction Methods, latest edition, Section 3-7, at a rate of 0.04 to 0.06 gallons per square yard.

The "overlay" exception referenced in Pinellas County Specifications for Hot Bituminous Mixtures, Plants Methods, Equipment and Construction Methods, latest edition, Section 3-15.8 does not apply to acceptance and payment for asphaltic concrete under this section.

PAYMENT
The work specified under this Section shall be paid for under the following pay items:
Milling Exist Asphalt Pavt (types specified).

PAY QUANTITY
The pay quantity for work specified under this Section shall be the number of **square yards** of milling, of the various materials and the thicknesses thereof specified in the applicable pay items, satisfactorily completed and accepted.

BASIS OF PAYMENT
The quantities determined as specified above shall be paid for at the contract price per **square yard**.

BRICK PAVEMENT REMOVAL

General

The work specified under this Section consists of the removal and palletizing of bricks to the lines shown on the plans and shall include all the labor to remove and stack the bricks by hand. The work also includes transporting pallets of brick to and from the City's storage facility.

Brick Pavement Removal

The Contractor shall take care while removing the bricks, as the bricks will be used to rebuild the street. The Contractor shall submit his plan for brick removal to the City for approval at least 14 calendar days prior to initiation of the work. The Contractor's method of brick removal shall minimize damage to the existing brick to the extent possible. Use of a front end loader, bobcat bucket, or similar equipment will not be allowed unless approved by the engineer. The City of Tarpon Springs will supply pallets where the bricks must be stacked neatly to a maximum of 10 courses. The Contractor shall wrap the pallets of brick in plastic to secure the bricks prior to removal from the site. The Contractor will transport the bricks to and from the City's storage facility. No pallets of bricks or loose bricks are to be left on the site at any time the site is unattended.

The removal of brick from the existing brick/concrete sidewalk along Tarpon Avenue is to be included within this Section.

Broken brick or brick covered with asphalt pavement shall not be salvaged and shall be properly disposed of by the Contractor.

PAYMENT

a. The work specified under this Section shall be paid for under the pay items for **Brick Pavement Removal**.

PAY QUANTITY

a. The pay quantity for the work specified under this Section shall be by the number of **square yards** of bricks actually removed and accepted.

BASIS OF PAYMENT

a. The quantities determined as specified above shall be paid for at the contract price per **square yard**.

BRICK PAVEMENT INSTALLATION

General

The work specified under this Section consists of the installation of brick street base, fine crushed concrete bedding course, compaction, sand joint filler to the lines shown on the plans and six (6) inches of crushed concrete and shall include all the labor to place the bricks.

To the greatest extent possible, brick removed from the existing brick pavement shall be reused. The supply of existing reusable brick from the project is not adequate to pave the areas shown on the Plans. The City has a supply of bricks in the City Yard for use in supplementing the reusable brick from the project. The Contractor shall obtain brick from the City Yard as necessary to complete the paving. The Contractor shall clean all brick supplied by the City.

Brick Pavement Installation

The roadway base shall be constructed using crushed concrete compacted in accordance with PAVEMENT section of these specifications.

A fine crushed concrete bedding course shall be constructed on all completed bases for brick pavement. Brick pavement shall be laid in a running bond pattern on a completed base with a fine crushed concrete bedding course and only clean, whole, sound brick shall be used. The brick shall be laid in close contact and the joints of each course shall be uniformly staggered with respect to the adjacent course. Whole brick shall be used except in starting and finishing a course and fitting pavement around manhole tops or other structures. Proper crown, slope and grade must be maintained.

Bricks shall be clean and free from foreign materials before installation.

Installation should start from a corner or straight edge and proceed forward over the undisturbed fine crushed concrete bedding course.

Bricks shall be plumb, level, and true to line grade; shall be installed properly, coincide and align with adjacent work and elevations.

Brick should be installed hand tight on the undisturbed fine crushed concrete bedding course. String lines should be used to hold pattern lines true.

Gaps between the edges of the brick surface shall be filled with standard bricks or with bricks cut to fit. Cut bricks should be no smaller than one-third the size of full bricks. Care should be taken when establishing the laying pattern to insure that less than one-third bricks are minimized.

Bricks are set into the fine crushed concrete bedding course by roller or plate vibrator capable of 3,000 to 5,000 compaction force. Vibration shall be conducted in crossing paths until the pavement surface is smooth and required elevation is achieved. Gaps between bricks at this point should be filled to about two-thirds of the brick's full height. Gaps between edges should be no more than 3/16-inches wide after

vibration. Gaps greater than 3/16 inch suggest that less than satisfactory interlock will be achieved. Bricks within three feet of unrestrained edges must not be compacted.

Once bricks are vibrated into place, clean, dry sand shall be broomed over the pavement surface and vibrated once or into the remaining unfilled gaps between bricks to the height of the joint level. Surplus sand should be swept from the pavement surface and disposed of.

The completed brick pavement installation should be washed down and cleaned to provide a clean finished workmanlike installation.

The work specified under this Section shall also include furnishing and preparing the fine crushed concrete bedding course, excavation, backfilling and compaction of the sub-base, installation of base course material and the edge restraint system called for in the Plans.

Brick Sidewalk Installation

The work specified under this Section consists of the construction of brick/concrete sidewalk to the lines and grades shown on the Plans, and as directed by the Engineer.

The sidewalk base shall conform to the requirements of Section 522 of the Florida Department of Transportation (FDOT) *Standard Specifications for Road and Bridge Construction, July 2019 edition*, except as amended herein, to the details and notes shown in the Plans, and to all applicable drawings of the Florida Department of Transportation (FDOT) *Standard Plans for Road and Bridge Construction (FY2018 – 2019)*.

Brick pavement shall be laid in a running bond pattern on a completed base that conforms to the requirements of Section 522 of the Florida Department of Transportation (FDOT) *Standard Specifications for Road and Bridge Construction, July 2019 edition.* Only clean, whole, sound brick shall be used. The brick shall be laid in close contact and the joints of each course shall be uniformly staggered with respect to the adjacent course. Whole brick shall be used except in starting and finishing a course. Proper slope and grade must be maintained.

Bricks shall be clean and free from foreign materials before installation.

Installation should start from a corner or straight edge and proceed forward over the undisturbed base.

Bricks shall be plumb, level, and true to line grade; shall be installed properly, coincide and align with adjacent work and elevations.

Brick should be installed hand tight on the undisturbed base. String lines should be used to hold pattern lines true.

Gaps between the edges of the brick surface shall be filled with standard bricks or with bricks cut to fit. Cut bricks should be no smaller than one-third the size of full bricks. Care should be taken when establishing the laying pattern to insure that less than one-third bricks are minimized.

Once bricks are installed hand tight into place, clean, dry sand shall be broomed over the sidewalk surface and vibrated once or into the remaining unfilled gaps between bricks to the height of the joint level. Surplus sand should be swept from the sidewalk surface and disposed of.

The completed brick sidewalk installation should be washed down and cleaned to provide a clean finished workmanlike installation.

The work specified under this Section shall also include furnishing and preparing the sub-base, excavation, backfilling and compaction of the sub-base, and installation of the as called for in the Plans.

Mock Ups
The Contractor shall install a 4-foot by 4-foot brick pavement area as described in this Section. This area will be used to determine acceptability of the surcharge of the fine crushed concrete bedding course, joint size, lines, laying pattern(s), color(s) and texture of the job. This area will be protected and maintained by the Contractor's project manager until final acceptance of the scope of the work covered in this Section has been granted. This area shall be the standard from which the work will be judged.

Fine Crushed Concrete Bedding Course

Fine crushed concrete bedding course shall be clean, non-plastic, free of deleterious or foreign matter.

The Contractor shall not deposit fine crushed concrete bedding course upon any portion of the aggregate base course until the base course has been approved by the Owner's Engineer.

The Contractor shall spread the fine crushed concrete bedding course evenly over the area to be paved.

The Contractor shall screed the sand to a level that will produce a 1-inch thickness when the bricks have been placed and vibrated. Adjust the sand level to ensure that the final pavement elevation will be 1/4 to 3/8 inches higher than adjacent edge restraints (curb, gutter, etc.) to allow for proper surface drainage.

PAYMENT

a. The work specified under this Section shall be paid for under the pay items for **Brick Pavement Installation (Reuse Existing Brick)** and **Brick Pavement Installation (City Supplied Brick)**.

PAY QUANTITY

a. The pay quantity shall be the number of **square yards** of **Brick Pavement Installation (Reuse Existing Brick)** and **Brick Pavement Installation (City Supplied Brick)** per plan quantity and shall include all work and materials described and specified herein. Payment includes cleaning and transporting City supplied brick.

BASIS OF PAYMENT

a. The work specified under this Section shall be paid for at the contract price per **square yard**.

BOX CULVERT SECTION

Concrete, Pre-cast
The work specified in this Section consists of the construction of Pre-cast Concrete Box Culvert. The work shall be done in accordance with these specifications and the requirements of Section 410 of the FDOT Specifications, as amended herein, and in conformity with the lines, grades, dimensions, and notes shown in the Plans.

Materials and Manufacture
The materials and manufacture of Pre-cast Concrete Box Culvert sections shall conform to the requirements of the following specifications, as amended herein:

AASHTO M259 –for box sections with two feet or more of earth cover and subjected to highway loading or subjected to dead load only.

AASHTO M273 –for box sections with less than two feet of earth cover and subjected to highway loading.

When approved by the Engineer, in writing, ASTM C789 may be used in lieu of AASHTO M259, and ASTM C850 may be used in lieu of AASHTO M273, subject to such requirements as may be stipulated, in writing, as a condition of approval. Also required is conformance with FDOT Structures Design Guidelines, latest edition and amendments thereto.

Concrete
Concrete shall be Class IV. Minimum concrete cover for slightly aggressive environment shall be 2 inches, and for moderately or extremely aggressive environment shall be 3 inches.

Construction
The methods for construction of trench and foundation, and for laying and backfilling shall conform to the requirements specified in Section 430 of the FDOT Specifications, with the following additional requirements:

Trench, Foundation, Laying and Backfill
The bedding shall consist of coarse concrete sand or other suitable granular material placed below the culvert to a minimum depth of 6 inches and to a minimum width of one foot outside the exterior walls of the culvert, between graded forms set one foot outside each exterior wall of the box culvert. When required by the Plans, other special bedding shall be provided.

Lifting Holes
Holes provided for lifting or joint restraint shall be sealed by plugging, using a non-shrinking mortar in accordance with Section 934 of the FDOT Specifications. Mortar shall be properly cured to insure a sound and watertight plug.

Joints
Field joints for Pre-cast Concrete Box Culvert shall be made with a butyl rubber-based pre-formed plastic gasket material, or as detailed in the Plans. Culverts to be laid with joints made from preformed plastic

gasket material shall be subject to the applicable requirements of Section 430-7.3 of the FDOT Specifications, with the following additional requirements:

1) The culvert producer shall furnish to the Engineer a written recommendation as to the cross-sectional area of gasket material which will create a watertight seal. This recommended cross-sectional area shall be the minimum permitted for gasket material.

2) The outside of each joint shall be completely wrapped with either a woven or non-woven filter fabric. The fabric shall be a minimum of two feet in width and shall be secured tightly against the box culvert section by metal or plastic reinforced strapping.

3) When specified in the Plans, the joint shall be secured by a suitable device capable of holding the sections to line and grade as well as fully home. These devices shall be removed after sufficient backfill has been placed and compacted to secure the sections.

Detail Drawings
Shop drawings, signed and sealed by a Florida licensed professional engineer, shall be submitted to the Engineer for review.

Details of special units, modifications and required devices shall be submitted for review to the Engineer prior to the manufacture thereof.

PAYMENT
No separate measurement or payment will be made for box culvert section. The cost for box culvert section shall be included in the cost of other applicable pay items.

REINFORCING STEEL

All work specified under this section shall conform to the requirements of Section 415 of the Florida Department of Transportation (FDOT) *Standard Specifications for Road and Bridge Construction, July 2019 edition*, except as amended herein. The work specified under this Section consists of the furnishing and placement of reinforcing steel and wire fabric in concrete structures, and in incidental concrete construction. The materials, fabrication and placement of Reinforcing Steel shall conform to the requirements of Section 415, as amended herein, such additional requirements as may be shown on the Plans, and, when specified herein or on the Plans, applicable drawings of the FDOT Design Standards.

