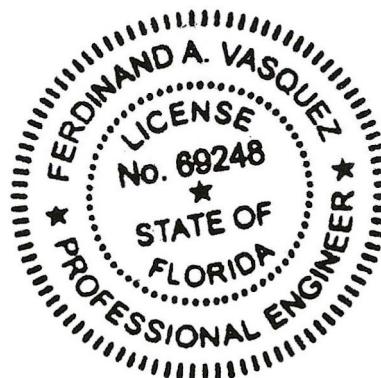


TECHNICAL SPECIFICATIONS

Technical Specifications
for
Unit Price Contract for Manhole
and Structures Rehabilitation
CIP #:55957



Ferdinand Vasquez
12/03/2024

Sarasota County
Capital Projects
1001 Sarasota Center Boulevard
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01026	Measurement and Payment
01310	Construction Schedule
01505	Mobilization
01550	Maintenance of Traffic (MOT)
02400	Sod Restoration
02539	Cleaning, Televising, Photographs and Assessment
02540	Ancillary Services
02757	Manhole and Structures Rehabilitation

SECTION 01026

MEASUREMENT AND PAYMENT

PART 1 - GENERAL

1.01 EXPLANATION AND DEFINITIONS

- A. The following explanation of the Measurement and Payment for the bid form items is made for information and guidance. The omission of reference to any item in this description shall not, however, alter the intent of the bid form or relieve the Contractor of the necessity of furnishing such as a part of the Contract at no additional cost to the County.

1.02 MEASUREMENT

- A. The quantities set forth in the bid form are approximate and are given to establish a uniform basis for the comparison of bids. The County reserves the right to increase, decrease, or eliminate the quantity of any class or portion of the work during the progress of construction in accordance with the terms of the Contract.

1.03 PAYMENT

- A. Payment for each Work Assignment shall be made at the Contract unit or negotiated unit price per item of work on the basis of the work actually performed, completed, and accepted by the County. Such work includes but is not limited to, the furnishing of all necessary plant, labor, materials, appurtenances, equipment, transportation, clean up, restoration of disturbed areas, and all other expenses to complete the construction and placing the work into operation, as described in the Work Assignment and Technical Specifications, and as directed by the County. All work shall comply with the current Sarasota County Utility Manual
- B. Payment for each item includes compensation for cleanup and restoration. Cleanup and surface restoration will be considered as ten percent (10%) of each pay item in the Work Assignment, and complete payment of each item will not be made until cleanup and restoration have been completed, and the final videos and logs are delivered and approved by the County.

1.04 MEASUREMENT AND PAYMENT OF LUMP SUM ITEMS

- A. Measurement and Payment for Lump Sum bid items will be made based on the approved Schedule of Values submitted by the Contractor. Monthly progress payments will be based on a percentage of the work completed, as approved by the County.

PART 2 – PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.01 PAY ITEMS

A1. Manhole and Structures Coating – Cementitious (Bid Items A1 (1-8)):

Measurement and Payment for furnishing and installing Manhole and Structures cementitious coating will be made at the Contract unit price as designated on the Bid Form for the various sizes and thickness indicated on the Price Schedule of the Bid Form, of acceptable coating material installed, and shall include all necessary mobilization, labor, tools, equipment, materials, bypass pumping, and maintenance of traffic (MOT) in residential areas required for the operation and installation of the cementitious coating. Separate payment shall be made for bypass pumping, maintenance of traffic (MOT) on arterial and FDOT roadways, the cleaning and interior surface preparation, and televising or providing photographs and assessment of the manholes and structures in the manner specified in the Technical Specifications and as indicated in the Price Schedule of the Bid Form. Measurement of the installed coating shall be to the nearest vertical or square foot for each manhole coated.

A2. Manhole and Structures Coating – Polyurethane (Bid Items A2 (1-16)):

Measurement and Payment for furnishing and installing Manhole and Structures polyurethane resin based coating over a cementitious buildup will be made at the Contract unit price as designated on the Bid Form for the various sizes and thicknesses indicated on the Price Schedule of the Bid Form, of acceptable coating material installed, and shall include all necessary mobilization, labor, tools, equipment, materials, and maintenance of traffic (MOT) in residential areas required for the operation and installation of the polyurethane resin based coating. Separate payment shall be made for cementitious buildup, bypass pumping, maintenance of traffic (MOT) on arterial and FDOT roadways, the cleaning and interior surface preparation, and televising or providing photographs and assessment of the manholes and structures in the manner specified in the Technical Specifications and as indicated in the Price Schedule of the Bid Form. Measurement of the installed coating shall be to the nearest vertical or square foot for each manhole coated.

A3. Manhole and Structures Coating – Epoxy (Bid Items A3 (1 – 13)):

Measurement and Payment for furnishing and installing Manhole and Structures high build epoxy resin based coating over a cementitious buildup will be made at the Contract unit price as designated on the Bid Form for the various sizes and thickness indicated on the Price Schedule of the Bid Form, of acceptable coating material installed, and shall include all necessary mobilization, labor, tools, equipment, materials, and maintenance of traffic (MOT) in residential areas required for the operation and installation of the high build epoxy resin based coating. Separate payment shall be made for the cementitious buildup, bypass pumping, maintenance of traffic (MOT) on arterial and FDOT roadways, the cleaning and interior surface preparation and televising or providing photographs and assessment of the manholes and structures in the manner specified in

the Technical Specifications and as indicated in the Price Schedule of the Bid Form. Measurement of the installed coating shall be to the nearest vertical or square foot for each manhole coated.

A4. Manhole and Structures Coating- Geopolymer Mortar (Bid Items A4 (1 – 8)):

Measurement and Payment for furnishing and installing Manhole and Structures geopolymer mortar coating will be made at the Contract unit price as designated on the Bid Form for the various sizes and thickness indicated on the Price Schedule of the Bid Form, of acceptable coating material installed, and shall include all necessary mobilization, labor, tools, equipment, materials, bypass pumping, and maintenance of traffic (MOT) in residential areas required for the operation and installation of the cementitious coating. Separate payment shall be made for bypass pumping, maintenance of traffic (MOT) on arterial and FDOT roadways, the cleaning and interior surface preparation, and televising or providing photographs and assessment of the manholes and structures in the manner specified in the Technical Specifications and as indicated in the Price Schedule of the Bid Form. Measurement of the installed coating shall be to the nearest vertical or square foot for each manhole coated.

B. Manhole and Structures Repair (Bid Items A1 (9-23), A2 (17-31), A3 (14-28), A4 (9-23)):

Measurement and Payment for furnishing and installing manhole and structures interior surface preparation, infiltration control, and repair and/or replacement of deteriorated structure sections will be made at the Contract unit price as designated on the Bid Form for the various items indicated on the Price Schedule of the Bid Form, of acceptable existing liner system removal; patching and profiling; infiltration control; bonding compound; bench and invert channel repair; chimney repair/replacement; rim and cover replacement; and rain water protector and shall include all necessary labor, tools, equipment, materials, , and maintenance of traffic (MOT) in residential areas required for the acceptable installation, surface restoration (paved or grassed areas), and completion of each item.

Removal of Existing Lining System (excluding T-Lock or similar lining) (Bid Item A1 (9), A2 (17), A3 (14), A4 (9)), will be measured and paid for acceptable removal and proper disposal of the existing lining system (excluding T-Lock or similar lining) per square foot (S.F.) of manhole and structures as directed by the County.

Removal of Existing T-Lock or Similar Lining System (Bid Item A1 (10), A2 (18), A3 (15), A4 (10)), will be measured and paid for acceptable removal and proper disposal of the existing T-Lock or similar lining system per square foot (S.F.) of manhole and structures as directed by the County.

Patching and Profiling – Cementitious Grout Only (Bid Item A1 (11), A2 (19), A3 (16), A4 (11)) will be measured and paid for acceptable patching and profiling per square foot as specified in the Technical Specifications and as directed by the County.

Infiltration Control – Cementitious or Chemical Grout (Bid Items A1 (12), A2 (20), A3 (17), A4 (12)), will be measured and paid for acceptable grouting, per gallon as specified in the Technical Specifications and as directed by the County.

Bonding Compound (Bid Item A1 (13), A2 (21), A3 (18), A4 (13)), will be measured and paid for acceptable bonding compound per gallon as specified in the Technical Specifications and as directed by the County.

Bench and Invert Channel Repair (Bid Item A1 (14), A2 (22), A3 (19), A4 (14)), will be measured and paid for acceptable repairs per linear foot as specified in the Technical Specifications and as directed by the County.

Chimney Repairs or Replacement (Bid Items A1 (15-16), A2 (23-24), A3 (20-21), A4 (15-16)), will be measured and paid for acceptable repairs or replacement per vertical foot as specified in the Technical Specifications and as directed by the County.

