

# Orange County Utilities

## Valve Exercising and Uni-Directional Flushing

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**SECTION 01001**  
**GENERAL WORK REQUIREMENTS**

**PART 1 - GENERAL**

1.1 NOTICES

- A. All notices or other papers required to be delivered by the Contractor to the County shall be delivered to the office of the Field Services Division, Orange County Utilities Department, 8100 Presidents Drive, Suite A, Orlando, FL 32809.

1.2 TERM CONTRACT

- A. The Contract is a term contract that shall commence on the date of award and terminate 12 months after the award date.
- B. The Contract is a Unit Price contract with the total estimated base bid equal to the sum of the pay item totals from the bid schedule. All quantities on the bid schedule are estimates and the County is not obligated to purchase a minimum or maximum amount during the Contract term.
- C. Projects will be authorized by issuance of a numbered delivery order. The delivery order will specify the location, description and completion time for the Project. Delivery orders will be emailed and mailed to the Contractor. The emailed copy of the delivery order shall be official Notice to Proceed.

1.3 METHOD OF ORDERING

A. Routine Orders:

- 1. The County will initiate a Work Request which shall include, but not be limited to the following: date; location and description of requested Work; sketch of requested Work; required bid line items and estimated quantities. The Work Request will be emailed to the Contractor.
- 2. The Contractor shall, upon receiving the Work Request from the County, visit the site and familiarize themselves with the site conditions and the requested Work. The Contractor shall submit their Job Cost Proposal and confirm or adjust the estimated quantities and use the unit prices in the Contract. The signed Job Cost Proposal shall be emailed to the County within 7 calendar days following the date of emailed Work Request.
- 3. The County will review and approve the Contractor's submitted Job Cost Proposal and process a Delivery Order authorization. If the submitted Job Cost Proposal contains quantities different from the estimated quantities, the County will work with the Contractor to confirm actual quantities before issuing the Delivery Order.
- 4. A copy of the Delivery Order will be emailed to the Contractor and will include job location, Work description, and completion due date. The emailed Delivery Order

shall serve as the official Notice to Proceed. Work shall commence as soon as possible after receipt of Delivery Order by email.

5. No changes in the scope of Work will be permitted after issuance of a Delivery Order as the Delivery Order is a lump sum described by the Job Cost Proposal.
6. Delivery Orders will not be issued for Job Cost Proposals under 500 dollars.

B. Emergency Orders:

1. Contractor shall be available to commence emergency restoration requests on an on-call basis. Emergency repairs shall commence after notification by the County and a Delivery Order is issued.
2. Emergency repair work may be required on twenty-four hours, seven (7) day/week basis as requested. Emergency repair work shall begin as agreed on by the Project Manager or Designee. The County may waive cost estimates and the issuance of a Delivery Order prior to the start of emergency repair work. Contractor will be required to submit a formal quote listing all repairs, materials and quantities with pricing used in the completion of the emergency repair. A Delivery Order will then be processed based on that quote after it has been reviewed and approved by the Project Manager or his Designee.

1.4 WORK TO BE DONE

- A. The Contractor shall furnish all labor, materials, equipment, tools, services, and incidentals to complete all work required by these specifications and as shown on the Drawings, at a rate of progress which will ensure completion of the Work within the Contract Time stipulated.
- B. The Contractor shall perform the Work complete, in place, and ready for continuous service, and shall include repairs, testing, permits, clean up, replacements, and restoration required as a result of damages caused during this construction.
- C. The Contractor shall comply with all City, County, State, Federal, and other codes, which are applicable to the proposed Work.
- D. All newly constructed Work shall be carefully protected from injury in any way. No wheeling, walking, or placing of heavy loads on it shall be allowed and all portions damaged shall be reconstructed by the Contractor at his own expense.
- E. Scope of Work: See Section 01010 "Summary of Work" and the Bid Schedule for details.

1.5 DRAWINGS AND PROJECT MANUAL

- A. The Work shall be performed in accordance with the Drawings and Specifications prepared by the County/Professional. All work and materials shall conform to the Orange County Utilities Standards and Construction Specifications Manual, latest edition or as indicated in these Specifications or Drawings.
- B. The Contractor shall verify all dimensions, quantities and details shown on the Drawings,

Supplementary Drawings, Schedules, Specifications or other data received from the County/Professional, and shall notify same, in writing, of all errors, omissions, conflicts and discrepancies found therein. Failure to discover or correct errors, conflicts or discrepancies shall not relieve the Contractor of full responsibility for unsatisfactory Work, faulty construction or improper operation resulting there from, nor from rectifying such conditions at his own expense.