Grade 60 reinforcing steel shall be used.

The Contractor shall submit reinforcing steel shop drawings to the Engineer for approval. The shop drawings shall show clearly the locations for all slab bolsters and high chair layouts.

PAYMENT

a. The work specified under this Section shall be paid for under the pay items for **Reinf. Steel** (type specified).

PAY QUANTITY

a. The pay quantity for work specified under this Section shall be the number of **pounds** of **Reinf. Steel** (type specified) specified in the applicable pay items, actually constructed, accepted and shall include all work described and specified herein.

BASIS OF PAYMENT

a. The work specified under this Section shall be paid for at the contract price per **pound**.

INLETS, MANHOLES, AND JUNCTION BOXES

The work specified under this Section consists of the construction of Inlets, Manholes, and Junction Boxes, and similar drainage structures, in accordance with the Florida Department of Transportation (FDOT) *Standard Specifications for Road and Bridge Construction, July 2019 edition* and Florida Department of Transportation (FDOT) *Standard Plans for Road and Bridge Construction (FY2018 – 2019)*, except as amended herein. Materials and construction shall conform to the requirements of Sections 425, 449 and 949 of the Florida Department of Transportation (FDOT) *Standard Specifications for Road and Bridge Construction, July 2019 edition*, except as amended herein, and such additional requirements as may be shown on the Plans, applicable drawings of the FDOT *Standard Plans for Road and Bridge Construction (FY2018 – 2019).*

Grates for Drainage Structures: All grates for drainage structures shall be galvanized steel grates having a diamond, hexagonal or similar reticulum pattern unless otherwise shown on the plans or directed by the Engineer. Additionally, all grates used on drainage structures which can be subjected to vehicular traffic shall be capable of withstanding H-20 and Heavy Duty Loading, and shall be the equivalent of those grates manufactured by U.S. FOUNDRY & MANUFACTURING CORPORATION in its H-20 and Heavy Duty Loading series.

The work specified under this Section shall include the furnishing and placement of all concrete, reinforcing steel and accessory items, cast iron and PVC pipe, gratings, frames, covers, cement grout, skimmer (including fasteners, anchors, and channel supports), and any other necessary fittings, and providing plugs and openings in existing structures, as shown on the Plans or as directed by the Engineer, all forms and falsework, all dewatering, excavation, backfilling and compaction around the structure, all #57 crushed stone bedding material, connection of pipes/culverts, all labor and materials required to restore the work site and affected property and facilities to a condition acceptable to the Engineer, and the disposal of all surplus materials not claimed by the Owner. Unless otherwise provided for in the Contract Documents all materials disposed of by the Contractor shall be disposed of in areas provided by the Contractor.

PAYMENT

a. The work specified under this Section shall be paid for under the following pay items: **Inlet** (types specified) & **Manholes** (types specified).

PAY QUANTITY

a. The pay quantity for the work specified under this Section shall be the number **each** of the structures identified in the applicable pay items, satisfactorily completed and accepted.

BASIS OF PAYMENT

a. The quantities determined as specified above shall be paid for at the contract price per **each**.

STORM SEWERS

The work specified under this Section consists of the construction of reinforced concrete storm sewer pipe in accordance with Section 125 and 430 of the Florida Department of Transportation (FDOT) *Standard Specifications for Road and Bridge Construction, July 2019 edition* and Florida Department of Transportation (FDOT) *Standard Plans for Road and Bridge Construction (FY2018 – 2019),* except as amended herein. Materials and construction shall conform to the requirements of Sections 430, 449 and 942 of the Florida Department of Transportation (FDOT) *Standard Specifications for Road and Bridge Construction, July 2019 edition*, except as amended herein, and such additional requirements as may be shown on the Plans, applicable drawings of the FDOT *Standard Plans for Road and Bridge Construction (FY2018 – 2019)*.

The work specified under this Section shall include the furnishing and placement of all pipe as shown on the Plans or as directed by the Engineer, all forms and falsework, all dewatering, excavation, backfilling and compaction around the pipe, all bedding material, connection to existing pipes/culverts and drainage structures, all labor and materials required to restore the work site and affected property and facilities to a condition acceptable to the Engineer, and the disposal of all surplus materials not claimed by the Owner. Unless otherwise provided for in the Contract Documents all materials disposed of by the Contractor shall be disposed of in areas provided by the Contractor.

PAYMENT

a. The work specified under this Section shall be paid for under the following pay items: **Pipe Culvert** (sizes specified).

PAY QUANTITY

a. The pay quantity for the work specified under this Section shall be the **linear feet** of the pipe identified in the applicable pay items, satisfactorily completed and accepted.

BASIS OF PAYMENT

a. The quantities determined as specified above shall be paid for at the contract price per **linear feet**.

CURB AND GUTTER

Concrete

The work specified under this Section consists of the construction of concrete curb, drop curb, curb and gutter, header curb (special), valley gutter, and shoulder gutter in accordance with the requirements of Section 520 of the Florida Department of Transportation (FDOT) *Standard Specifications for Road and Bridge Construction*, *July 2019 edition*, except as amended herein, and applicable drawings of the Florida Department of Transportation (FDOT) *Standard Plans for Road and Bridge Construction (FY2018 – 2019),* Pinellas County Standard Details, latest edition, and the details and notes shown on the Plans.

Job-mix design formulas for all Portland Cement Concrete, of the type specified, shall be submitted at least 14 days prior to use on the project. The submitted formulas shall be derived or approved by the Owner and/or its agents. All concrete mix designs shall meet FDOT Concrete Class mix guidelines, except as follows:

> WHEN APPROVED, IN WRITING, BY THE ENGINEER, an Alternate Class I Concrete mix design formula, for concrete curb and gutter to be placed by automated curb machines, may show, as a substitution for #57 aggregate, an amount of #89 aggregate not to exceed 33 percent, by weight, of the #57 aggregate.

The work specified under this Section shall include the construction of all curb and gutter transitions called for on the Plans in accordance with the details shown or referenced on the Plans, the furnishing and placement of all required Reinforcing Steel, and the furnishing and construction of all necessary forms.

The work specified under this Section shall also include all labor, equipment, and materials needed for furnishing and installation of all welded wire for concrete header as shown on the Plans.

PAYMENT

a. The work specified under this Section shall be paid for under the following pay items: **Concrete Curb, Type D**, **Concrete Header**, and **Concrete Curb, Type A P.C.E.D. 1305**.

PAY QUANTITY

a. The pay quantity for the work specified under this Section shall be the number of **linear feet** of curbs identified in the applicable pay items actually constructed and accepted. Payment for the quantities determined as specified herein shall constitute full compensation for all work specified under this Section.

BASIS OF PAYMENT

a. The curb quantities determined as specified above shall be paid for at the contract price per **linear feet.**

RIPRAP

The work specified under this Section consists of the construction of riprap in accordance with Section 530 of the Florida Department of Transportation (FDOT) *Standard Specifications for Road and Bridge Construction, July 2019 edition* and Florida Department of Transportation (FDOT) *Roadway and Traffic Design Standards*, applicable edition, except as amended herein. Materials and construction shall conform to the requirements of Sections 530 and 902 of the Florida Department of Transportation (FDOT) *Standard Specifications for Road and Bridge Construction, July 2019 edition*, except as amended herein, and such additional requirements as may be shown on the Plans, applicable drawings of the FDOT *Roadway and Traffic Design Standards*, applicable edition.

The work specified under this Section shall include the furnishing and placement of all riprap as shown on the Plans or as directed by the Engineer, all dewatering, excavation, backfilling, filter fabric, all labor and materials required to restore the work site and affected property and facilities to a condition acceptable to the Engineer, and the disposal of all surplus materials not claimed by the Owner. Unless otherwise provided for in the Contract Documents all materials disposed of by the Contractor shall be disposed of in areas provided by the Contractor.

PAYMENT

a. The work specified under this Section shall be paid for under the following pay items:
Riprap (types specified).

PAY QUANTITY

a. The pay quantity for the work specified under this Section shall be the **tons** of **Riprap** (types specified) identified in the applicable pay items, satisfactorily completed and accepted.

BASIS OF PAYMENT

a. The quantities determined as specified above shall be paid for at the contract price per **ton**.

FENCING

FDOT Type B

The work specified in this Section consists of the construction of chain link fencing, removal and resetting of existing chain link fencing, and the furnishing and installation of cantilever gates as shown in the Plans. If shown in the Plans, the work in this Section shall also include vinyl coated fence fabric, extra-length posts and top rails.

The construction of Fencing under this Section shall conform to the applicable provisions of Section 550 of the Florida Department of Transportation (FDOT) *Standard Specifications for Road and Bridge Construction*, *July 2019 edition*, and the FDOT *Standard Plans for Road and Bridge Construction (FY2018 – 2019)*, as amended herein, and the lines, grades, dimensions and notes shown in the Plans. Fencing shall be constructed to the heights specified in the Plans.

The construction of Cantilever Gates under this Section shall conform to the applicable requirements of Section 550 of the FDOT Specifications and the FDOT *Standard Plans for Road and Bridge Construction (FY2018 – 2019)*, as amended herein, and the details and notes shown in the Plans. Cantilever gates shall be of the type specified in the Plans (i.e., swing, slide, etc).

Removal and Resetting Existing Chain Link Fencing

Removal of existing chain link fencing should start from a corner and proceed to the next corner post. The Contractor shall roll existing chain link fencing and store/secure until final grading and sodding is complete within area(s) designated for existing chain link fence resetting, as shown in the Plans.

Resetting the existing chain link fencing, gates, posts and required mounting hardware shall conform to the applicable provisions of Section 520 and 550 of (FDOT) *Standard Specifications for Road and Bridge Construction*, *July 2019 edition*, and the FDOT *Standard Plans for Road and Bridge Construction (FY2018 – 2019)*, as amended herein.

The work specified in this section consists of all labor, materials, and equipment needed to reset the existing chain link fencing (and gate(s)) as shown in the Plans.

PAYMENT

a. The work specified under this Section shall be paid for under the pay items for **Fencing Reset Existing** (types specified) & **Fence Gate** (types specified).

PAY QUANTITY

a. The pay quantity for **Fencing Reset Existing** (types specified) shall be the **linear feet** quantity & the pay quantity for **Fence Gates** (types specified) shall be the **each** quantity, which shall include all work described and specified herein.

BASIS OF PAYMENT

a. The work specified under this Section shall be paid for at the contract price per **linear feet** and per **each.**

PERFORMANCE TURF, SOD

Including Watering and Fertilizer

The work specified under this Section consists of the furnishing and placement of grass sod including all water and fertilizer within the limits shown on the Plans, over all disturbed areas and in such other areas as the Engineer may direct. The furnishing and placement of sod shall conform to the requirements of Section 570 of the Florida Department of Transportation (FDOT) *Standard Specifications for Road and Bridge Construction, July 2019 edition*, except as amended herein, and, where specified herein or on the Plans, applicable standard drawings of the Florida Department of Transportation (FDOT) *Standard Plans for Road and Bridge Construction (FY2018 – 2019).*

The work under this section includes labor, equipment and materials for furnishing and installation of hydroseed, in accordance with Section 570 of the Florida Department of Transportation (FDOT) *Standard Specifications for Road and Bridge Construction, July 2019 edition.*

The Contractor will backfill areas to be sodded with clean fill to maintain proper grade of the planting area, and the sod shall be properly cut-in and tamped.

Sod stabilization shall occur within 72 hours of achieving final grade. All slopes steeper than 3:1 shall include sod stapling or staking.

Water for sodding shall be applied per the FDOT Standard Specifications for Road and Bridge Construction, Section 570.

PAYMENT

a. The work specified under this Section shall be paid for under the pay items for **Performance Turf** (types specified), including watering and fertilizer.

PAY QUANTITY

a. The pay quantity for the work specified under this Section shall be the number of **square yards** of **Performance Turf** (types specified), includes watering and fertilizer, of the types specified in the applicable pay items, actually placed and accepted. This pay quantity shall include all required water and fertilizer, excavation of the trench for the sod, and the satisfactory disposal of excavated material. No payment shall be made for unauthorized areas of sodding, and no additional allowance shall be made for furnishing and applying the fertilizer and water necessary to establish the growth of sodding. All sod shall be Bahia or shall match existing as directed by the Engineer.