Manhole Rim and Cover Raised (Bid Items A1 (17-18), A2 (25-26), A3 (22-23), A4 (17-18)), will be measured and paid for acceptable adjustments per each based on required lift increase, as specified in the Technical Specifications and is directed by the County.

Rim and Cover Replacement (Bid Items A1 (19-20), A2 (27-28), A3 (24-25), A4 (19-20)), will be measured and paid for acceptable replacement per each based on required surface repairs, as specified in the Technical Specifications and as directed by the County.

Seam Extrusion Welding (Bid Item A1 (21), A2 (29), A3 (26), A4 (21)), will be measured and paid for acceptable welding of seams per linear foot. The Contractor shall furnish all labor, materials, equipment, supervision, and necessary ancillaries as specified, and directed by the Engineer, for seam extrusion welding, and disposal of materials. All work shall be performed as per the manufacturer's specifications.

Fusion Welding of Pipe Boot (Bid Item A1 (22), A2 (30), A3 (27), A4 (22)), will be measured and paid for acceptable fusion welding of pipe boot per each. The Contractor shall furnish all labor, materials, equipment, supervision, and necessary ancillaries as specified, and directed by the Engineer for fusion welding of pipe boot and disposal of materials. All work shall be performed as per the manufacturer's specifications.

Install Rain Water Protector (Bid Item A1 (23), A2 (31), A3 (28), A4 (23)), will be measured and paid at the applicable Contract unit price bid for each rain water protector insert installed as listed on the Bid Form. Payment will be made for each rain water protector insert installed and shall represent full compensation for all labor, material, and equipment required to complete this Bid Item.

C. **Cleaning, Televising and Assessment (Bid Items A1 (24-28), A2 (32-36), A3 (29-33), A4 (24-28))**: Measurement and Payment for Cleaning, Televising/Photographs, and Assessment of the existing

manholes and structures directed by the County will be made at the **Contract unit price per Each** for (Pre- and Post-Video and/or Pictures for each manhole or structure will be considered as one) the various conditions and work classifications indicated on the Price Schedule of the Bid Form and as defined in the Technical Specifications. Price includes all necessary labor, tools, equipment, and materials required for the Cleaning and Televising/Photographs Operations and for the removal and proper disposal of roots and the debris resulting from the Cleaning Operation. Price also includes supplying the County with two (2) copies of the digitized pre and post rehabilitation audio-video record in USB flash drive format or digital photographs (USB flash drive); two (2) copies of the Cleaning and Inspection Logs; and three (3) copies of the final assessment report, as specified in the Technical Specifications.

GPS Mapping shall be delivered in ESRI Geodatabase format as specified in the Technical Specifications for the **County requested manhole locations** with payment made at the **Contract unit price per Each** manhole mapped.

D. Ancillary Services (Bid Items A1 (29-36), A2 (37-44), A3 (34-41), A4 (29-36)):

Bypass Pumping (Bid Items A1 (29-31), A2 (37-39), A3 (34-36), A4 (29-31)): Measurement and Payment for bypass pumping will be made at the **Contract unit price per Day** for the various pump sizes indicated on the Price Schedule of the Bid Form, as approved by the County, and as defined in the Technical Specifications. This price shall include mobilizing and demobilizing the bypass pumping system and providing sewage bypass pumping for the distance pumped over the time period required to repair and coat the manholes and structures indicated in each Work Assignment. This price shall also include all necessary labor, equipment, including back-up pumps, tools, material, including pressure rated conduit, and power, including fuel, necessary for furnishing, installing, operating, maintaining, decommissioning and removing an approved bypass pumping system to divert sewage flow around the manholes and structures to be repaired and coated, in accordance with the Technical Specifications. The use of flow through plugs in lieu of bypass pumping will be considered as incidental to the lining installation and not paid separately.

Bypass Pumper Truck and Vac-Truck (Bid Items A1 (32-33), A2 (40-41), A3 (37-38), A4 (32-33)): Measurement and Payment for bypass Pumper Truck and Vac-Truck will be made at the **Contract unit price per Hour** the trucks are on the project site for bypassing operations as approved by the County. This price shall include mobilizing and demobilizing, equipment, and providing sewage bypassing for the time period the vehicles are required on-site, there will be no compensation for idle time. This price shall also include all necessary labor, equipment, tools, material, fuel, and proper disposal of water as necessary for an approved bypass system for sewage flow around the manholes and structures to be

repaired and coated, in accordance with the Technical Specifications. The time to mobilize, demobilize and dispose of water will not be paid as an hourly rate. Note these bid items are for bypassing operations only and not for cleaning structures which would be incidental to that work.

Maintenance of Traffic (MOT) Bid Items A1 (34-35), A2 (42-43), A3 (39-40), A4 (34-35): Measurement and Payment shall be made at the **Contract unit price per each** for the Maintenance of Traffic (MOT) Plan associated with each Work Assignment. Work components listed on the Price Schedule of the Bid Form will be measured and paid as indicated. This price includes preparing a maintenance of traffic plan for each project work site affected by the Contractor's operations. The price also includes obtaining construction permits and approvals; construction and maintenance of any necessary detour facilities; providing of personnel and facilities to guide traffic safely around the work; providing access to residences and businesses along the project; furnishing, installing and maintaining of traffic control barricades, railings, warning lights, and other safety devices during construction; the control of dust; the immediate clean-up of any spills; and any other special requirements needed for the safe and expeditious movements of traffic as defined in the Technical Specifications, as directed by the County, and as approved by the agency(s) governing traffic safety in specific work areas. Payment will be made for MOT for arterial and FDOT roadways. These roadway systems are defined as follows:

Arterial roadways are streets with speed limits higher than 35 mph and up to and including 50 mph. Arterial roadways may be two lane or multilane highways.

FDOT roadways are streets within FDOT right-of-way or with speed limits above 50 mph.

Maintenance of Traffic for commercial, industrial, and residential streets (speed limits 35 mph or less) shall be considered incidental to other work and shall be included in the provided pay items above. No separate payment will be made for MOT for these streets.

Emergency Mobilization (Bid Item A1 (36), A2 (44), A3 (41), A4 (36)): Measurement and Payment for emergency mobilization will be made at the **Contract unit price per Each** as indicated on the Price Schedule of the Bid Form, as approved by the County, and as defined in the Technical Specifications. This price shall include mobilizing and demobilizing all equipment and materials required to complete the emergency work, in accordance with the Technical Specifications.

END OF SECTION

SECTION 01310

CONSTRUCTION SCHEDULE

PART I - GENERAL

1.01 DESCRIPTION OF REQUIREMENTS

- A. Within ten days of the issuance of the Notice to Proceed for each Work Assignments, the Contractor shall prepare and submit to the County for review and approval, a construction progress schedule for the work. This schedule shall be based on calendar days, with sub-schedules of related activities, which are essential to its progress. The project duration shown on the schedule shall not exceed the time indicated on the individual Work Assignment.
- B. Contractor shall submit revised progress schedules on a monthly basis. No partial payments shall be approved until there is an approved updated construction progress schedule in hand.
- C. The Contractor shall designate an authorized representative of his firm who shall develop and maintain the construction schedule and progress and payment reports. This representative of the Contractor shall be responsible to the Contractor's Representative, who shall have the authority to act on behalf of the Contractor in fulfilling the commitments of the Construction schedules.
- D. The project schedule software shall be compatible with the latest County software.
- E. The progress schedule shall demonstrate compliance with the Contract Document requirements utilizing a Critical Path Method (CPM) precedence method schedule to coordinate, plan, schedule, and perform the work (including the activities of subcontractors and suppliers).

1.02 FORM OF SCHEDULES

- A. The Contractor shall prepare schedules in the form acceptable to the County.
 - 1) Provide a separate horizontal bar for each activity of the Work Assignment.
 - 2) Horizontal time scale: In weeks from start of construction and identify the first work day of each month. The schedule shall identify the day, month, and year of starting and finishing each activity.
 - 3) Scale and spacing: To allow space for notations and future revisions.
 - 4) Minimum sheet size: 8 1/2 inches X 11 inches.
 - 5) Maximum sheet size: 11 inches X 17 inches.

B. Format of listings: The chronological order of the start of each item of work for each Work Assignment.

1.03 CONTENT OF SCHEDULES

- A. Show the complete sequence of construction by activity including:
 - 1) Activity beginning and ending date
 - 2) Duration
 - 3) Early start date
 - 4) Early finish date
 - 5) Activity float and total float
 - 6) Predecessor
 - 7) Successor
- B. Show the dates for the beginning of and completion of each major element of construction in no more than a one-week increment scale.
- C. Show projected percentage of completion for each item, as of the first day of each month.
- D. The schedule shall clearly identify the project's critical path. Provide a list of all long lead items (equipment, materials, etc.) with anticipated delivery dates to the County.