BASIS OF PAYMENT

a. **Performance Turf** shall be paid for at the contract price per **square yard**.

SINGLE POST SIGN

The work specified under this Section consists of furnishing all labor, materials, equipment, and incidentals for performing all operations necessary to locate, remove, and relocate an existing single post sign within the limits shown on the Plans.

The sign relocation shall conform to the requirements of Section 700 of the Florida Department of Transportation (FDOT) *Standard Specifications for Road and Bridge Construction*, *July 2019 edition*, except as amended herein, the details and notes shown on the Plans, and, when specified herein or on the Plans, applicable drawings of the Florida Department of Transportation (FDOT) *Standard Plans for Road and Bridge Construction (FY2018 – 2019).*

The work specified under this Section also includes all sign panel(s), post(s) and foundation for a complete assembly. Includes panels, posts, foundation, and any other items attached to the assembly (beacon, solar panel, etc.), as noted in the plans. Relocation of signs will consist of removing the existing sign assembly and installing the sign on a new foundation at the location shown in the Plans. When the Plans call for existing ground-mounted signs to be relocated or removed, after removing the sign panel from the assembly, remove supports and footings. Restore the area of the sign removal or relocation to the condition of the adjacent area. Removed items become the property of the contractor, unless otherwise noted in the plans/specs.

PAYMENT

a. The work specified under this Section shall be paid for under the pay items for **Single Post Sign, Relocate, Single Post Sign, Remove, and Single Post Sign, F&I** (types specified).

PAY QUANTITY

a. The pay quantity for the work specified under this Section shall be per **Assembly** quantity**,** which shall include all work and materials described and specified herein.

BASIS OF PAYMENT

1. The work and quantities determined as specified above shall be paid for at the contract price per **Assembly**.

PAVEMENT MARKINGS

The work specified under this Section consists of the furnishing and installation of pavement markings. Painting traffic stripes shall be performed pursuant to Section 710 and thermoplastic traffic stripes and markings shall be performed pursuant to Section 711 of the Florida Department of Transportation (FDOT) *Standard Specifications, July 2019 edition*.

The work specified under this Section includes all cleaning and preparing of surfaces, furnishing of all labor, materials, application, curing and protection of all items, protection of traffic, furnishing of all tools, machines and equipment, and all incidentals necessary to complete the work.

PAYMENT

a. The work specified under this Section shall be paid for under the pay items for **Pavement Marking, Thermoplastic** (types specified).

PAY QUANTITY

a. The pay quantity for **Pavement Marking, Thermoplastic** (types specified) shall be the **linear feet** quantity, which shall include all work described and specified herein, satisfactorily completed and accepted.

BASIS OF PAYMENT

b. The work specified under this Section shall be paid for at the contract price per **linear feet**.

DETECTABLE WARNINGS

The work specified under this Section consists of furnishing all labor, materials, equipment, and incidentals for performing all operations necessary to install detectable warnings on walking surfaces shown within the limits shown on the Plans.

The work specified under this Section shall conform to the requirements of Section 527 of the Florida Department of Transportation (FDOT) *Standard Specifications for Road and Bridge Construction, July 2019 edition*, except as amended herein, the details and notes shown on the Plans, and, when specified herein or on the Plans, applicable drawings of the Florida Department of Transportation (FDOT) *Standard Plans for Road and Bridge Construction (FY2018 – 2019)*.

The work specified under this Section shall be in accordance with the Americans with Disabilities Act Accessibility Guidelines (ADAAG) Section 4.29.2. Detectable warnings may consist of tiles, pavers or mats. Use detectable warnings with size and pattern as shown in the plans comprised of truncated domes aligned in parallel rows in accordance within Standard Plans Index 522-002 of the Florida Department of Transportation (FDOT) *Standard Plans for Road and Bridge Construction (FY2018 – 2019)*. Do not use detectable warnings with a diagonal pattern. Mats shall not be the adhesive/glued down type. However, thermo-type/torch down thermoplastic mat applications and other types (i.e., anchored), in accordance with FDOT specifications, shall be acceptable.

Contractor shall prepare the surface and install detectable warnings in accordance with the detectable warning manufacturer's recommendations and instructions, using materials and/or equipment recommended and approved by the manufacturer, for adherence to cementitious substrate surfaces. Mortar topping [351-2(d) Materials] shall not be used. The quantities to be paid for will be:

1. Detectable warnings that are applied to curb ramps will be paid per square feet for each detectable warning that is furnished, installed and accepted.

Contractor shall submit for review and approval by the Engineer, certification that detectable warnings planned for use meet the requirements of FDOT Section 527-2.2 "Material Properties" as well as manufacturer's installation recommendations and instructions. The City reserves the right to select which product can be utilized. Tactile surfaces shall be colored black.

PAYMENT

a. The work specified under this Section shall be paid for under the pay items for **Detectable Warnings**.

PAY QUANTITY

a. The pay quantity for the work specified under this Section shall be per **square foot** quantity**,** which shall include all work and materials described and specified herein.

BASIS OF PAYMENT

a. The work and quantities determined as specified above shall be paid for at the contract price per **square foot**.

SHEETING & BRACING

The work specified under this Section consists of the construction of Sheeting and Bracing for trenches, retaining walls, etc., for the purpose of preventing injury to workers, damage to completed work, or disturbance of or damage to adjacent areas and existing structures and facilities resulting from the collapse of trench walls.

It shall be the responsibility of the Contractor to provide adequate Sheeting and Bracing for all trenching operations where such is required pursuant to applicable Federal, State, County and Municipal regulations. Additionally, the Contractor shall construct such Sheeting and Bracing as may be called for on the Plans, or directed by the Engineer during construction operations, for the protection of adjacent areas and existing structures and facilities.

The construction of all Sheeting and Bracing shall conform to the requirements of all applicable Federal, State, County and Municipal regulations.

The design, methods of installation, and adequacy of Sheeting and Bracing shall be, and shall remain, solely the responsibility of the Contractor. At the Contractor's option, and at no additional expense to the City, a trench box may be substituted as approved by the Engineer.

In general, sheeting and bracing shall be removed as the trench is backfilled, in such manner as to prevent the collapse of trench walls or the disturbance of or damage to adjacent areas and existing structures and facilities. The voids left by the extraction of the sheeting and bracing shall be carefully filled by jetting, ramming or other means. The Contractor’s removal of sheeting or bracing shall not relieve the Contractor of the responsibility for damages resulting from the premature removal of sheeting and bracing.

The Engineer may order, in writing, any or all sheeting or bracing to be left in place for the purpose of preventing injury to adjacent structures, property, etc. If left in place, such sheeting shall be cut off at the elevation specified by the Engineer, but in no case shall sheeting be cut off at an elevation higher than thirty-six (36) inches below the existing grade. Bracing remaining in place shall be driven in tight. The right of the Engineer to order sheeting and bracing to remain in place shall not be construed as creating any obligation on his part to issue such order.

PAYMENT

No separate measurement or payment will be made for sheeting and bracing. The cost for sheeting and bracing shall be included in the cost of other applicable pay items for which sheeting and bracing is required.

SANITARY GRAVITY SEWER

PART 1 – GENERAL

The information appearing hereafter is furnished for the benefit of the bidder in preparing his bid as some portions of it may or may not appear elsewhere in the bid documents or on the drawings.

1.01 Scope of Work

A. The Work includes furnishing all plant, labor, tools, equipment, materials, and performing all operations in connection with removal and construction of sanitary sewers and appurtenant structures, including excavation, trenching, backfilling and appurtenant work as required, or as directed.

1.02 Material Depth Limitations

A. Pipe materials used for gravity sewers shall be subject to the depth limitations in accordance with the City of Tarpon Spring's Standard Details.

PART 2 - PRODUCTS

2.01 Materials

A. All gravity sewer pipe and appurtenant materials used in the City of Tarpon Springs Sewer System shall be as specified in the latest version of the City of Tarpon Springs Utilities Material Specification Manual at the time of plan approval.

PART 3 – EXECUTION

3.01 Construction

A. Order of Work

1. The Engineer reserves the right to specify which sewer lines will receive priority in construction. In general, however, the work will be from the lower end of the sewer towards the upper end of the sewer.

B. Maintenance of Existing Sewerage Facilities

1. It is the responsibility of the Contractor to maintain operation of the existing sewerage facilities during construction and repair work. The Contractor shall be responsible for providing any equipment required to maintain operation of service during construction. Any damage done to any existing sewer pipe or structure is to be immediately repaired to a condition equal to, or better than, its original condition.

C. Location and Grade of Sewers

1. The line and the grade of the sewer, as well as the location of manholes, and all other appurtenances, shall be as shown on the Plans or, as directed by the Engineer. The grade line as given on the Plans indicates the grade of the invert of the sewer pipe.

D. Cutting Gravity Sewer Pipe

1. Cutting ductile iron pipe shall be field cut with a power saw. No impact cutting is permitted. The spigot end of pipe thus cut shall be filed or ground to form a bevel.
2. Cutting PVC sewer pipe may be field cut using hand or power saws in accordance with the manufacturer's recommendations. The raw spigot end thus formed shall be filed to remove gasket damaging burrs and to form a standard bevel.

E. Laying Gravity Sewers

1. Cut sheets for complete sections of the gravity sewers, as designated by the Engineer, shall be submitted by the Contractor to the Engineer for approval at least two days prior to construction. Each run of gravity sewer shall be represented on a separated cut sheet.
2. Installation of PVC pipe shall be per ASTM D-2321 and UNI-B-5.
3. Trench excavation shall be as specified in Section 125 of the Florida Department of Transportation (FDOT) *Standard Specifications for Road and Bridge Construction, July 2019 edition*.
4. Each pipe shall be laid true to line and grade so as to form a close concentric joint with the adjoining pipe, preventing offsets in the flow line. The trench bottom shall form a solid base for the entire length of pipe and shall be capable of supporting the full weight of the pipe and backfill material. The pipe bells shall not bear against the solid bottom of the ditch. Sewers will be inspected with mirrors at intervals during construction and corrected, if necessary, before backfill.
5. All wye units, stubs, or other fittings placed in lines for future connections, or services, shall have the open bell tightly plugged using pipe manufacturer’s recommended watertight plug. All plugs shall be capable of withstanding 4 psi internal air test pressure, yet permit easy removal for future use.
6. The open ends of all pipelines shall be kept securely plugged at the end of each day's work and at any other time when any operation is being carried out which might permit foreign materials, rock, dirt, etc. to enter the pipe. Pipelines shall be thoroughly flushed out upon their completion and when directed by the Engineer.

F. Joining Gravity Sewer Pipe

1. Gravity sewer pipe having factory fabricated joints shall be joined together in strict accordance with the manufacturer's specifications. The surface shall be wiped free of dust, dirt, gravel, or other foreign materials before joining. The spigot end shall be centered on grade into the bell end of the last downstream length of pipe, and properly seated.
2. When seating pipe with a pry, lever, or other approved device, care shall be taken to protect the pipe end from damage. Ends damaged in any manner shall be cause for rejection of the pipe.

G. Repair and Replacement Construction

1. All repair and replacement work shall conform to standards specified for new construction wherever applicable, or as specified in the Repair Specifications.

H. Removal of Existing Pipe

1. Existing pipe no longer in service that is removed from the system shall be disposed of properly by the Contractor. Openings in manholes, sewer lines, or wye branches remaining in place shall be properly plugged and sealed so as to eliminate any possibility of infiltration at the point of separation. All pieces of broken pipe shall be removed from the trench before backfilling operations commence. Backfill of the trench shall be as specified in STORM SEWERS. Inspection of structures remaining in place shall be made before backfilling.

3.01 Inspections of Lines and Manholes

A. Inspection of completed lines and manholes shall be scheduled within a reasonable time after construction or when required by the Engineer. Before scheduling an inspection, the Contractor shall prepare the lines by cleaning and flushing. Manholes shall be clean, finished and free of leaks.

B. Manholes shall be on a true and uniform grade. The inverts shall have a smooth steel troweled finish. All benches shall be uniformly sloping. The frames shall be tight and properly set in mortar on solid

masonry. The invert, benches and adjacent pipe shall be free of splattered mortar. All required interior lining or paint shall be kept intact. Manhole frames shall be adjusted to grade with the covers and frames cleaned and free of mortar and asphaltic mixtures. All precast manhole seams shall be filled with an approved asphaltic compound.

C. Pipe between manholes shall be true to line and grade. Dips and sags with one inch or more of trapped water shall be cause for rejection. Inspection shall be by mirror and sunlight and shall be followed by television inspection at the Contractor's/Developer's expense. Air testing may be required also at the Contractor's/Developer's expense. Contractor shall provide personnel to assist with inspections.

D. The Contractor shall provide City of Tarpon Springs Utilities Department with a Television Inspection of the completed gravity sewers in accordance with the following:

1. Shall be performed by a NASSCO PACP Certified Operator who will use software that is compatible with Granite XP latest version software to NASSCO PACP Standards.
2. Shall be submitted as digital media that includes video and data base file in PACP format and include a printed copy of the PACP television inspection log.
3. Shall perform a manhole inspection and provide a completed NASSCO Manhole Inspection form latest version for each manhole that is connected to the sewer being inspected.
4. All pertinent data recorded in audio on the media to include:
    a. Street name.
    b. Manhole numbers (these numbers must match manhole numbers on “as built” drawings).
    c. Date
    d. Size and material of pipe
    e. Service connection locations, right or left
    f. All distances between manholes
    g. Locations of suspected obvious pipe deficiencies (i.e., bad joints, breaks or leaks, etc.)
5. PVC pipe shall have a deflection test using a seven and one-half percent 1 (go-no-go) test mandrel of appropriate size, which shall be visible on video at all times.
6. The printed NASSCO PACP television report (indicating manhole numbers) which will accompany the media. This written report must include:
    a. Manhole numbers (these numbers must match manhole numbers on "as-built" drawings).
    b. Service connection locations, right or left.
    c. Reference to service connection locations out of manholes.
    d. Locations of suspected and obvious pipe deficiencies (i.e., bad joints, breaks or leaks, etc.).
    e. Depth of each manhole.
    f. Actual measured distance (on ground) between manholes.
7. All visual and television inspections shall be completed and approved by City of Tarpon Springs Utilities Department after the road base has been constructed but prior to the placing of any asphalt.
8. Television Inspection Media must clearly show details of structural defects, misalignments and infiltration.

E. All known or indicated breaks shall be repaired by the Contractor regardless of the test allowances. Faulty sections of sewer lines, manholes, or service connections rejected by the Engineer shall be removed and re-laid by the Contractor. Sunken manholes will not be accepted.

3.03 Service Connections – Wye Units and Service Pipe

A. In new sewer construction, D.I.P. and PVC service connections shall be made by means of a wye or tee. All joints connected to the wye unit shall remain flexible. Service connections on existing mains shall be made using a sewer saddle approved in the City of Tarpon Spring’s Standard Details.

B. All new sewer service connections shall have a continuous looped trace wire consisting of one (1) 14-gauge minimum solid copper or one (1) 12- gauge copper clad steel tracer wires taped to the top center of the pipe from the cleanout to the main line and back to the cleanout in accordance with the City of Tarpon Spring's Standard Details. Tracer wire shall be in accordance with the City's Standard Details.
C. Service pipe for all properties shall be laid to the property line and plugged, as shown on the City's Standard Details. All ends of service lines shall be marked by a permanent stake and where sidewalks or curbs are located nearby, by a chiseled mark cut in the sidewalk or curb. Service pipe shall have a protective cover of not less forty-two (42) inches under all roads and thirty-six (36) inches at all property lines. Inspection of service pipe shall be made before backfill. Service pipe shall have a visibly good line and grade. Shallow service shall be laid by using a four foot hand level with proper shim attached to one end.
D. In cases of extra depth where service pipe cannot be laid on a continuous grade to the property line, the Contractor shall then furnish all materials and construct risers as shown on the Plans. When pipe cannot be adequately supported on undisturbed earth, it shall be supported on a concrete cradle. No payment will be made for concrete required to correct conditions resulting from faulty construction methods or negligence.

3.04 Service Reconnections
A. Service reconnections require adapters for all joints that will not connect properly with ordinary factory joints. Approved pipe cutting methods shall be used to cut any pipe required for the connection. All cut pipe will be ground and smoothed to remove snags and sharp edges. No mortar or collars shall be used on reconnections unless specifically approved by the Engineer.

3.05 Adjusting Existing Service Cleanouts
The work specified under this Section also includes furnishing of all labor, materials, tools, machines and equipment, and all incidentals necessary to complete the adjustment of existing sewer service cleanouts to final grade. Payment to be made under **Utility Fixtures – Misc (LS)**.

3.06 Joining New Pipe to Old Pipe
A. Joining polyvinyl chloride pipe to existing vitrified clay pipe requires an adapter approved by the City of Tarpon Springs for all joints that will not connect properly with ordinary factory joints. Approved pipe cutting methods must be used to cut any pipe required for the connection. All cut pipe shall be ground and smoothed to remove snags and sharp edges. No mortar or collars shall be used for such connections unless approved by the Engineer.

3.07 Joining Pipe to Manholes or Other Structures
A. All manhole connection holes shall be core drilled with a maximum hole diameter not to exceed one and a half times the pipe diameter.
B. Approved standard groutable PVC-to-manhole fitting approved in the City of Tarpon Spring's Standard Details, or a flexible rubber boot may also be used at the manhole connection. The boot shall be manufactured of neoprene or isoprene compounds formulated and tested to resist deterioration due to sewage, hydrogen sulfide, oils, fats, greases, petroleum products and by-products. The connection at the manhole wall shall be flexible and 6 water-tight. Any annular space inside the manhole at the connection shall be filled with approved caulking material or joint filler.
C. Pipe connections to existing manholes shall be made so that finished work will conform, as nearly as possible, to the essential requirements for new manhole construction, as specified above. Drop

connections on existing manholes shall be strengthened by use of eight #6 pins, placed around the drop elbow and tee, or inside PVC drops may be used.
D. Section includes labor and materials for non-shrink grout.

3.08 Adjusting Existing Manholes
The work specified under this Section also includes furnishing of all labor, materials, tools, machines and equipment, and all incidentals necessary to complete the adjustment of existing sewer manhole rims to final roadway grade. Payment to be made under **Sewer Manhole, Adjust Rim (LS)**.

3.09 Water Main Storm Drain Crossings
A. In all cases where sanitary sewer mains cross water mains, or storm sewers with a minimum clear distance between the sanitary sewer and the water main or storm sewer of less than twelve (12) inches, the sanitary sewer shall be ductile iron pipe for a distance of ten feet on either side of the point of crossing. No pipe joint shall occur within ten (10) feet of the crossed water main.

3.10 Steel Casing (Sleeves)
A. All road crossings requiring casings for this project shall be constructed in accordance with the requirements of the Florida Department of Transportation, the City of Tarpon Springs, Pinellas County, and the conditions of the applicable permits for each crossing.
B. The Contractor shall provide all subsurface soils investigations as required by the DOT utilities Accommodation Guide and submit the subsurface investigation reports to the agency in jurisdiction, as required, with a copy to the Engineer, prior to beginning installation.
C. Carrier pipes shall have mechanical joints or push-on joints and be supported to prevent damages to either carrier or casing pipe. Upon satisfactory installation and pressure test of carrier pipe and pipe supports, the annular space between the pipe and casing shall be filled with clean sand. Ends of casing pipe shall be sealed with brick and mortar after installation of carrier pipe and sand.
D. The installation of the casing, pipe and appurtenances shall be in accordance with the details shown on the Drawings.
E. Casing pipe shall be steel pipe that conforms to the requirements of ASTM A 139, Grade A and have a yield strength of 35,000 psi. Joints for steel casing shall be single butt weld and shall conform to AWWA C 206. Casing pipe wall thickness in inches shall not be less than that listed in the following table. The casing pipe shall be coated externally with coal tar primer followed by hot coal tar enamel in accordance with AWWA C 203.

Roadway Crossings (County and FDOT)

Nominal Outside Diameter	*Nominal Thickness
12 or less	0.188
14 - 16	0.281
20	0.343
24	0.406
30	0.469
36	0.531

* Minimum thickness for pipe diameter not shown shall be the same as required for the next larger size listed above.

PAYMENT

a. The work specified under this Section shall be paid for under the pay items for **Utility Pipe, Remove & Dispose** (types specified), **Utility Pipe - PVC Sewer**, **Utility Fixtures – Misc.**, and **Sewer Manhole, Adjust Rim**.

PAY QUANTITY

a. The pay quantity for **Utility Pipe, Remove & Dispose** (types specified) & **Utility Pipe - PVC Sewer** shall be the **linear feet** quantity; the pay quantity for **Utility Fixtures – Misc.** and **Sewer Manhole, Adjust Rim** shall be the **lump sum** quantity, all of which shall include all work described and specified herein, satisfactorily completed and accepted.

BASIS OF PAYMENT

c. The work specified under this Section shall be paid for at the contract price per **linear feet**, & **lump sum.**

SANITARY MANHOLE

PART 1 - GENERAL

1.01 SCOPE OF WORK

A. The intent of this section is to address all work, including all labor, tools, equipment, materials, and performing all operations pertaining to the installation of sanitary manholes.

B. All details of work pertaining to materials and construction methods shall conform to the requirements of Section 570 of the *Florida Department of Transportation (FDOT) Standard Specifications for Road and Bridge Construction, July 2019 edition.*

1.02 SUBMITTALS

A. All materials and procedures required to establish compliance with the Specifications shall be submitted to the City/Engineer for review/approval.

B. Submittals shall include at least the following:

1. Descriptive literature, bulletins and/or catalogs of materials.

2. Work procedures including flow diversion plan, method of repair, etc.

3. As-Built survey on completed structures.

1.03 SUBSTITUTIONS

A. Only after execution of the contract will the City/ Engineer consider requests from Contractor for substitutions. Substitutions will be considered only when a product becomes unavailable due to no fault of Contractor.

B. Items identified as “equal” shall be accompanied by product literature and a written itemized comparison of the published specifications (feature by feature from the manufacturer’s literature) for the item specified and for the item proposed. The burden of proof of “equality” shall be on the supplier.

C. Request constitutes a representation that Contractor:

1. Has investigated proposed product and determined that it meets or exceeds, in all respects, specified product.
2. Will provide the same warranty for substitution as for specified product.
3. Will coordinate installation and make other changes which may be required for Work to be complete in all respects.
4. Waives claims for additional costs which may subsequently become apparent.

D. Substitutions will not be considered when they are indicated or implied on shop drawing or product data submittals without separate written request, or when acceptance will require substantial revision of Contract Documents.

E. Engineer will determine acceptability of proposed substitution and will notify Contractor of acceptance or rejection in writing within a reasonable time.

1.04 PUMPING AND BYPASSING

A. When pumping and bypassing is required or ordered by the Engineer, the Contractor shall supply the pumps, conduits, and other equipment to divert the flow of sewage around the pipeline on which work is to be performed. The bypass system shall be of sufficient capacity to handle existing peak flow plus additional flow that may occur during a rainstorm. The Contractor will be responsible for furnishing the necessary labor and supervision to set up and operate the pumping and bypassing system.

B. When flow in a sewer line is plugged, blocked, or bypassed, sufficient precautions must be taken to protect the sewer lines from damage that might result from sewer surcharging. Further, precautions must be taken to ensure that sewer flow control operations do not cause flooding or damage to public or private property being served by the sewers involved. Under no circumstances shall sewage be discharged into/onto any place other than another sewer manhole or a piece of equipment designed to carry sewage. Any damage caused from the Contractor's neglect of these precautions is responsibility of the Contractor.

1.05 MANHOLE COATING

A. A coal tar epoxy protective coating, equal to Koppers 300M, shall be applied to the fillets and walls of precast concrete sanitary sewer manholes, 2 coats shall be applied to the inside of the manhole to yield a final dry thickness of 9 mils, and 1 coat shall be applied to all outside surfaces of the manhole.

PAYMENT

a. The work specified under this Section shall be paid for under the pay item for **Sewer Manhole** (type specified).