1.04 PROGRESS REVISIONS

- A. Indicate progress of each activity as of the date of revision.
- B. Show changes occurring since previous revision of schedule:
 - 1) Major changes in scope.
 - 2) Activities modified since previous revision.
 - 3) Revised projections of progress and completion.
 - 4) Other identifiable changes.
- C. Provide a narrative report as needed to define:
 - 1) Problem areas, anticipated delays, and the impact on the schedule.
 - 2) Corrective action recommended and its effect.
 - 3) The effect of changes on schedules of sub-contractor(s) and others.

1.05 DISTRIBUTION

- A. Distribute copies of the schedules to:
 - 1) County (two hard copies, one electronic copy)
 - 2) Subcontractors (as needed)
- B. Instruct recipients to report promptly to the Contractor, in writing, any problems anticipated by the projections shown in the schedules.

END OF SECTION

SECTION 01505

MOBILIZATION

PART 1 - GENERAL

1.01 GENERAL

- A. Contractor shall mobilize as required for the proper performance and completion of each Work Assignment in accordance with the Contract Documents.
- B. Mobilization shall include, but not be limited to, the following items, as applicable to each Project:
 - 1) Move plant and equipment onto the Project Site necessary for Contractor's operation
 - 2) Install temporary power, wiring, and lighting facilities
 - 3) Establish fire protection system
 - 4) Provide field office complete with furnishings, equipment, and utility services
 - 5) Provide On-Site communication facilities
 - 6) Provide On-Site sanitary facilities and potable water facilities
 - 7) Arrange for storage yard
 - 8) Obtain required permits
 - 9) Post OSHA required notices and establish safety programs
 - 10) Contractor's superintendent shall be on Site full time
 - 11) Obtain Performance and Payment Bond when applicable
 - 12) Obtain Builders Risk Installation Floater when applicable
 - 13) Provide submittals
 - 14) Install/remove silt fencing as necessary in unstabilized areas.
 - 15) Install/remove soil tracking prevention devices per FDOT Index 106 in unstabilized areas.

1.02 PAYMENT FOR MOBILIZATION

- A. The costs of bonds, permits, and any additional required insurance over and above the Contractor's standard insurance as specified in Article V of the Construction Contract, and any other pre-construction expense necessary for the start of the Project, excluding cost of construction materials, shall also be included in Mobilization.
- B. No separate payment will be made for mobilization. Mobilization is considered incidental to other work to be performed in the Work Assignment and the costs shall be included in those identified bid items as described in Section 01026 Measurement and Payment.

1.03 PAYMENT FOR EMERGENCY MOBILIZATION

- A. The costs of bonds, permits, and any additional required insurance over and above the Contractors' standard insurance as specified in Article V of the Construction Contract, and any other pre-construction expense necessary for the start of the Project, excluding cost of construction materials, shall also be included in the payment for Emergency Mobilization.

- B. Payment for emergency mobilization will be made when the Contractor has completed the required Mobilization items and will not exceed 90% of the Item Bid for Emergency Mobilization
- C. The work involved in the demobilization is included in the Emergency Mobilization Bid Item.
- D. Payment for demobilization (10% of the Item Bid for Emergency Mobilization), will be made at such time that the Contractor has completely demobilized from the site.

END OF SECTION

**SECTION
01550**

**MAINTENANCE OF
TRAFFIC (MOT)**

PART 1 – GENERAL

1.01 DESCRIPTION

- A. Work under this Section consists of maintaining traffic within the project limits for each Work Assignment, including any temporary suspensions of work, and includes all traffic control plans, facilities, devices, and operations as required for the safety and convenience of the public and to minimize public nuisance, as specified herein.
- B. The Contractor's work includes preparing approved traffic control plans; construction and maintenance of approved detour facilities (where required); providing necessary facilities for access to residences and businesses along the project; furnishing, installing, and maintaining traffic control markings, signs, and safety devices; and any other special requirements for safe and expeditious movement of traffic in the project area and other impacted areas as specified herein.

1.02 STANDARD REQUIREMENTS FOR MAINTENANCE OF TRAFFIC

- A. All MOT work shall conform to the latest editions of the Florida Department of Transportation (FDOT) Design Standards, the Manual on Uniform Control Devices (MUTCD) Part VI, the FDOT Standard Specifications for Road and Bridge Construction, Section 102, and Sarasota County Mobility Standards. Regardless of the MOT standards and specific traffic control plan used, it is the Contractor's responsibility to maintain the work zone in a safe condition.

1.03 SUBMITTALS

- A. Traffic Control Plan - Prepare detailed work zone traffic control plans for County review and approval. The traffic control plan shall apply specifically to each phase of the Contractor's activities for each Work Assignment. The Contractor may not begin work until a traffic control plan is approved by the County. Except in an emergency, modifications to the traffic control plans require the County's written approval.

1.04 SPECIFIC REQUIREMENTS

- A. The work for MOT may include the following:

- 1) All roads will be kept open to two-way traffic during construction, except one-way roads and where otherwise

approved in the MOT. Except in approved detoured areas, the Contractor will maintain one lane of traffic in each direction (each lane 11-foot wide minimum) at all times by using existing or constructing temporary pavement.

- 2) Portions of work phases may be worked concurrently with the approval of the County, provided traffic is properly maintained.
- 3) Temporary pavement will consist of six-inch thick suitable base and one-inch thick asphalt concrete surface; cost is included in MOT.
- 4) Construction of major side streets can be phased similarly to maintain one lane of traffic in each direction (each lane 11-foot wide minimum) at all times by using existing or constructing temporary pavement.
- 5) Unless provided for under the Items Bid, all cost of all barricades, signing, flagmen, and temporary pavement marking are included in the cost of MOT. The Contractor will erect and maintain all barricades, warning signs, and delineators.6) Detouring of traffic to other roads to by-pass the project area must be approved by Sarasota County before implemented.
- 7) The Contractor shall remove any existing striping conflicting with the MOT plan during construction and provide adequate signing and/or striping. Advanced "road closed" warning signs shall be placed at side streets at the direction of the County.
- 8) Paved temporary connections shall be provided at intersections as directed by the County.
- 9) Alternate access will be provided to all residences and businesses whenever construction interferes with the existing means of access. The Contractor is not permitted to isolate residences or businesses.
- 10) Major intersections shall have through movements maintained at all times during construction except during short periods of time approved by the County.
- 11) Traffic shall be maintained on paved, dust free surfaces at all times.
- 12) The resetting of traffic signs on side streets and the resurfacing and/or pavement marking on detour roads and/or side streets before and after construction is completed shall be included in the cost of Maintenance of Traffic.
- 13) The County shall approve any alteration of approved traffic patterns prior to implementation.
- 14) The Contractor is responsible for establishing a work schedule so that any location under construction will not be left in a hazardous condition at the completion of the work day.
- 15) When construction activities require flagmen for traffic control, the Contractor will employ the appropriate number of trained,

competent flagmen, and will provide them with appropriate equipment in good condition.

16) Temporary approaches or crossings and intersections with trails, roads, streets, businesses, residences, and parking lots and parking garages will be provided and maintained in a safe condition by the Contractor. The Contractor shall take precautions to protect the work and the safety of the public.

END OF SECTION

SECTION 02400

SOD RESTORATION

PART 1 - GENERAL

1.01 DESCRIPTION OF REQUIREMENTS

- A. Work under this section consists of furnishing all labor, material and equipment to replace and maintain all grassed areas disturbed during construction of each Work Assignment by the furnishing and placing sod, as directed by the County.

1.02 REFERENCE DOCUMENTS

- A. Materials used in this work shall conform to the following requirements of Florida Department of Transportation Standard Specifications for Road and Bridge Construction, current edition:
 - 1) Sod - Section 981-3
 - 2) Fertilizer - Section 982
 - 3) Water - Section 983

1.03 SUBMITTALS

- A. Submit certifications and identification labels for all sod and fertilizer supplied.

PART 2 – PRODUCTS

2.01 SOD

- A. Grassed areas disturbed by the Contractor's operation shall be restored with sod of the same type as the existing lawn grass type.
- B. The sod shall be taken up in commercial-size rectangles, preferably 12-inch by 24-inch or larger, except where 6-inch strip sodding is called for.
- C. The sod shall be sufficiently thick to secure a dense stand of live grass. The sod shall be live, fresh and uninjured at the time of planting. It shall have a soil mat of sufficient thickness adhering firmly to the roots to withstand all necessary handling. It shall be reasonably free of weeds and other grasses. It shall be planted as soon as possible after being dug and shall be shaded and kept moist from the time it is dug until it is planted.
- D. Sod should be handled in a manner to prevent breaking or other damage. Sod shall not be handled by pitch forks or by dumping from trucks or other vehicles. Care shall be taken at all times to retain the native soil on the roots of each sod roll during stripping and handling. Sod that has been

damaged by handling during delivery, storage or installation will be rejected.

2.02 FERTILIZER

- A. Chemical fertilizer shall be supplied in suitable bags with the net weight certification of the shipment. Fertilizer shall be 12-8-8 and comply with Section 982 of the FDOT Standard Specification for Road and Bridge Construction.
- B. The numerical designations for fertilizer indicate the minimum percentages (respectively) of (1) total nitrogen, (2) available phosphoric acid and (3) water soluble potash, contained in the fertilizer.
- C. The chemical designation of the fertilizer shall be 12-8-8, with at least 50 percent of the nitrogen from a non-water-soluble organic source. The nitrogen source may be a urea-formaldehyde source provided it is not derived from a waste product of the plastic industry.

2.03 EQUIPMENT

- A. The device for spreading fertilizer and seed shall be capable of uniformly distributing the material at the specified rate.

PART 3 - EXECUTION

3.01 SOD BED PREPARATION

- A. Areas to be restored shall be cleared of all rough grass, weeds, and debris, and brought to an even grade.
- B. The soil shall then be thoroughly tilled to a minimum 6-inch depth.
- C. The areas shall then be brought to proper grade, free of sticks, stones, or other foreign matter over $\frac{1}{2}$ inch in diameter or dimension. The surface shall conform to finish grade, less the thickness of the sod, free of water-retaining depressions.

3.02 INSPECTION

- A. The County shall verify that soil preparation and related preceding work has been completed. Work will not begin until conditions are satisfactory.

3.03 SOD HANDLING AND INSTALLATION

- A. During delivery, prior to planting, and during the planting of sod areas, the sod panels shall at all times be protected from excessive drying and unnecessary exposure of the roots to the sun. All sod shall be stacked

during construction and planting so as not to be damaged by sweating or excessive heat and moisture.

- B. After completion of soil conditioning as specified above, sod panels shall be laid tightly together so as to make a solid sodded lawn area. On mounds and other slopes, the long dimension of the sod shall be laid perpendicular to the slope. Immediately following sod laying the lawn areas shall be rolled with a lawn roller customarily used for such purposes, and then thoroughly watered.
- C. Sod shall be placed to restore all areas where grass existed prior to construction; on all slopes of 3 horizontal on 1 vertical (3:1) or greater; in all areas where erosion of soils will occur; along edge of roads, driveways, and structures; and as directed by the County. Sod shall be pinned as necessary on sloped areas to maintain the tight placement of sod panels.

3.04 SOD MAINTENANCE

- A. The sod shall produce a dense, well established growth. The Contractor shall be responsible for the repair, mowing (6" maximum height) and re-sodding of all eroded or bare spots until project acceptance. Sod repair shall be accomplished as in the original work.
- B. Sufficient watering shall be done by the Contractor to maintain adequate moisture for optimum development of the sodded areas. Sodded areas shall receive no less than 1.5 inches of water per week for at least 2 weeks. Thereafter, the Contractor shall apply water for a minimum of 60 days as needed until the sod takes root and starts to grow or until final acceptance, whichever is latest.

END OF SECTION

SECTION 02539

CLEANING, TELEVISING, PHOTOGRAPHS AND ASSESSMENT

PART 1 GENERAL

1.01 DESCRIPTION

- A. Work to be performed under this section includes cleaning, televising/pictures, and assessing manholes and structures located throughout Sarasota County, Florida.

1.02 SUMMARY

- A. The Contractor shall perform the flushing, cleaning, closed circuit televising/pictures (USB flash drive format), and assessment of each manhole and structures specified in the Work Assignment.
- B. Cleaning shall include, as required, removal of sand, silt, and debris; water jetting/pressure washing; root removal; scales and corrosion scraping and removal; and the proper collection and disposal of the resulting cleaning operations debris.
- C. Televising shall include producing and supplying two (2) copies of the pictures/digital audio-video records in DVD format on USB flash drive, and the Cleaning and Television Inspection Log of each manhole and structures specified and directed.
- D. Assessment shall include defect/observation coding as established by NASSCO's Manhole Assessment and Certification Program (MACP) for all manholes and structures cleaned and televised. Assessment shall be conducted by personnel certified in NASSCO's MACP. Rating and ranking system shall follow methods established by NASSCO Pipeline Assessment and Certification Program (PACP).

1.03 REQUIREMENTS

- A. The Contractor shall conduct his operations in strict accordance with all applicable Federal, State, and Local safety codes and regulations, and shall be responsible to maintain and ensure the safety of the public and work personnel at the project site. The Contractor shall, at all times, conform to all applicable Occupational Safety and Health Administration (OSHA) Standards.
- B. Television inspection video operator shall comply with the National Association of Sewer Service Companies (NASSCO). The Contractor shall

have television inspection personnel certified in NASSCO's Manhole Assessment and Certification Program (MACP).

- C. The Contractor shall be responsible for the loading, transportation, and disposal of all waste materials generated by its operations, to the nearest approved landfill, meeting all Local, State, and Federal rules and regulations.
- D. The Contractor shall ensure compliance with the latest editions of Chapter 40 CFR Part 263. "Standards Applicable to Transporters of Hazardous Waste" and Chapter 17-730, Part 3 of the Florida Administrative Code (FAC), as applicable.
- E. The Contractor shall conform to traffic control and maintenance of traffic (MOT) requirements of the State of Florida Department of Transportation (FDOT), and the Sarasota County Capital Projects, Mobility Standards, when working within public roadways and rights-of-ways.
- F. The Contractor shall mobilize and be on site within ten (10) days following issuance of the Notice to Proceed for each Work Assignment by the County, unless otherwise agreed to by the Contractor and the County. In the case of an emergency, the Contractor shall respond within twenty-four (24) hours of the telephone notification by the County, to be followed by the issuance of a written Work Assignment.
- G. The Contractor shall inform the County in writing of its planned work schedules and shall afford the County reasonable opportunity to observe and inspect the Contractor's work in progress. The County will be advised of all scheduling changes. Once work has begun in an area, the Contractor shall complete the work without interruption.
- H. The Contractor shall provide the County with a 2 week notice to allow for notification mailers to be sent. Door hangers will be hung 48 hours prior to work in general area of work to be performed.

1.04 SUBMITTALS

- A. Contractor shall submit to the County for review and approval:
 - 1) Names and qualifications of sub-contractor, personnel and equipment to be assigned to the cleaning and televising work. No cleaning or televising work shall commence until this submittal has been approved.
 - 2) Two (2) copies of the cleaning and television inspection logs, both hard copy and on USB flash drive, for each manhole shall be submitted with each payment application.
 - 3) Two (2) copies of the Pre and post pictures/videos in both hard copy and on USB flash drives of television inspections performed for each manhole and structures specified in the Work Assignment shall be submitted with each payment application.

- 4) Three (3) copies of the final assessment report shall be provided to the County at the time of the Work Assignment completion. Final payment will not be made until the final assessment report is received and approved by the County.
- 5) GPS Mapping Database when requested by Sarasota County for specific manholes and structures : GIS deliverables to be in the ESRI Geodatabase format, version 10.x or higher. Daily logs shall be posted for the County to review before submittal of payment application.

1.05 CLEANING

- A. The manholes and structures shall be cleaned by removing dirt, rock, sand, roots and other deleterious materials from the manholes and structures. The cleaning equipment shall be capable of removing grease, roots, protrusions, and scale and corrosion (tuberculation) from the manhole. The cleaning process may be accomplished while the manhole is flowing, however, by-pass pumping may be required.
- B. All necessary precautions are to be taken to protect the manholes and structures from damage resulting from the cleaning process. Damage to the manholes or structures or flooding of private or public property, resulting from the cleaning operation, shall be the responsibility of the Contractor to correct.

1.06 CLEANING EQUIPMENT

- A. The cleaning system shall utilize a device capable of dislodging sediments found in sewer manholes and structures and without damaging their structural integrity.
- B. The equipment shall include a high velocity gun for washing and scouring manhole and structures walls and floors. The gun shall be capable of producing flows from a fine spray to a solid stream.
- C. The cleaning devices shall have sufficient power to force and move the debris for extraction.
- D. The cleaning equipment shall come complete with water tank, auxiliary engines, pumps, and hose reels.
- E. Where required, equipment shall be provided by the Contractor which is capable of removing roots and removing scale and rust build-up (tuberculation) without damage to the manholes and structures.
- F. The cleaning method employed shall maintain normal flows during the

cleaning process.

- G. Solids shall be removed by vacuuming the debris to the surface. Approved equipment shall decant and separate the water from the solids before it is transported to an approved disposal site. Liquid decanted from the solids shall be returned to the pipeline system.
- H. Equipment with fluid leaks such as hydraulic, oil, or debris tanks will be removed from the site immediately and the cleanup will be the responsibility of the contractor.