PAY QUANTITY

a. The pay quantity for **Sewer Manhole** (type specified) shall be the **each** quantity, all of which shall include all work described and specified herein, satisfactorily completed and accepted.

BASIS OF PAYMENT

d. The work specified under this Section shall be paid for at the contract price per **each.**

POTABLE WATER SYSTEM

The work specified under this Section shall include furnishing all plant, labor, equipment and materials, in performing all operations in connection with construction of water mains and appurtenances, including all excavations, sheeting and bracing, #57 crushed stone bedding material as directed by the Engineer, backfilling, fire hydrant assembly, compaction, pressure testing, disinfection, tapping, adjustments to finish grade, fittings/valves/meters, and accessories, concrete thrust blocks, jointing material, polyethylene wraps, flushing and cleaning with polyurethane foam pig, complete and ready for use in accordance with the latest Specifications of the American Water Works Association and the applicable plans, and subject to the terms and conditions of the Contract.

Potable water PVC pipe shall be blue in color. Reclaimed water PVC shall be lavender in color.

The Contractor shall provide a complete disinfected, tested, and operating system including pipe, pipe fittings, thrust blocks or restrained joints, valves, valve boxes, meters, meter boxes, fire hydrants and appurtenances.

Materials and construction pertaining to construction of water distribution systems shall be in accordance with American Water Works Association (AWWA) standards.

Materials and construction pertaining to restoration and construction of roads and structures shall be in accordance with the latest edition of the Florida Department of Transportation (FDOT) *Standard Specifications for Road and Bridge Construction, July 2019 edition*.

All mains shall be cleaned and flushed to remove all sand and other foreign matter. The Contractor shall clean all mains using at least one pass of a polyurethane foam pig. The Contractor shall be responsible for developing a flushing plan to be submitted to the Engineer for approval prior to flushing. The Contractor shall dispose of all water used for cleaning and flushing without causing a nuisance or property damage. All debris shall be captured and removed from the system at the nearest accessible location.

The information appearing hereafter is furnished for the benefit of the bidder in preparing his bid as some portions of it may or may not appear elsewhere in the bid documents or on the drawings.

The Contractor will be given as much latitude and assistance as possible in planning and coordinating his work, however, all work required to properly achieve the objective of the project must be carried out and be consistent with good construction practices normally observed throughout the industry.

It will be the responsibility of the Contractor to locate all existing sewer laterals, water service lines, storm drains, sewer mains, water mains, and all other underground facilities etc. sufficiently in advance of the trench excavation to minimize the possibility of disruption of utility services. The Contractor shall also maintain a sufficient amount of repair components on hand to make emergency and/or permanent repairs to any utility line accidentally broken.

Repairs to water mains will be made with approved special compression type clamps or couplings similar to those manufactured by Dresser Industries.

Special attention and care will be required to assure that the bedding of the PVC pipe is in accordance with the manufacturer's recommendations. Special bedding and backfill materials may be required in those areas where the excavated material is deemed unsuitable by the Engineer.

Where references are made to Federal, ASTM, AWWA, ANSI or other Specifications or standards, they are deemed to mean the latest revision of such reference that is in effect on the date of the bid opening.

All materials and accessories shall be fabricated with the highest quality workmanship, and suitable for the service for which they are intended. All materials shall be new and shall not have been in service at any time prior to their installation on this project. If necessary, for the convenience of the Contractor, used materials (plugs, valves, etc.) may be used temporarily to expedite or facilitate construction, or in any tests related to the project, however, such materials must be removed and shall not be incorporated into the project construction.

Tests

All materials shall be tested in accordance with the applicable Federal, AWWA or ASTM Specification. Certified copies of tests shall accompany each shipment and non-compliance with this provision shall be a basis for rejection. In addition, each shipment may be subject to inspection by the Engineer.

Regardless of the above-required certification, if during construction, cracks, visible flaws, or any other type of defect that will impair or affect the proper operation of the facility are found, such defect will be rejected by the Engineer and removed from the project work site.

Field pressure tests by the Contractor shall be conducted on the main and tapping sleeve(s) and valve(s) and shall be conducted in the presence of the Engineer or authorized City of Tarpon Springs representative. A minimum of two (2) days notice shall be given before starting the tests.

Wet Taps

After the installation of a tapping sleeve(s) and valve(s) and prior to the tapping operation, the installed unit shall be tested for leakage by applying a minimum test pressure of 150 psi. The test pressure shall be held for a period of one (1) hour after the pressure source has been removed, with no evidence of leakage for acceptance.

Water Mains and Fire Lines

No testing shall be done until all concrete thrust blocking is in place and set. If high-early strength concrete is used, testing may be conducted 48 hours after the concrete is placed; otherwise thrust block concrete must cure 5 days before pressure testing commences. In testing, the part of the system under test shall be filled with water and subjected to a sustained pressure of 150 pounds per square inch for water mains and 200 psi for fire lines. The piping shall be tested in sections, thereby testing each valve for secure closure. While the system is being filled, air shall be carefully and completely exhausted. If permanent air vents are not located at all high points, the Contractor shall install corporation stops or fittings and valves at such points so the air can be expelled as the pipe system is slowly filled with water.

Test pressure shall be maintained for at least two (2) hours and until all sections under test have been checked for evidence of leakage. Rate of loss shall not exceed that specified in the following paragraph "Allowable

Limits for Leakage." Visible leaks shall be corrected regardless of total leakage shown by test. Testing shall be in accordance with the applicable provisions of AWWA Standard C-600, Section 13.

All pumps, gauges and measuring devices shall be furnished, installed and operated by the Contractor and all such equipment and devices and their installations shall be approved by the Engineer. All pressure and leakage testing shall be done in the presence of a representative of the Owner and/or the Engineer upon 48-hours notice.

Water for testing and flushing shall be potable water provided and purchased by the Contractor from a source approved by the Engineer.

Allowable Limits For Leakage

The hydrostatic pressure tests shall be performed as herein above specified and no installation, or section thereof, will be acceptable until the leakage is less than the number of gallons per hour as determined by the formula:

$$L = \frac{ND(P^{.5})}{7400}$$

in which, L = Allowable leakage, in gallons per hour
N = Approximate number of joints in the section of main being tested
D = Pipe diameter; in inches
P = Average test pressure during the test, in psi gauge

Pipe of 500 feet or less in length will be allowed zero leakage.

Water shall be supplied to the main during the test period as required to maintain the test pressure as specified. The quantity used, which shall be compared to the above allowable quantity, shall be measured by pumping from a calibrated container. A 5/8-inch meter installed on the discharge side of the pump may be used to measure the leakage for large mains when approved by the Engineer. All hydrostatic leakage tests shall be recorded on the form presented at the end of this Section.

Disinfection of Water Distribution System

All improvements, additions or repairs to the potable water system, the main and related appurtenances shall be thoroughly flushed, disinfected and sterilized prior to being placed into service (as determined by Pinellas County Health Dept.).

Prior to the introduction of a disinfecting agent or solution, the main shall be thoroughly flushed with the use of a foam pig to remove foreign materials until the water flows clear from the discharged point at the end of the line.

The disinfection agent shall be free chlorine in an aqueous solution and shall conform to AWWA Specification C-651 or as approved by Pinellas County Health Dept.

The disinfecting solution shall be of sufficient strength to provide a minimum chlorine concentration of 75 mg/L and shall remain in the main for a minimum of twelve (12) hours before it is flushed out. After the

above disinfecting process has been completed, the line shall be flushed until the residual chlorine content of the water is less than 0.5 mg/L, measured by standard method using the orthotolidine procedure. All new valves installed in the line shall be opened and closed during the flushing operation.

After the new installation has been disinfected and flushed, the City shall take water samples in sterile containers from the line at the location(s) designated by the Engineer for delivery to the State or County agency having jurisdiction for bacterial content determination of public water supplies. If the result of the examination of any of the samples are unsatisfactory, the disinfection and flushing process shall be repeated as many times as necessary until satisfactory test results are obtained.

Prior to the disinfection, flushing and collection and delivery of the water samples, the Contractor should check with State or County agency having jurisdiction to be certain the procedures or methods outlined above are also in conformance with responsible agency directives that may be in effect. The Contractor must obtain confirmation of acceptable bacterial tests from the appropriate agency before the new main is placed in service.

Pinellas County Public Health Unit Permit Requirements

Temporary blow-offs, gate valves and/or sample taps shall be installed by the Contractor at locations specified on the Pinellas County Public Health Unit approved construction plans. The Contractor shall comply with all applicable provisions of the permit.

Valves

All valves shall be suitable for the intended service with bubble tight shut-off to flow in either direction.

GATE VALVES

Valves less than three (3) inch nominal size

The valves shall conform to Federal Specifications WW-V-54d, Class A, Type 1, wedge disk, non-rising stem gate valves. Rating shall be a minimum of 125 pound steam working pressure (SWP) and 200 pound cold water pressure rating. The valve body, bonnet, bonnet ring, packing nut, and disk shall be bronze conforming to ASTM B-62. The valve stem shall be silicon bronze alloy conforming to ASTM B-371. The packing shall be Teflon-impregnated asbestos. The handwheel shall be malleable iron, with handwheel nut to be zinc-plated steel. The valve shall be repackable under pressure. Valve shall be counterclockwise opening with a clear waterway opening for the full nominal diameter of the valve. Each valve shall have manufacturer's identification and pressure ratings cast upon the body. Each valve shall be tested under hydrostatic pressure or pneumatic pressure of at least twice the rated working pressure. Valves shall be manufactured by Lunkenheimer Company, or approved equal.

Valves of three (3) inch nominal size and larger

The gate valves shall be of iron body, resilient seated design conforming to AWWA C-509. The valve shall be designed for bubble tight shut-off to flow in either direction. The valve design shall incorporate a non-rising stem, O-ring stem seals, and shall open counterclockwise. The valve interior shall be fully coated with a corrosion resistant polymer coating approved for potable water service. Valves shall be equipped with standard 2-inch square operating nuts. Valves shall be furnished with all jointing accessories. Approved manufacturers are Mueller, Kennedy, Clow or approved equal.

AIR RELEASE VALVES

Air release valves shall be of the compound lever type and shall be capable of automatically releasing accumulated air from a fluid system while that system is in operation and under pressure. Valves shall be Val-Matic Valve and Manufacturing Corp. Model 38, or approved equal.

To assure tight shut-off, a viton orifice button shall be used to seal the valve discharge orifice when the valve is in a closed position. The orifice diameter will be sized for use within a given operating pressure range to ensure maximum discharge capacity.

The body and cover shall be of cast iron. The gasket shall be of Buna-N. With the exception of the viton orifice button, the leverage mechanism, float, and all other internal trim shall be of stainless steel. The cover bolts shall be of stainless steel.

The stainless steel float shall be designed to and shall be capable of withstanding a pressure of 1,000 psi. The air release valves shall have a 1-inch NPT inlet connection, and a 3/32-inch orifice. The outlet size shall be 1/2 inch NPT.

Valves shall be rated for a working pressure of 150 psi. They shall be piped into an assembly including a ball valve connection as indicated on the Plans. All ball valves for use on air release piping shall be bronze body and shall conform to Federal Specification WW-V-35B, Type II, Class A, Style 3, end connection. Valves shall be Watts Regulator Company Series B-6100, or approved equal.

All pipes and fittings used in the unit assembly shall be galvanized steel pipe, bonderized for painting. The exterior surfaces of the valves shall be sandblasted and primed by the manufacturer. Final painting shall be performed in the field by the Contractor following installation and shall be two coats of Koppers Glamertex 501 enamel or approved equal.

Waterproof Cabinet

The cabinet minimum dimensions shall be 32 inches high, 20 inches wide, and 14 inches deep. The cabinet shall be manufactured of 0.125-inch minimum 5052 alloy sheet aluminum with Smooth Natural Finish. The door hinge shall be 2 inches wide, continuous with a 3/16 inch pin manufactured of stainless steel. The door gasket shall be cellular neoprene, 1 inch wide and 1/4 inch thick. The door shall have a 3-point locking system with Corbin lock. All cabinets shall have identical locks so that one key will open all locks, including existing C.O.D. air release cabinets (D.O.T. No. 2 key). The Contractor shall ensure that all keys provided with the cabinets are received by the Owner prior to completion of work. The door shall also be furnished with a 2-position doorstop for fixing the door open at either 90 or 120 degrees. Cabinet ventilation will be provided by 1-inch diameter holes in the top, louvered vents on the door, and a 3 by 1 inch drain slot on the left side of the cabinet wall. All vents and drain holes, and any opening in the cabinet wall on top, shall be covered with aluminum screen, permanently and continuously attached from the inside.