1.07 REMOVAL OF DEBRIS

- A. Materials generated by the cleaning operation shall be removed by vacuuming the manholes and structures. Suitable plugs and by-passing, or internal temporary piping, shall be used to prevent the movement of solids to adjacent sections of pipe.
- B. Waste materials and debris resulting from the cleaning operations, shall be removed, drained of excess fluid, and conveyed by the Contractor to an approved waste disposal site. The disposal site shall be accessible during Contractor working hours. All permits required for loading and transporting the waste material shall be the responsibility of the Contractor. Under no circumstances shall the debris removed from the manholes and structures be dumped onto the streets or into ditches, catch basins, or storm water system.
- C. Liquid that is properly decanted from the waste material can be drained into the pipeline system after obtaining County approval.
- D. Unless otherwise provided for in the price schedule of the bid form, all costs associated with the removal, draining, loading, transporting, and disposal of debris and waste materials generated by the cleaning operation shall be considered incidental to the cleaning of the manholes and structures, and therefore considered included in the Unit Prices bid for cleaning.

1.08 TELEVISION/PHOTOGRAPH INSPECTION

- A. Equipment and TV Picture Quality: The TV camera must be specifically designed for manhole and structures inspection, small, rugged and waterproof. The camera must have its own light source suitable to provide a clear bright color picture of the entire structure. The camera shall have the ability to turn and view into the upstream and downstream pipe and focus on any pipe to manhole/structure connection damage or defect. The camera, television monitor, and other components of the video system shall

be capable of producing a picture quality adequate for the purposes of the inspection. The County shall determine the adequacy of the picture quality when the work is started.

B. TV Inspection Procedures:

- 1) The camera system shall be capable of assessing (making visible) all interior manhole and structures surfaces any time during the inspection. Excessive water in the manhole and structures shall be removed by the Contractor for proper inspection.

C. Documentation: Documentation of the television inspection shall be prepared by the Contractor at the site on a daily basis. The County shall observe that documentation (entering voice data on the video USB flash drive and preparing computer generated inspection logs) is being properly, accurately and legibly done during the TV inspection of each manhole and structures. The County shall sign the Contractor's daily logs as evidence that the work was observed.

D. Operating Personnel: Television inspection video operation shall be conducted by personnel certified by the National Association of Sewer Service Companies (NASSCO) Pipeline Assessment and Certification Program (PACP) and Manhole Assessment and Certification Program (MACP).

E. Digital photographs and inspection logs of each structure identified to be rehabilitated may be completed in lieu of the TV inspection requirements. Pre and post rehabilitation photographs are required. The camera for taking photographs shall be a minimum of 10 mega pixels and proper lighting and complete coverage of each structure shall be required.

F. Payment Request Submittals: The Contractor shall provide copies of the audio-video or digital photograph USB flash drives, and the Inspection Logs to the County with each Pay Request.

1.09 WATER: The use of potable water from a public, private, or reclaimed water system for manhole and structures cleaning shall be permitted and may be required. The cost of any water used for cleaning shall be the Contractor's responsibility.

PART 2 PRODUCTS – NOT USED

PART 3 EXECUTION

3.01 SYSTEM FLOW CONTROL

- A. The Contractor shall divert the upstream system flow around the manhole or structure being cleaned and televised, as necessary, and discharge the intercepted flow to a downstream manhole or other suitable outlet. By-pass set-up and operation shall be as specified in the Technical Specifications.
- B. Where manholes and structures are determined by the County to be of a critical nature and cannot be by-passed during normal work hours, cleaning and televising work shall be required at low flow periods, which may include nighttime hours.
- C. If system flow is minimal and cleaning and televising can be performed in a timely manner, bypassing may not be required.
- D. The use of an internal by-pass pipe, properly installed and operational, may be approved by the County. The Contractor must demonstrate that the method used will not interfere with the cleaning, televising, and assessment work to be performed.
- E. Interruption of Sanitary Sewer Flows:
 - 1) The Contractor shall place informational door hangers on customer's doors forty-eight (48) hours prior to commencement of work in a particular area. The Contractor shall make every effort possible to notify each customer whose service may be affected by the cleaning and televising operations.
 - 2) At no time will any service lateral remain inoperative for more than an eight (8) hour period. Any service outage for more than 8 hours will be temporarily by-passed into the mainline sanitary sewer in a manner approved by the County and at the Contractor's expense.
- F. The Contractor shall be responsible for any system back-up or any damage that may be caused by the Contractor's operations.

3.02 CLEANING AND TELEVISING

- A. The Contractor shall clean and televised the manholes and structures to be repaired and coated. The interior surface of the manholes and structures shall be cleaned with high pressure water jet equipment. The Contractor shall remove waste product build-up, hard scales (tuberculation), roots, debris, grease, and other deleterious materials before any repair or coating work is performed. All manhole and structures damage, and infiltration points shall be noted on the digital video record (USB flash drive) and recorded in the cleaning and television inspection logs.
- B. The Contractor shall notify the County if any severe problems are discovered during televising. If conditions such as damaged upstream or downstream piping or major blockages are found, or where additional damage would occur if cleaning is attempted or continued, the Contractor shall notify the County and request further direction on how to proceed.

C. Any damage caused by the Contractor to any existing pipe or structure will be immediately repaired to a condition equal to or better than its original condition at the Contractor's expense.

3.03 PROTRUDING ROOTS: When directed by the County, existing roots that protrude into the manhole and structures shall be removed from the inside wall of the manhole and structures by means of mechanical equipment. Root protrusions shall be ground using grinding tools specifically designed for this purpose. The finished product shall be uniform and smooth to accept the repair and coating products to provide a proper seal.

3.04 TRAFFIC CONTROL AND MAINTENANCE OF TRAFFIC: Manholes to be cleaned and televised may be in backyard easements; or in light traffic subdivision roadways, collector roads, or highways requiring Maintenance of Traffic plans conforming to Florida Department of Transportation and/or Sarasota County requirements.

3.05 CLEANUP: Cleanup is an essential part of the work. As the work progresses and is completed, the Contractor shall clean the various work sites of all excess materials and debris, completely restoring all work areas to the satisfaction of the County. This cleanup shall be done as promptly as practicable and shall not be left until the end of the project. No part of the work is considered complete and no payment will be made until cleanup has been completed and accepted by the County.

3.06 FINAL ACCEPTANCE

A. Audio/Video USB flash drives or Digital Photographs: Inspection of manholes and structures cleaned shall be by television or digital photograph inspection. The Contractor shall provide the County with two (2) copies of the digitized audio-video record on USB flash drive using GraniteNet asset inspection software platform or digital photographs, with data-view and accurate footage displayed as follows:

- 1) Street name and nearby address
- 2) Manhole and structures numbers
- 3) Any noted manhole and structures defect or damage, with assessment of damage
- 4) Any visible infiltration, with an assessment and estimate of inflow rate

B. Inspection Log: Two (2) copies of the cleaning and television/photographic inspection logs for each manhole and structures completed for the Work Assignment shall be submitted to the County in both hard copy and digital copy on USB flash drive prior to final payment of the Work Assignment.

C. Assessment Report: Three (3) copies of the final assessment report and one completed electronic data base in Excel (to be provided per work

assignment), meeting NASSCO requirements, shall be provided to the County at the time of the Work Assignment completion. Final payment will not be made until the final assessment report is received and approved by the County.

3.07 GPS MAPPING

- A. The County may request specific manholes and structures encountered in this contract to be GPS mapped within sub-foot accuracy and the data delivered in ESRI Geodatabase format, version 10.x or higher. Coordinate data shall be field collected with autonomous GPS readings and subsequently differentially corrected via post-processing. The contractor shall further refine positions through filtering and inspection to eliminate noise, problematic satellite geometry and multi-path degradation. Point valve features shall be collected at an epoch of 1 second with a minimum occupation of 20 seconds. Specific parameters include:
 - 1) Elevation mask: 15 degrees above the horizon
 - 2) Coordinate system; as agreed with NAD 1983 State Plane Florida EAST
 - 3) Satellites: four or more
 - 4) Position Dilution of Precision (PDOP): <6
 - 5) Horizontal Dilution of Precision (HDOP): <4
 - 6) Minimum number of raw positions collected: 20
 - 7) In the event of obstructions – where a clear GPS position cannot be captured – a laser offset will be executed from a nearby location
- B. At a minimum and in addition to database attribute requirements, the following coordinate data items shall be generated as a result of this process
 - 1) PDOP value
 - 2) HDOP value
 - 3) Correction Status
 - 4) Date Recorder
 - 5) Time Recorded
 - 6) Total Positions
 - 7) Filtered Positions
 - 8) Horizontal Precision
 - 9) Vertical Precision
 - 10) Standard Deviation
 - 11) Coordinate File Name
 - 12) X-coordinate
 - 13) Y-coordinate
- C. Identifier to determine whether the feature was acquired through laser or GPS DOCUMENTATION: Documentation data shall be collected on each requested manhole and structures and will be agreed upon, and compatible with the County's ESRI Software in advance of work startup. Data documentation shall include, at a minimum:
 - 1) Physical data – Basin Name, Manhole Number, LS Number, Inspection

Date, MH Use, Surveyed By, MACP Cert#, MH Depth, Street, Nearest Address, GPSX, GPSY, High H2S, Purpose, Location, Surface Type, Inspection Status, Cover Shape, Cover Size, Cover Material, Cover Type, Insert, Cover Condition, Riser Ring, RR Type, Riser Condition, Frame Material, Frame Condition, Frame Seal Inflow, Frame Offset Distance, Frame depth, Chimney Material, Chimney Lining, Chimney I&I, Chimney Condition, Cone Type, Cone Material, Cone Lining, Cone I&I, Cone Condition, Wall Material, Wall Lining, Wall I&I, Wall Condition, Wall Width, Bench Present, Channel Present, Special Conditions, Manhole discrepancies (by category and details).

- 2) Location data – Mapping grade GPS coordinate data parameters noted in the GPS mapping section.
- 3) Discrepancies – Details on discrepancies so that a work order as described below) can be concisely created.

D. DELIVERABLE DATABASE: Sarasota County Government requires GIS deliverables to be in the ESRI Geodatabase format, version 10.x or higher. All data must be projected in State Plane Florida West HARN, NAD1983 datum, linear units in feet. Specific layer types, attribution requirements, and delivery methods will be detailed in Scopes of Services. Contractor shall be able to fully integrate data into ESRI and also torque chart data shall be integrated into the County's ESRI system. Metadata, including a detailed citation describing field data collection practices, equipment settings, post processing procedures, base station used for differential correction and expected accuracy, are to be submitted with final and interim data deliveries. The database shall contain the information agreed to by the County.

E. Obstructed GPS data shall be obtained through laser offset method.

F. The Contractor shall employ and designate a qualified Quality Control Manager who shall be responsible for re-inspection of all field processed data if it falls outside of tolerances. All such data shall be re-collected. The Quality Control Manager shall also be responsible of random sampling of not less than 10% of the total contract value. This will provide quality assurance of all physical aspects of the service and validation of all data attributes collected. Daily logs will be posted for the County to review before invoice submittals occur.

END OF SECTION

SECTION 02540
ANCILLARY SERVICES

PART 1 GENERAL

1.01 SCOPE

- A. The Contractor shall provide for the mobilization of personnel, and equipment; bypass pumping as required; and the maintenance of traffic for each Work Assignment.
- B. The work includes furnishing all labor, tools, equipment and materials and performing all operations necessary to mobilize, bypass pump, and control traffic as specified and directed.

1.02 REQUIREMENTS

- A. The Contractor shall conduct his operations in strict accordance with all applicable Federal, State, and Local safety codes and regulations, and shall be responsible to maintain and ensure the safety of the public and work personnel at the project site. The Contractor shall, at all times, conform to all applicable Occupational Safety and Health Administration (OSHA) Standards.
- B. The Contractor shall conform to traffic control and maintenance of traffic (MOT) requirements of the State of Florida Department of Transportation (FDOT), and the Sarasota County Mobility Standards, when working within public roadways and rights-of-ways.

1.03 MOBILIZATION

- A. Mobilization shall conform to Section 01505 of the Technical Specification.

1.04 BY-PASS PUMPING

- A. Furnish, operate, and maintain by-pass pumping equipment as required. Pump motors shall be equipped with mufflers that conform to the Sarasota County Noise Ordinance, and as specified below.

1.05 MAINTENANCE OF TRAFFIC

- A. Maintenance of traffic shall conform to Section 01550 of the Technical Specifications.

PART 2 PRODUCTS

2.01 MATERIALS AND EQUIPMENT

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

B. Any materials or equipment supplied under this section which is deemed unsuitable by the County shall be removed from the project and replaced by the Contractor at no additional cost to the County.

PART 3 EXECUTION

3.01 HAULING BYPASS WATER

A. The Contractor shall utilize Pumper Trucks, Vac- Trucks and Tanker Trucks as necessary for

an approved bypass system to haul bypass wastewater to proper disposal site designated by the County. This work shall include mobilizing and demobilizing, equipment, and hauling sanitary wastewater bypassing for the time period the vehicles are required on-site, **there will be no compensation for idle time**. This work shall also include all necessary labor, equipment, tools, material and fuel for an approved bypass system for sanitary wastewater flow around the sections to be repaired and lined in accordance with the Technical Specifications. The time to mobilize, demobilize and dispose of wastewater will not be paid separately and will be considered incidental to pay items established. Note the bid items for hauling wastewater for bypassing operations and disposing wastewater are not to be utilized for cleaning which would be incidental to that work.

3.02 BYPASS PUMPING

A. The Contractor shall supply primary and back-up pumps, conduits, fuel and other equipment, including all stand-by equipment, to divert the flow around the facilities in which work is to be performed.

B. The by-pass system shall be of sufficient capacity to handle existing flows plus additional flow that may occur during a rain event. The Contractor shall be responsible for furnishing the necessary labor and supervision to set up and operate the by-pass pumping systems.

C. A float ball type level control and monitoring system shall be implemented. The pump shall be equipped with high level alarm functions with auto-dialer control capable of calling the Contractor and up to four (4) additional phone numbers. One phone number shall be dedicated to a County designee.

D. The design of the temporary by-pass systems shall be the responsibility of the Contractor, however, such systems shall be subject to approval by the County. The Contractor shall submit two (2) sets of detailed drawings, including pump type, make and model, manufacturer's flow data, hydraulic calculations, curves, specifications, a description of the temporary by-pass equipment and a by-pass plan to the County for approval at least ten (10) days prior to the installation and operation of any temporary by-pass system.

E. The by-pass plan must include specific site sketches and diagrams. A sequential order of pumping operation procedures shall include a description of by-pass monitoring, maintaining of suction screens, fueling,

odor control, and life safety and security. The Contractor shall provide emergency contact(s) - 24/7 phone number(s), to the County.

- F. Noise levels between 7:00 p.m. and 7:30 a.m. shall not exceed 70 dB measured at a distance of 25 feet from the pump motor. All pumps shall be of a quiet pack type unit.
- G. If the Contractor's operations disrupt system flows, except for such brief periods as expressly required and approved by the County, the Contractor shall immediately make all repairs, and do all work necessary to restore flows to the satisfaction of the County, at no additional cost to the County. The by-pass operation shall progress continuously on a 24-hour per day, 7-day per week basis, until flow is re-established. The Contractor shall provide the services of emergency repair crews on call 24 hours per day.
- H. Any fines or damage caused by not maintaining system flows as specified above shall be the responsibility of the Contractor.

3.03 MAINTENANCE OF TRAFFIC (MOT)

- A. Contractor shall be responsible for the design, submittal, and approval of the Project's maintenance of traffic (MOT) plans by the proper reviewing agencies. It will be the Contractor's responsibility to set up and maintain the MOT according to State and Local transportation agency regulations. All MOT work shall conform to the requirements of the Sarasota County Capital Projects-Mobility Standards.
- B. The Contractor shall at all times conduct the work as to ensure the least possible disruption to traffic and inconvenience to the general public, including nearby residents, and to ensure the protection of persons and property, in a manner satisfactory to the County.
- C. The Contractor shall not begin work until the Maintenance of Traffic Plan is approved in writing by Sarasota County. Any modification to the M.O.T. plan requires County written approval.
- D. All spills caused by Contractor's operation will be cleaned up immediately. Dust will be controlled by the Contractor on a daily basis.
- E. All costs in connection with the Maintenance of Traffic work shall be included in the unit and/or lump sum prices established under the Price Schedule of the Bid Form.