The cabinet shall be fastened securely to the concrete pad with 4 - 3/4-inch stainless steel anchor bolts. The cabinet shall be Type III as manufactured by Suncoast Metal Fabricators of Tampa, Florida, or approved equal. Concrete and reinforcing steel shall conform to current Florida Department of Transportation (DOT) Standard Specifications (Latest Revisions). Concrete slab shall be 6 inches thick with no. 4 steel bars, 6 inches on center, each way.

The cabinet shall be furnished with a 3 by ¾-inch stainless steel nameplate with engraved or etched lettering.

Valve Installation
Valves shall be placed at the locations indicated on the Contract Plans or as otherwise directed by the Engineer and valve boxes shall be furnished and installed for each buried valve.

The valve boxes shall be the cast iron extension type with a cast iron cover with the proper extension sections suitable for the particular locations indicated.

The valve boxes shall be installed plumb and centered over the valve wrench nut or hand wheel. The valve box shall be installed in such a manner that any shock will not be transmitted to the body of the valve and the top of the cover shall be set slightly above the finished ground surface unless directed otherwise. Where boxes are located in paved areas, the box cover shall be sealed and set flush with the pavement surface.

When valves, fittings, plugs, etc. are being installed, it shall be accomplished in the same manner as outlined for cleaning, laying and joining the pipe. In addition to reaction backing, mega-lug 1100 series for DIP or approved equal shall be provided on all valves and fittings. Reaction backing shall be either pre-cast or poured-in-place concrete having a 28 day, 2500 psi compressive strength. The backing shall be placed between solid ground and the fittings and installed in such a manner that the pipe and fitting joints will be accessible for repair.

Backfilling may be necessary in some instances (heavy traffic areas) prior to testing, however, this does not relieve the Contractor of his responsibility of full compliance with the applicable Specifications.

Valve Removal
The work specified in this section consists of all labor, materials, and equipment needed to partially remove potable water main valves associated with the existing water mains that are to be abandoned as shown in the Plans.

Ductile Iron Pipe and Fittings
Iron pipe used on this project shall be ductile iron designed for a minimum working pressure of 150 psi.

All pipe, regardless of type, shall be for potable water use and shall comply with all applicable standards for such use. All ductile iron pipes to be encased in concrete shall be encased in polyethylene material with a minimum of 8-mil thickness in accordance with the latest edition of AWWA C-105-72.

Ductile iron pipe shall be of a design in conformance with ANSI specification A21.51 and AWWA C-151 and appropriate for the type of pressure service and use specified above. The minimum wall thickness shall be Class 50 unless otherwise specified. The pipe shall be asphalt coated on the outside and shall have a bituminous seal coat over a thin coat cement mortar lining on the inside. The cement lining shall conform to AWWA C-104.

Fittings shall be coated and lined as specified for the pipe above. The fittings shall be rated for the operating pressure specified for the pipeline in which they will be installed, joints and gaskets of the type suitable for use with the pipe being used, suitable for potable water service, and conform to AWWA C-153. The coating

shall be continuous and smooth, strongly adherent and neither sticky nor brittle when exposed to heat or cold. All fittings shall be mechanical joint type.

Mechanical and push-on joints shall conform to AWWA C-111-64. Joint glands shall be ductile iron with bolts conforming to the preceding referenced joint standard. The joint gaskets and lubricant shall also conform to the referenced standard, and if requested, a certificate of approval as to non-toxic, bacteria growth and odor or taste imparting characteristics shall be furnished for presentation to the State Department of Health. The lubricant shall be furnished in factory sealed containers with labels bearing the manufacturer's name and trademark or trade name and shall be that recommended by the pipe manufacturer. Flanged ductile iron pipe shall have a minimum thickness of class 53 except that the thickness of pipe with screwed flanges shall be not less than 0.37 inch. Flanges with long hubs shall be screwed on the threaded end in the shop. The face of the flange and the end of the pipe shall be refaced together. There shall be no leakage through the pipe threads, and the flanges shall be designed to prevent corrosion of the threads from the outside. Flanges shall meet the requirements of ANSI B16.1, 125 pound and shall be faced and drilled to that standard. Where tap or stud bolts are required, flanges shall be tapped. Gaskets for flanged joints shall be shall be of the full faced type meeting the requirements of ANSI B16.21. Gaskets shall be rubber with cloth insertion, as made by the Crane Co., Garlock Packing Co., U.S. Rubber Co., or approved equal.

Bolts and nuts for mechanical joints, flanged joints and restrainers shall be Grade B, ASTM A-307, low alloy, high strength steel equal to "Acipolly", "Usalloy", "Corten", or 304 stainless steel and conform to ANSI B16.1 for Class 125.

Pipe and fittings exposed to view shall be shop primed on the outside with 1 coat Koppers 622-LCF Primer on properly prepared unprimed metal and 2 coats Koppers Glamortex 501 Enamel, colored to match existing piping.

PVC Pressure Pipe and Fittings

PIPE

Polyvinyl chloride pipe smaller than two inches shall conform to the requirements of ASTM Designation D-1785, Latest Revision, Class 1120 or 1220, Schedule 80 pipe with a minimum pressure rating of 400 psi at 23 C (73.4 F) for unthreaded pipe.

Polyvinyl chloride pipe two inches and three inches in diameter shall conform to the requirements of ASTM Designation D 2241, Latest Revision, Class 1120 or 1220 (SDR 21) for a minimum pressure rating of 200 psi at 23 C (73.4 F), for unthreaded pipe.

Polyvinyl chloride pipe four inches to 12 inches in diameter shall conform to the requirements of AWWA C-900, Latest Revision. It shall have the same O.D. as cast and ductile iron pipe and be compatible for use without special adapters with cast iron fittings.

All pipe shall have laying lengths of twenty (20) feet and shall have a dimension ratio (DR) of 18 with the exception of 4" pipe.

Polyvinyl chloride pipe 14 inches to 24 inches shall conform to the requirements of UNI-BELL-B-11 "Polyvinyl Chloride (PVC) Pressure Pipe" and AWWA C-905. All 235-psi pressure rated pipe shall meet the requirements of DR 18.

All pipes shall be suitable for use as pressure conduit. Provisions must be made for expansion and contraction of each joint with an elastomeric ring. The bell shall consist of an integral wall section with a bonded-in, solid cross section elastomeric ring that meets the requirements of ASTM F-477. The bell section shall be designed to be at least as strong as the pipe wall.

All PVC pipe shall bear the approval seal of the National Sanitation Foundation (NSF) that will remain legible during normal handling, storage and installation.

FITTINGS

Fittings for PVC pipe smaller than two inches shall be Schedule 80 PVC with solvent weld or threaded joints and conform to the requirements of ASTM Designation D-2467, Latest Revision, and D-2464, Latest Revision, respectively.

Fittings for PVC pipe three inches to 24 inches shall be ductile iron fittings. Ductile iron fittings shall be mechanical joint with a minimum pressure rating of 350 or higher PSI, and shall conform to the requirements of ANSI Standard A 21.53.

All PVC pipe fittings shall bear the approval seal of the National Sanitation Foundation (NSF) for potable water pipe.

Bolts and nuts for mechanical joints and restrainers shall be Grade B, ASTM A-307, low alloy, high strength steel equal to "Acipolly", "Usalloy", "Corten", or 304 stainless steel and conform to ANSI B16.1 for Class 125.

JOINTS

PVC pipe two inches and larger shall have provisions for expansion and contraction provided in the joints. All joints, except solvent weld and threaded joints, shall be designed for push-on makeup connection. A push-on joint may be coupling manufactured as an integral part of the pipe barrel consisting of a thickened section with an expanded bell with a groove to retain a rubber sealing ring of uniform cross section similar and equal to Johns Manville Ring-Tite and Ethyl Bell Ring, or may be made with a separate twin gasketed coupling similar and equal to Certainteed Fluid-Tite.

Joints in PVC pipe smaller than two inches shall be solvent welded in accordance with the recommendations of the pipe manufacturer using the solvent welding compound non-sulphur based, furnished with the pipe, or shall be threaded. Threaded joints shall be used only with Schedule 80 pipe, or better. At threaded joints between PVC and metal pipes, the metal shall contain the socket end and the PVC side the spigot. A metal spigot shall not, under any circumstances, be screwed into a PVC socket.

Polyethylene Pipe and Fittings

Polyethylene pipe resins shall be high-performance, high-molecular weight, high-density polyethylene conforming to ASTM D-1248 (Type III, Class C, Category 5, Grade P34) and ASTM D-3550 (cell classification PE 345434C) otherwise designated as PE 3408 and ASTM F-714. The pipe and fittings shall

be compounded with a minimum of 2% carbon black to withstand outdoor exposure without loss of properties. Pipe and fittings shall have a pressure class of at least 200 psi, meeting the requirements of Standard Dimension Ratio (SDR) 9. Where required, flange connections shall be provided with a full-face neoprene gasket. Flanges shall be made of the same material as the pipe. Each pipe length shall be marked with the manufacturer's name or trademark, size, material code, and pressure class.

Steel Pipe

All steel pipe shall be hot-dipped, zinc coated galvanized, grade A, electric resistance welded, schedule 40 conforming to ASTM Designation A-120. All joints shall be threaded joints and shall be made up with an approved, nontoxic, non-hardening pipe joint compound applied to the male thread only. After having set up, a joint shall not be backed off unless the joint is completely broken, the threads cleaned and new compound applied. All joints shall be airtight. Fittings shall be galvanized malleable iron, 300 psi service rating.

Pipe exterior shall be field coated with two coats of Koppers Glamortex 501 enamel or approved equal, after surface has been prepared with Koppers 40 passivator or Koppers 30 metal conditioner or approved equal.

All exposed threads, wrench marks, or other damage to the zinc coating shall be protected per above coating system.

Service Saddles and Tapping Sleeves

Service saddles shall be wide single flexible band and shall have a ductile iron body with a min. 12-mil nylon coating. Straps, studs and hardware shall be a minimum 304 stainless steel. Service Saddles shall be model FC 202 as manufactured by Ford, or approved equal.

Tapping sleeves shall consist of two sections of min. 3/8-inch welded steel, ASTM A-285 Grade C, which bolt together on the pipe and seal against a concave wedge gasket around the tap opening. The sleeve body shall have a fused bonded epoxy coating and nuts and bolts shall be 304 stainless steel. Tapping sleeves shall be Rockwell 622 or approved equal.

Taps into existing mains are to be at the 10:00 or 2:00 position.

Corporation Stops and Curb Stops: Corporation stops and curb stops shall be brass, equipped with connections compatible with the connecting service pipe type, in accordance with AWWA Standard C-800. Corporation stops shall be Type F-1100, as manufactured by the Ford Meter Box Co., or approved equal. Curb stops for single services shall be Catalog Number B94-324W, or approved equal. All curb stops shall be furnished with provisions for locking.

Polyethylene Tubing

Polyethylene tubing for service lines shall be municipal service tubing copper tube sized and approved by the National Sanitation Foundation for use in transmitting fluids for human consumption. The tubing shall be designed for a minimum burst pressure of 630 psi for water at 23^{o} C (73.4^{o} F). Tubing shall be manufactured in accordance with the requirements of ASTM Designation D-2737, Latest Revision, SDR 9, 200 PSI, PE 3408 as manufactured by Yardley or approved equal.

Fittings shall be brass, equipped with compression type connections, such as "Insta-Tite" as manufactured by Mueller Company, Decatur, Illinois, or approved equal.

Temporary Blow-offs

Temporary blow-offs shall be installed for clearing the water mains. Blow-offs installed on water mains up to and including 10-inch shall be same diameter as the water mains. Blow-offs for water mains 12-inch and larger shall be 10-inches in diameter. Temporary blow-offs shall be removed and plugged after the main line cleared.