END OF SECTION

SECTION 02757

MANHOLE AND STRUCTURES REHABILITATION

PART 1 – GENERAL

1.01 DESCRIPTION OF REQUIREMENTS

- A. Work under this section includes furnishing all labor, materials, accessories, equipment, and tools and performing all operations required to furnish and install manhole and structures repairs and interior coatings for corrosion protection and infiltration elimination, in accordance with the Contract Documents, Work Assignments, and as directed by the County.
- B. Work also includes providing all necessary labor, equipment, and tools for the proper removal and disposal of the existing deteriorated and failed lining and coating systems, as applicable.
- C. Items of work covered under this section include cleaning, surface preparation, and repair of manhole and structures interiors, including, sealing leaks and defects with approved cementitious or chemical grout, and applying an approved interior coating, where directed.
- D. Work also includes the repair of manhole benches and invert; removal of roots; manhole chimney repairs and/or replacements; and manhole rim and cover replacements; all as specified below, described in the Work Assignment, and directed by the County.
- E. The Contractor shall observe all standards of safety for confined space entry and chemical usage as stipulated by OSHA, and other federal, state and local agencies. These include, but are not limited to, air quality monitoring, safety harnesses and equipment, air/oxygen breathing apparatus, the wearing of chemical resistant safety suits where applicable, and minimum number of workers on the job site. The Contractor shall comply with the manufacturer's Materials Safety Data Sheet (MSDS) for the products used under this section.
- F. When required by coating manufacturer, the concrete must be fully hydrated, prior to application of the coating to the concrete, masonry, or brick surfaces. Contractor shall assure that the hydration process for newly installed structures has reached its completion prior to application of coating.

1.02 SUBMITTALS

- A. The Contractor shall submit complete sets of Product Data and Material Safety Data Sheets for the repair systems and interior coating system to the County for review and approval, prior to scheduling any repair and coating work.

- B. The Contractor shall submit manufacturer's application and installation instructions to the County for all products used.
- C. The Contractor shall provide documentation to the County that the manufacturer has a minimum of five (5) years' experience in producing the proposed coating system, and that this proposed system produced successful protection and rehabilitation of manholes and structure.

1.03 WARRANTY

- A. The coating manufacturer shall supply the County a minimum five (5) year manufacturer's written warranty of the selected coating system against failure to adhere to the manhole and structures, failure against abrasion, acid, hydrogen sulfide attack, chemical attack, microbiologically induced corrosion, pinhole development, or any other defect which would lead to deterioration or infiltration.
- B. Any dispute between the Contractor and the manufacturer regarding fault of defects shall not affect this warranty to the County. If failure is detected by the County within this five (5) year period, the coatings shall be repaired or replaced to the satisfaction of and at no cost to the County.

PART 2 – PRODUCTS

2.01 GENERAL

- A. Interior manhole and structures coating systems specified herein shall be resistant to abrasion, acid, hydrogen sulfide attack, chemical and corrosion attack; and prevent infiltration.
- B. This specification provides for four (4) basic coating system alternates, as follows:
 - 1) Spray applied cementitious material composed of a one component, high strength, fiber reinforced, pure fused calcium aluminate cement, and calcium aluminate aggregate. The coating shall be a minimum of 1/2" thick for new construction and up to 1" thick for rehab construction, applied in one or two coats. The product shall be SewperCoat®PG, Strong Seal High Performance Mix, or Quadex Aluminaliner PF.
 - 2) Spray applied factory blended geopolymer mortar composed of a one component fiber reinforced geopolymer synthesized from pozzolanic materials of industrial byproducts, enhanced with monocrystalline quartz aggregate. The coating shall be a minimum of 1/2" thick as designated on the bid form and applied in one or two coats on top of a cementitious buildup. The product shall be GeoKrete by Quadex.
 - 3) Spray applied self-priming polyurethane resin-based coating system containing 100% solids, and volatile organic compound (VOC) free. The coating shall be a 1/8", 1/4" or 1/2" thick as designated on the bid form and applied in one or two coats on top of a cementitious buildup. The product shall be SprayWall®, as manufactured by SprayRoq Protective Lining Systems, Birmingham, AL.

4) Spray applied self-priming ultra-high build epoxy resin-based coating system containing 100% solids, and volatile organic compound (VOC) free. The coating shall be 1/8", 1/4" or 1/2" thick as designated on the bid form and applied on top of a cementitious buildup. The high build epoxy product shall be Raven®405, as manufactured by Raven Lining Systems, Tulsa, OK or Structure Guard as manufactured by Quadex LLC, Houston, TX.

C. The materials used shall be designed, manufactured, and intended for use in sanitary sewer system manholes protection and rehabilitation. The materials shall have been successfully used in manhole and structures construction and rehabilitation projects as determined by the County, based on information provided by the Contractor.

D. The selected product or system must bear the manufacturer's certification that it will fulfill the requirements described herein when applied in accordance with the manufacturer's written instructions. The Contractor shall be certified by the manufacturer to install the approved repair and coating system; and shall supply a list of locations and references for at least three (3) projects, in which the product was successfully installed and operational for the past 5 years.

2.02 PATCHING MIX

A. A quick setting, fiber reinforced, cementitious compound, shall be used as a patching and profiling mix. It shall be mixed and applied per manufacturer's recommendation and meet the following minimum requirements:

Compressive Strength	ASTM C109	1,400 psi @ 6 Hour 5,000 psi
Flexural Strength	ASTM C293	550 psi @ 28
Shrinkage	ASTM C596	0 % @ 90% R.H.
Bond Strength	ASTM C321	145 psi @ 28

2.03 INFILTRATION CONTROL MIX

A. A rapid setting cementitious or chemical product (Strong-Plug, DeNeef AC-400, Avanti AV-1 18, or equal), specifically formulated for leak control shall be used to stop minor water infiltration. The product shall be mixed and applied according to manufacturer's recommendations, and capable of stopping visible leaks.

2.04 HIGH INFILTRATION GROUTING MIX

A. A rapid setting cementitious grout (Strong-Plug, or equal), shall be used for stopping very active infiltration, and filling voids, cracks, missing mortar, and other substrate defects. The product shall be mixed and applied according to manufacturer's recommendations. The cementitious grout

shall be volume stable having a minimum 1-day compressive strength of 50 psi, and a 28-day compressive strength of 250 psi.

B. A rapid setting chemical acrylic, acrylic based, or urethane-based grout (DeNeef AC400, Avanti AV-202, or equal), specifically formulated for stopping very active infiltration may be substituted with approval of the County. The chemical grout shall consist of a principal sealant constituent, an initiator (trigger), and a catalyst, and be mixed and applied in accordance with manufacturer's recommendations.

C. Application may include drilling of the manhole and structures walls and pressure grouting the exterior to produce a grout curtain capable of stopping visible leaks.

2.05 MANHOLE RING AND COVER REPLACEMENTS shall conform to the typical details; shall be watertight with no perforations in the cover; and shall be capable of withstanding H-20 traffic loading in paved areas.

2.06 MANHOLE CHIMNEY REPLACEMENTS shall conform to the typical details; and based on existing conditions as directed, shall be pre-cast concentric or eccentric cone sections; pre-cast top slab sections; and/or pre-cast concrete rings or non-metallic (HDPE) adjustment rings. In no case shall brick be used to adjust ring and cover to finish grade.

2.07 RAIN WATER PROTECTOR inserts shall be as manufactured by FRW Industries, Conroe, Texas, or equal. Inserts shall be complete with a self-cleaning relief valve. Relief valves shall operate on a pressure differential of $\frac{1}{2}$ psi. Neoprene gaskets shall be installed under the insert lip to insure a leak proof seal.

2.08 WATER

A. Water shall be clean and potable.

2.09 BONDING COMPOUND

A. Material shall be a modified cementitious bonding compound that protects exposed reinforcing steel, enhances bond of overlay to substrate, and is compatible to the selected coating system.

2.10 CALCIUM ALUMINATE COATING MATERIALS

A. The calcium aluminate cementitious coating shall be used to form a structurally enhanced monolithic coating covering all interior manhole and structures surfaces including walls, inverts, and benches, and shall have an applied minimum density of 125 pounds/cubic foot, with the following minimum properties:

Compressive Strength	ASTM C109	5,500 psi @ 24 hours 7,000 psi @
Splitting Tensile	ASTM C496	700 psi @ 28 days
Flexural Strength	ASTM C293	>1,300 psi @ 28
Shrinkage	ASTM C596	<0.08% @ 90%
Bond Strength (Slant)	ASTM C882	>2,500 psi @ 28

2.11 GEOPOLYMER COATING MATERIALS

A. The Geopolymer coating shall be used to form a structurally enhanced monolithic coating covering all interior manhole and structures surfaces including walls, inverts, and benches, and shall have an applied minimum density of 136 pounds/cubic foot with the following minimum properties.

Compressive Strength	ASTM C109	2,500 psi @ 24 hours 8,000 psi @
Splitting Tensile	ASTM C496	900 psi @ 28 days
Flexural Strength	ASTM C293	>1,300 psi @ 28
Shrinkage	ASTM C596	<0.02% @ 90%
Bond Strength (Slant)	ASTM C882	>5,000 psi @ 28

2.12 POLYURETHANE RESIN BASED COATING MATERIALS

A. The resin-based coating shall be used to form a structurally enhanced monolithic coating covering all interior manhole surfaces including walls, inverts, and benches, and shall have an applied minimum density of 81 +/- pounds/cubic foot, with the following minimum properties:

Compressive Strength	ASTM D695	7,500 psi @ 28 days
Flexural Strength	ASTM D790	12,000 psi @ 28
Tensile Strength	ASTM D638	7,000 psi @ 28 days
Shrinkage	ASTM D2566	<0.50% @ 95% R.H.
Adhesion to Concrete	ASTM D454 1	Substrate Failure
Bond Strength	ASTM C882	>1,600 psi @ 28

2.13 ULTRA HIGH BUILD EPOXY RESIN BASED COATING MATERIALS

A. The resin-based coating shall be used to form a structurally enhanced monolithic coating covering all interior manhole and structures surfaces including walls, inverts, and benches, and shall have an applied minimum density of 81 +/- pounds/cubic foot, with the following minimum properties:

Compressive Strength	ASTM D695	7,500 psi @ 28 days
Flexural Strength	ASTM D790	12,000 psi @ 28

Tensile Strength	ASTM D638	7,000 psi @ 28 days
Shrinkage	ASTM D2566	<0.50% @ 95% R.H.
Adhesion to Concrete	ASTM D454 1	Substrate Failure
Bond Strength	ASTM C882	>1,600 psi @ 28

PART 3 – EXECUTION

3.01 GENERAL

- A. The repair of manholes and structures may be limited to patching only, infiltration control and patching, coating only, or a combination thereof. The County shall direct the rehabilitation of each such structure, and measure and pay for the repair system and coating method(s) actually used and approved.
- B. Sanitary sewer flow control, as specified in the technical specifications shall be exercised by the Contractor as required to ensure that no flowing sewage comes into contact with the manhole and structures surfaces being coated.
- C. New concrete structures shall be cured for at least 30 days prior to application of resin-based coatings.

3.02 PREPARATION

- A. The manhole and structures surfaces shall be clean, structurally sound and free from oil, grease, loose mortar, paints, existing protective lining or coating systems, efflorescence, laitance, or other deleterious materials or substances.
- B. Existing leaks and defects shall be sealed and repaired prior to application of the coating with the use of the products referenced above. The Contractor shall bring the interior surfaces to a smooth profile by filling voids, cracks, missing mortar, and correcting other substrate defects.
- C. An approved patching mix shall be used to repair manhole inverts and benches. Repaired finish of inverts and benches shall conform as closely as possible to the typical details.
- D. Where directed, deteriorated manhole chimneys shall be repaired and rebuilt with an approved patching mix or replaced per the typical details. Extensive repairs shall require the use of steel dowels and high strength concrete or grout formed to the original shape of the chimney, where required and directed by the County.
- E. Where directed, manhole ring and covers shall be installed per typical details and as follows:
 - 1) Ring and cover assembly shall be placed in a full bed of mortar.

- 2) Paved surfaces shall be restored to an "as good" condition acceptable to the governing right-of-way agency.
- 3) In unpaved areas, the cover shall be set one (1") inch above finished grade with the surrounding surfaces returned to an "as good" condition, acceptable to the County.
- 4) The manhole rim and cover in its final position, shall be capable of withstanding H2O traffic loading; shall be constructed such that it does not rattle or have movement when hit by traffic; and be set flush with the finished pavement grade, when located in paved areas.

3.03 APPLICATION OF CALCIUM ALUMINATE CEMENT SYSTEM

- A. The calcium aluminate cement coating system shall be applied at a minimum of 1/2" thickness, over the entire interior of the manholes and structures in accordance with ACI 506, and manufacturer's recommendations by the manufacturer's certified applicator. Appropriate protective equipment shall be used.
- B. When applied to highly deteriorated concrete, masonry, or brick surfaces lacking in interior mortar, additional thickness shall be applied to create a smooth surface, with a minimum 1/2" thickness at its thinnest point in the deteriorated areas.
- C. At no point will there be any material left in the invert of the incoming or discharge side of the pipeline.
- D. Mix water shall be potable water with a temperature not exceeding 80 degrees F. Chill mix water with ice if necessary.
- E. Coating system shall be thoroughly mixed and applied with low-pressure, wet-spray equipment, cleaned and free of Portland cement build-up to avoid accelerated set. Coating shall be applied by a trained technician certified by the manufacturer.
- F. Caution shall be taken to minimize exposure of the applied product to sunlight and air movement. If application of a second coat is to be longer than 15 minutes after completion of first coat, the manhole cover shall be set back in place. During curing, at no time should the finished product be exposed to sunlight or air movement for longer than 15 minutes before replacing the manhole cover.
- G. The final coating applications shall have a minimum of 4 hours cure time before being subjected to active sewage flows, with the use of manufacturer's approved accelerating admixture(s), as necessary.

H. Traffic shall not be allowed over manholes for 6 hours after the coating application has been completed, with the use of manufacturer's approved accelerating admixture(s), as necessary.

3.04 APPLICATION OF GEOPOLYMER MORTAR SYSTEM

- A. The geopolymers mortar coating system shall be applied at a minimum of 1/2" thickness, over the entire interior of the manholes and structures in accordance with ACI 506, and manufacturer's recommendations by the manufacturer's certified applicator. Appropriate protective equipment shall be used.
- B. When applied to highly deteriorated concrete, masonry, or brick surfaces lacking in interior mortar, additional thickness shall be applied to create a smooth surface, with a minimum 1/2" thickness at its thinnest point in the deteriorated areas.
- C. At no point will there be any material left in the invert of the incoming or discharge side of the Pipeline.
- D. Mix water shall be potable water with a temperature not exceeding 80 degrees F. Chill mix water with ice if necessary.
- E. Coating system shall be thoroughly mixed and applied with low-pressure, wet-spray equipment, cleaned and free of Portland cement build-up to avoid accelerated set. Coating shall be applied by a trained technician certified by the manufacturer.
- F. Caution shall be taken to minimize exposure of the applied product to sunlight and air movement. If application of a second coat is to be longer than 15 minutes after completion of first coat, the manhole cover shall be set back in place. During curing, at no time should the finished product be exposed to sunlight or air movement for longer than 15 minutes before replacing the manhole cover.
- G. The final coating applications shall have a minimum of 4 hours cure time before being subjected to active sewage flows, with the use of manufacturer's approved accelerating admixture(s), as necessary.
- H. Traffic shall not be allowed over manholes for 6 hours after the coating application has been completed, with the use of manufacturer's approved accelerating admixture(s), as necessary.

3.05 APPLICATION OF POLYURETHANE OR EPOXY COATING

- A. The resin-based coating system shall be applied over the entire interior of the manholes and structures in accordance with manufacturer's instructions and recommendations, with a thickness of 1/8", 1/4" or 1/2", as directed

by the county. Application shall be performed by a manufacturer certified applicator, as applicable. Appropriate protective equipment shall be used.

- B. Coating system shall be thoroughly mixed and applied with a heated plural component spray system, cleaned and free of any build-up. Coating shall be applied by a trained technician certified by the manufacturer.
- C. At no point will there be any material left in the invert of the incoming or discharge side of the pipeline
- D. The final application shall have a minimum of 2 hours cure time, or as otherwise recommended by the manufacturer, before being subjected to active sewage flows.
- E. Traffic shall not be allowed over manholes and for 6 hours after the coating application has been completed, or as otherwise recommended by the manufacturer.

3.06 TESTING AND INSPECTION

- A. After the coating application specified herein has been completed, the manholes and structures shall be subjected to visual inspection and third-party testing.
- B. Visual inspections for water tightness, completeness of coating, and coating thickness shall be performed by the County and the Contractor. All observed visible leaks and defects in the coating shall be repaired by the Contractor to the County's satisfaction. There shall be no visible infiltration.
- C. The Contractor shall provide coating thickness test apparatus as approved by the coating manufacturer and shall test the coating thickness of each manhole and structures in the presence of the County.
- D. Third party testing will consist of holiday (spark) testing of the coating, and/or adhesion (bond) testing of the coating to the substrate per applicable ASTM testing methods and shall meet the physical requirements listed in the technical specifications. Type and frequency of testing shall be determined by the County. Initial testing shall be scheduled and paid for by the County. The contractor shall repair any holiday found or damage to the coating resulting from adhesion testing at no additional expense to the County.
 - 1). Should the coating fail to meet initial test requirements, the contractor will be directed to perform additional testing at Contactor's expense. Failure of adhesion testing will require additional tests in the structure to determine the limits of the defective application. The contractor shall

remove any defective coating and replace per manufacturer's specifications and requirements at no additional expense to the County.

E. During the course of the warranty period, and prior to expiration of the warranty period, the new or rehabilitated manholes and structures may be visually inspected for water tightness and coating condition by the County. All observed visible leaks and defects in the coating shall be repaired and re-coated by the Contractor to the County's satisfaction, at no additional cost to the County. There shall be no visible infiltration or evidence of infiltration such as stains, etc., in order to be found acceptable.

END OF SECTION