Fire Hydrants

Hydrants shall conform to A.W.W.A. Standard C-502 latest revision and specified herein. Hydrants shall be of the compression type, closing with line pressure. Hydrants shall be of the traffic model breakaway type. Hydrant cap and stuffing box shall be of a unitized, one-piece design creating a watertight cavity without the use of gaskets. The combination of three O-Rings to a crimped brass ferrule around the stem shall seal the cavity from contact with water. An alemite fitting shall be supplied for periodic lubrication of the opening threads with grease. Operating nut shall be of one-piece bronze construction. A dirt shield shall be provided to protect the operating mechanism from grit buildup and corrosion due to moisture. A thrust washer shall be supplied between the operating nut and stem lock nut to facilitate operation. Nozzles shall be of the tamper resistant, turn type with O-Ring seals and stainless steel retaining screws. An O-Ring shall be provided to seal between the upper and lower barrels. The main valve shall be of solid rubber reinforced with steel. The seat shall be of a bronze ring threaded to a bronze insert in the hydrant shoe, with O-Rings to seal the drainway and barrel from leakage of water in the shoe. Hydrant drain valve shall momentarily force flush with each operation. Drainway shall be of bronze. Drain valve facing shall be of synthetic rubber with a stainless steel retaining pin. All internal parts for the Fire Hydrant assembly are to be stainless steel. Approved manufacturers are Mueller, Kennedy, or Clow.

Note: A "Fire Hydrant Assembly" includes the fitting on the main, the connecting pipe fittings and valves.

Pipe Installation

The pipe shall be laid according to the indicated lines and grades with valves and fittings placed at the proper locations and restrained using Mega-Lug 1100 series for DIP, Series 2000 PV for PVC or approved equal, or specialty fittings if shown on plans. Water mains shall be laid with a minimum cover of 36 inches below finished grade unless otherwise indicated.

Pipe that is classified as flexible shall be bedded according to the manufacturer's recommendations true to line and with a uniform, continuous support on a firm base. No blocking of any type be used to support or bring the pipe to grade. Backfill shall be properly placed and compacted to provide lateral support and prevent distortion of the true diameter of the pipe.

Prior to starting the pipe laying operation the Contractor shall have available at the work site, all earth working and shoring equipment, hand tools, mechanical tampers, slings, pumps etc., necessary for proper and efficient installation.

All pipe, fittings, valves, etc., shall be carefully lowered into the trench or excavation. Rolling, dropping or dumping of materials into the trench is not acceptable. Strings of pipe shall not be fabricated on the surface for later placement in the trench.

Each section of pipe and each fitting shall be thoroughly examined for cracks, flaws, or other defects while the item is suspended prior to its final placement. Should any pipe, valve, fitting or pipe accessory be damaged during handling, it shall be brought to the attention of the Engineer and corrective repairs or rejection of the damaged item shall be based on his decision

Prior to placement of ductile iron or PVC pipe, the bell and spigot ends of each section shall be thoroughly cleaned to remove any excess coating, lumps of foreign material, etc. in order to assure a sound connection when joints are made. In the case of ductile iron pipe, the bell and spigot ends of the pipe shall be wire brushed and wiped clean of any dirt, grease, oil or other foreign material before the joint is made. All pipe joints shall be made up in strict accordance with manufacturer's instructions and recommendations.

During the process of installing the pipe, extreme care shall be taken to prevent any foreign material from entering the pipe. If necessary, depending upon the prevailing physical conditions, the Engineer may require both ends of the pipe to be covered or plugged before it is lifted and lowered into the trench.

No pipe will be laid when trench conditions are unsuitable. When the pipe is being installed it shall be laid with the bell ends facing the direction of laying and upstream of the flow direction, unless otherwise approved by the Engineer.

After a length of pipe is placed in the trench, the spigot end shall be centered in the bell and the pipe brought to grade and line and inserted to reference line. The pipe shall then be anchored to grade with well-tamped approved backfill material under the pipe haunches.

Cutting pipe for insertion of valves, fittings, etc., shall be done in a workmanlike manner with all cuts at right angles to the barrel of the pipe. All burrs and rough spots shall be removed to leave a smooth end, and where cement lined cast or ductile iron pipe is used, care shall be taken not to damage the cement lining. Fittings and valves shall be assembled onto DI and PVC pipe in strict conformance to the pipe manufacturer’s recommendations.

Where indicated, or if it becomes necessary to deflect the pipe from a true line or grade, either vertically or horizontally, the amount of deflection shall not exceed the maximum allowed as specified under AWWA C-600 for the type of pipe and joint being used.

Deflection of PVC pipe shall be done in strict conformance with pipe manufacturer’s recommendations. The properly assembled pipe shall have the spigot end reference mark flush with the end of the bell. The deflection angle for the 14 and through 24 inches diameter PVC pipe shall never exceed 1.5 degrees. Whenever the maximum joint deflection is not adequate to maintain the required alignment, fittings shall be used.

During periods when pipe is not being laid, both open ends of the line in place shall be sealed with a watertight plug.

Identification tape shall be installed 18 inches above installed pipe on a tamped backfill surface continuously over all water mains. The tape shall be a minimum of 2 inches wide and have a minimum tensile strength of 50 pounds. The tape shall also be the color blue, non-corrodible, and have the word "WATER" printed on it.

Fourteen (14) gauge single strand blue U.S.E. copper wire suitable for damp use shall be continuously installed on top of all PVC water mains. This wire shall be fastened to the top of the mains with a waterproof adhesive tape every 5 LF or less and at the vertex of fittings. Tape shall be able to withstand backfilling operations without breaking or causing wire to change position. Ends of wires shall be terminated in the water main valve box to the cover and sealed to prevent water intrusion. Wire splices shall be made with an approved underground splice kit such as manufactured by 3M Company, in which the crimp connector splice is completely sealed from water and air with a polyester resin. The wire shall be tested for continuity by the Contractor prior to owner acceptance.

Restrained Joints

Restrained joints shall be installed on all fittings, valves, caps, and plugs. All pipe joints within the distance indicated on the following table shall be restrained.

These distances shall apply to lengths of pipe on each side of the fitting. Tees and dead ends valve or capped shall be considered equivalent to 90° bends.

MINIMUM LENGTH (L) TO BE RESTRAINED ON EACH SIDE OF FITTING

Pipe Size	90° Bend	45° Bend	22.5° Bend	11.25° Bend
4	18	18	18	18
6	34	18	18	18
8	40	18	18	18
10	50	18	18	18
12	61	25	18	18
16	78	32	18	18

* L is measured in feet.
* Values for L are based on pipe installed in sandy soil.
* Values for L for pipe installed in silt, muck or peat shall be increased by 30%.
* When depth of soil cover is less than 2 feet, values for L shall be increased by 30%.

Restrained joints for D.I. pipe may be of types fabricated by the various manufacturers, upon approval by the Engineer of details submitted by the Contractor. Restrained joints that require field welding will not be acceptable, and the thickness of the pipe barrel remaining at grooves cut for restraint shall not be less than that required for the design wall thickness. Joint restrainers for PVC pipe shall be mega-lug 2000 PV series or approved equal.

Thrust Blocks

Concrete thrust blocks, pre-cast or poured, shall be placed at all bends, tees, plugs and other fittings to provide lateral support unless otherwise directed by the Engineer. Thrust blocks shall not interfere with joints and shall conform to the details shown on the drawings.

Steel Casing (Sleeves)

All road crossings requiring casings for this project shall be constructed in accordance with the requirements of the Florida Department of Transportation, Pinellas County Highway Department, and the conditions of the applicable permits for each crossing.

The Contractor shall provide all subsurface soils investigations as required by the DOT utilities Accommodation Guide and submit the subsurface investigation reports to the agency in jurisdiction, as required, with a copy to the Engineer, prior to beginning installation.

The water mains so designated to be installed under the pavement at the locations indicated on the Drawings shall be installed in casings. The steel casing shall conform to the requirements of the Florida Department of Transportation as outlined in Utility Accommodation Guide Procedure No. 592-400 and any supplements thereto. All work and materials shall be subject to inspection by the Department of Transportation, the Pinellas County Highway Department, depending on the jurisdiction. All property and surface conditions shall be restored to their original condition.

Carrier pipes for water shall have mechanical joints or push-on joints and be supported to prevent damages to either carrier or casing pipe. Upon satisfactory installation and pressure test of carrier pipe and pipe supports, the annular space between the pipe and casing shall be filled with clean sand. Ends of casing pipe shall be sealed with brick and mortar after installation of carrier pipe and sand.

The installation of the casing, pipe and appurtenances shall be in accordance with the details shown on the Drawings.

Casing pipe shall be steel pipe that conforms to the requirements of ASTM A-139, Grade A and have a yield strength of 35,000 psi. Joints for steel casing shall be single-butt weld and shall conform to AWWA C-206. Casing pipe wall thickness in inches shall not be less than that listed in the following table. The casing pipe shall be coated externally with coal-tar primer followed by hot coal-tar enamel in accordance with AWWA C-203.

Roadway Crossings (County and FDOT)

Nominal Outside Diameter	*Nominal Thickness
12 or less	0.188
14 - 16	0.281
20	0.343
24	0.406
30	0.469
36	0.531

* Minimum thickness for pipe diameter not shown shall be the same as required for the next larger size listed above.

Installation of Casing Carrier Pipe

When DIP pipe is installed in casings, sleeves must be used to prevent damage to the pipe and bell during installation and to provide proper long-term line support. The pipe in casing shall not rest on the bells. Skids shall be used to properly position the pipe in casing. Four skids shall be placed 45^{o} from the horizontal and 90^{o} apart. Skids may extend for the full length of the pipe, with the exception of the bell and spigot portion

required for assembly or may be spaced at intervals. Skids shall provide sufficient height to permit clearance between bell joint and casing wall. Skids shall be fastened securely to the pipe with 1-1/2 to 2-inch stainless steel straps. Over belling of pipe shall be prevented by installing end of skid flush with the spigot reference line.

The pipe shall be installed in the casing using (1) Winch drawn cable or (2) jacking. In both methods, the Contractor is to exercise care to avoid damage to the pipe and bell joints. Lubricants may be used to ease installation (drilling mud, flux soap, etc.), however, petroleum products shall not be used. Wooden skids shall be of pressure treated lumber. Under no circumstances shall creosote treated lumber be used.

Site and Earthwork

Before starting excavation, the Contractor shall make a thorough examination of the area to determine the exact location of any known or suspected underground structures or utilities, and use extreme care, including hand excavation, to prevent damage to these facilities during the construction process. Should obstructions not known or not indicated on the drawings be encountered that would necessitate an alteration of the plans, the Engineer will either order a deviation from the indicated line or grade or arrange for the relocation or the removal of the obstruction if possible. Where it is necessary to cross existing utilities (pipelines, cables, etc.) the grade or line shall be adjusted to provide the proper clearances required by Federal, State or local laws or ordinances.

Clearing, Grubbing, Trees and Shrubs

The Contractor shall only remove trees, shrubs and grass that interfere with the construction. All other vegetation shall be protected, preserved and/or replaced.

Shrubbery, trees and plants on private or public property shall be protected from damage during construction and shall be replaced with equivalent plantings by the Contractor if damaged by his activities.

Excavation and Backfill

The Contractor shall perform all excavation required to the depths shown on the detail sheet. Unless otherwise directed, excavations shall be made by open cut. Banks of excavation shall not be steeper than the angle of repose of the material being excavated. If the available space does not permit this slope, sheeting or appropriate trench box will be required. The Contractor shall provide adequate equipment for the removal of storm or subsurface waters. Existing facilities shall be carefully supported and protected from damage, and if damaged, shall be restored.

If existing earth is unsuitable for the proper installation of pipe, the Contractor will be required to remove such materials to the width and depth as directed by the Engineer and replace it with the proper, selected fill material. Select fill material will not be considered as a pay item.

Compaction tests shall be made at locations as directed by the Engineer and shown on plan details. All tests shall be paid for by the Contractor. Where unsatisfactory compaction is revealed by the tests, the Contractor shall re-excavate, backfill, re-compact and/or rework the backfill as required to obtain the required compaction over the entire depth.

The Contractor shall proceed with caution in the excavation and preparation of the trench, so that the exact location of underground structures, facilities and utilities, both known and unknown, may be determined, and

he shall furnish temporary or permanent support, protection and maintenance for such structures, facilities and utilities. In the event of damage, the Contractor shall arrange with the Owner of the structure, facility or utility to repair the damage. The Contractor shall pay all charges for such repair as required by respective utility.

The Contractor shall provide suitable equipment to cut pavements, excavate trenches and remove debris, and shall supply an adequate labor force to efficiently open and close the excavation within the required time frame. Hand tools shall be employed for excavating areas around existing subsurface installations if necessary.

Roads shall be kept open for traffic at all times. The Division of Traffic Control shall approve plans for maintenance of traffic prior to all pipe line work.

On completion of backfill, the Contractor shall ready the roadway sections to be paved, remove all debris, excess materials, barricades and temporary work leaving walkways and roads clear of obstructions.

Trenches

Trench excavation shall be such that the pipe can be laid to alignment and grade required. Since the grade encountered during construction may not be the finished grade of the work area, care shall be taken to place the water mains at the grades shown in the drawing profiles. Trenches shall be adequately shored and drained. Trench dewatering pumps shall discharge to natural drainage channels, drains or storm sewers and shall be adequate to remove accumulated storm and/or subsurface water. The Contractor shall prevent surface water from flowing into the trenches. Dewatering discharge locations shall be approved by the Engineer.

All excavated material retained for backfill shall be piled in such a manner as not to endanger the work or obstruct sidewalks, driveways or drainage. Fire hydrants, valve pit covers and boxes, curb stop boxes, fire and police call boxes and other utility controls shall be unobstructed and accessible at all times during construction.

The width of the trench from the top of the pipe to the trench bottom shall not exceed 12 inches on either side of the pipe. The width above the pipe may be as wide as practical while not interfering with existing utilities.

Trenches for 2-inch and smaller pipe shall be opened with a ditch-witch or comparable small ditching equipment. Ditching equipment may be tire or track mounted. If tracked equipment is used "walking boards" or other suitable means shall be used to protect pavement, sidewalk and curbs.

Trenches for pressurized pipelines shall be of a depth that will provide a minimum of 36 inches of cover over the barrel of the pipe, except as otherwise authorized or shown on design profiles. Additional trench depth required to clear conflicts shall not be cause for additional payments.

Where classified excavation is required, the rock shall be excavated to a minimum depth of 6 inches below the inverts shown. Over depths in rock excavations shall be refilled to grade with loose granular earth, lime rock, shell, or other acceptable material thoroughly compacted in place.

Whenever wet, unstable soil or muck that is determined by the Engineer to be incapable of properly supporting the pipe is encountered, such material shall be removed to the required depth and the trench refilled

to proper grade with loose granular moist earth, lime rock, shell, or other acceptable material thoroughly compacted in place.

The trench shall be dry when the bottom is prepared. A continuous trough shall be excavated to receive the bottom quadrants of the pipe barrel. Bell holes shall be excavated so that after placement only the barrel of the pipe receives bearing pressure from, and is uniformly supported by, the bottom of the trench. Preparation of the trench bottom and placement of the pipe shall be accomplished in such a manner that the final position of the pipe is true to line and grade and uniformly supported throughout the barrel of each length of pipe. The trench bottom disturbed by the disengagement and withdrawal of pipe slings or lifting tackle will be restored.

When pipe is placed in refill over rock or other over depth, additional backfilling of the same material shall be tamped below the haunches of the barrel to form a trough of firm bedding.

Excavation for appurtenances shall be made to a size that will allow at least 12 inches clearance at the embankment or shoring.

Pipe shall not be strung out along the job site but shall be properly stored and brought to the trench in a careful manner.

Backfill

The Contractor shall not perform any backfilling until the pipelines have been inspected and accepted by the Engineer.

Backfill material shall consist of earth, loam, sandy clay, sand, gravel, soft shale or other acceptable materials, free from organic materials, large clods of earth or stones. Where excavated material is not suitable for backfill, it shall be replaced by acceptable materials from other areas as directed by the Engineer.

Trenches within or across roadways or other areas to be paved shall be backfilled and compacted to their full depth. Compaction shall be to 98 percent minimum density as determined by the methods specified in AASHTO T180.

In non-traffic areas, material shall be deposited in 6-inch layers and thoroughly and carefully tamped until the pipe has a cover of not less than one foot. The remainder of the backfill shall be deposited in one-foot layers and thoroughly tamped. Water tamping will be permitted only when the water used is free draining and the water table is below the elevation of the fill and remains there during the period of water compaction. Where trenches are improperly backfilled or where settlement occurs, the trenches shall be re-opened to the depth required, refilled, re-compacted, and restored to the required grade.

The Contractor shall do all shoring and sheathing required to perform and protect the excavation, existing structures and personnel. The Contractor is responsible for all safety aspects of the project and must insure that all construction complies with all state and federal requirements for personnel including but not limited to OSHA requirements. All open trenches shall be barricaded per D.O.T. standards. Open trenches shall be limited in quantity to the extent possible.

Should subsurface water be encountered during the boring or trenching operations the Contractor shall provide the equipment to effectively dewater the excavated area to a point, and for such a period of time to prevent displacement of pipe, fittings, etc., and until all work in that immediate area is completed.

The surface of all excavated earthwork shall be shaped to conform to the original lines, grades or contours shown on the drawings. Excess earthen material must be removed from the work area. Spreading or "thin coating" as a means of disposing such material will not be permitted.
Drainage ditches and swales shall be restored to their original configuration, and where erosion control devices exist extreme care shall be taken in removing excess materials from the flow line. Hand dressing or grading may be required in certain areas where the use of mechanical equipment is not practical.

Pavement, Curbs and Gutters, Sidewalks
Pavement removal shall be held to the minimum width consistent with good construction practice. The pavement material shall be carefully separated from other excavated materials, and shall not be used as backfill. It shall be satisfactorily disposed of by the Contractor. Base material may be salvaged and stockpiled for reuse if approved by the Engineer.

Pavement removed shall be replaced as shown on plan details. Base and surface materials shall conform as closely as practicable in quality to the materials removed, or as superseded by base and surface composition, thickness and widths as specified on the Contract Plans. The edges of pavement restoration shall be cut to neat lines 1 foot beyond any settled or broken areas. Pavement shall be replaced as soon as practicable after compaction of the backfill. Workmanship and materials shall be in accordance with best standard practice for work of this type, and shall conform to all local requirements or Florida Department of Transportation (FDOT) standards (whichever is more restrictive) for new pavement construction.

Pipe crossings and installations along City and County streets and highways shall be made in accordance with the details shown on the Contract Plans, and in full compliance with applicable regulatory agency requirements. All materials and workmanship shall conform to governing agency Specifications. Florida State Road Department Standard Specifications shall apply where local agency has no specification.

Final and daily clean-up along the rights-of-way and repaired sections of the pavement shall be subject to the approval of the Engineer.

Curb and gutters shall be installed to the lines, grades and thickness shown. Where curb and gutters are replacements, they shall match the original construction in appearance. The concrete requirements shall be as specified in the Florida Department of Transportation (FDOT), *Standard Specification for Road and Bridge Construction,* current edition. The concrete shall be Class A (3000#).

Dewatering
All work under this section shall consist of complete dewatering of all excavations.

APPROVAL OF DEWATERING PLAN
At lease 10 days prior to the commencement of any dewatering activity, the Contractor shall submit to the Engineer for record purposes only, a detailed description of the proposed dewatering system. This plan shall include design computations, layout, type, and spacing of dewatering devices, number and size of pumps and other equipment, with a description of the installation and operating procedures.

QUALIFICATIONS OF WORKMEN

At least one person shall be provided who shall be present at all times during the execution of this portion of the work and who shall be thoroughly familiar with the dewatering system being installed, the referenced standards, the requirements of this work, and who shall direct all work performed under this section.

It shall be the responsibility of this Contractor to determine the water level at the time prior to beginning excavation and construction.

DEWATERING SYSTEM

The dewatering system shall be adequate to pre-drain the soils to be excavated to the extent that the piezometric water level in the construction area is a minimum of 2 feet below the bottom of the excavation trench, or bottom of the footings as indicated on the Contract Plans, at all times, or as otherwise required to obtain the specified compaction and installation conditions.

In the event of layered soils, the hydrostatic head in the zone below the subgrade elevation shall be relieved to prevent uplift.

Prior to any excavating below or within 2 feet above the groundwater level, a dewatering system shall be placed into operation to lower water levels to the extent specified previously, and then shall be operated continuously 24 hours per day, 7 days a week, until all work has been completed to the satisfaction of the Engineer.

Where used, well points shall be installed in an approved manner and in sufficient numbers to provide the necessary removal of water as stated previously. Well points and header piping shall be installed in such a manner that traffic on public thoroughfares and site access roads will not be impeded.

The Contractor shall be solely responsible for the arrangement, location, and depths of the dewatering system necessary to accomplish the specified work. The dewatering system shall stay in full operation until not less than 90 percent of the total building load is applied, as will be determined by the Engineer, or until excavations and trenches have been backfilled and compacted.

Whenever possible, exhaust from all pumps, and engine noise, shall be silenced and muffled to prevent excessive noise.

Wellpoint pump discharge shall be controlled to prevent erosion, undermining, and all other damage, and be piped to approved locations.

The Contractor shall comply with any and all applicable regulations and permitting requirements concerning groundwater pumpage and discharge.

CLEANUP

Upon completion of the dewatering work, the Contractor shall remove all equipment and leave the project site in a neat, clean, and acceptable condition, satisfactory to the Owner, Engineer or their agents. Wellpoint holes and excavations shall be adequately backfilled and compacted to prevent settlement.

PAYMENT

a. The work specified under this Section shall be paid for under the pay items for **Utility Pipe, Remove & Dispose** (types specified), **Utility Pipe - PVC Water**, **Utility Fixture** (types specified), **Fire Hydrant** (F&I), & **Fire Hydrant** (remove).

PAY QUANTITY

a. The pay quantity for **Utility Pipe, Remove & Dispose** (types specified) & **Utility Pipe - PVC Water** shall be the **linear feet** quantity; the pay quantity for **Fire Hydrant** (F&I) shall be the **each** quantity; and the pay quantity for **Utility Fixture** (types specified) shall be the **each** & **lump sum** quantity, and the pay quantity for **Fire Hydrant** (remove) shall be the **lump sum** quantity, all of which shall include all work described and specified herein, satisfactorily completed and accepted.

BASIS OF PAYMENT

The work specified under this Section shall be paid for at the contract price per **linear feet**, **each**, & **lump sum.**

GROUNDWATER CONTROL FOR OPEN CUT EXCAVATION

This section provides for furnishing all labor, materials, equipment, power and incidentals for performing all operations necessary to dewater, depressurize, drain and maintain excavations and foundation beds as described herein and as necessary for construction of structures and appurtenances. Included are installing, maintaining, operating and removing dewatering systems and other approved devices for the control of surface and groundwater during the construction of open cut excavations, tunneling, boring and jacking, or auger pits, structures and appurtenances, and protecting work against rising waters and repair of any resulting damage.

At least 10 days prior to the commencement of any dewatering activity, the Contractor shall submit to the Project Manager for record purposes only, a detailed description of the proposed dewatering system. This plan shall include design computations, layout, type, and spacing of dewatering devices, number and size of pumps and other equipment, with a description of the installation and operating procedures.

It is the sole responsibility of the Contractor to identify groundwater conditions and to provide any and all labor, material, equipment, techniques and methods to lower, control and handle the groundwater as necessary for his construction methods and to monitor the effectiveness of this installed system and its effect on adjacent facilities.

The Contractor shall operate, maintain and modify the system(s) as required to conform to these specifications. Upon completion of the construction, Contractor shall remove the system(s). The development, drilling and abandonment of all wells used in the dewatering system shall comply with regulations of the Florida Department of Environmental Protection and the Southwest Florida Water Management District.

The Contractor shall assume sole responsibility for dewatering systems and for all loss or damage resulting from partial or complete failure of protective measures and any settlement or resultant damage caused by the dewatering operation, except as otherwise provided in the General and Supplementary Conditions.

Dewatering shall conform to the applicable sections of the Florida Department of Transportation *Standard Specifications for Road and Bridge Construction, 2019 edition, except as amended herein.*

PAYMENT

a. No separate measurement or payment will be made for dewatering. The cost for dewatering shall be included in the cost of other applicable pay items.