- C. All schedules are given for the convenience of the County and the Contractor and are not guaranteed to be complete. The Contractor shall assume all responsibility for the making of estimates of the size, kind, and quantity of materials and equipment included in the Work to be done under this Contract.
- D. Intent:
  - 1. All Work called for in the Specifications applicable to this Contract, but not shown on the Drawings in their present form, or vice versa, shall be of like effect as if shown or mentioned in both. Work not specified either in the Drawings or in the Specifications, but involved in carrying out their intent or in the complete and proper execution of the Work, is required and shall be performed by the Contractor as though it were specifically delineated or described.
  - 2. Items of material, equipment, machinery, and the like may be specified on the Drawings and not in the Specifications. Such items shall be provided by the Contractor in accordance with the specification on the Drawings.
  - 3. The apparent silence of the Specifications as to any detail, or the apparent omission from them of a detailed description concerning any Work to be done and materials to be furnished, shall be regarded as meaning that only the best general practice is to prevail and that only material and workmanship of the best quality is to be used, and interpretation of these Specifications shall be made upon that basis.
- E. Refer to the Contract for the order of precedence of items and documents.

## 1.6 PROTECTION AND RESTORATION

- A. The Contractor shall be responsible for the preservation of all public and private property, and shall use every means of protection necessary to prevent damage thereto. If any direct or indirect damage is done to public or private property by or on account of any act, omission, neglect, or misconduct in the execution of the Work on the part of the Contractor, such property shall be restored by the Contractor, at his expense, to a condition similar or equal to that existing before the damage was done, or the Contractor shall make good the damage in other manner acceptable to the County/Professional.
- B. Protection of Trees and Shrubs
  - 1. Protect with boxes or other barricades.
  - 2. Do not place excavated material so as to injure trees or shrubs.
  - 3. Install pipelines in short tunnels between and under root systems.
  - 4. Support trees to prevent root disturbance during nearby excavation.
- C. Tree and Limb Removal

1. Tree limbs, which interfere with equipment operation and are approved for pruning, shall be neatly trimmed and the tree cut coated with tree paint.
  2. The County may order the Contractor, for the convenience of the County, to remove trees along the line or trench excavation. The Contractor shall obtain any permits required for removal of trees. Ordered tree removal shall be paid for under the appropriate Contract Items.
- D. Trees or shrubs destroyed by negligence of the Contractor or his employees shall be replaced by the Contractor with new stock of similar size and age, at the proper season and at the sole expense of the Contractor.
- E. Lawn Areas: All lawn areas disturbed by construction shall be replaced with like kind to a condition similar or equal to that existing before construction. Where sod is to be removed, it shall be carefully removed, and the same re-sodded, or the area where sod has been removed shall be restored with new sod in the manner described in the applicable section.
- F. Where fencing, walls, shrubbery, grass strips or area must be removed or damaged incident to the construction operation, the Contractor shall, after completion of the work, replace or restore to the original condition.
- G. The cost of all labor, materials, equipment, and work for restoration shall be deemed included in the appropriate Contract Item or items, or if no specific item is provided therefore, as part of the overhead cost of the Work, and no additional payment will be made therefore.

## 1.7 PUBLIC NUISANCE

- A. The Contractor shall not create a public nuisance including, but not limited to, encroachment on adjacent lands, flooding of adjacent lands, or excessive noise.
- B. Sound levels measured by the County/Professional shall not exceed 45 dBA from 8 p.m. to 8 a.m. or 55 dBA 8 a.m. to 8 p.m. This sound level shall be measured at the exterior of the nearest exterior wall of the nearest residence. Levels at the equipment shall not exceed 85 dBA at any time. Sound levels in excess of these values are sufficient cause to have the Work halted until equipment can be quieted to these levels. Work stoppage by the County/Professional for excessive noise shall not relieve the Contractor of the other portions of this specification including, but not limited to, completion dates and bid amounts.
- C. No extra charge may be made for time lost due to work stoppage resulting from the creation of a public nuisance.

## 1.8 CONTRACTOR'S PAYMENTS TO COUNTY FOR OVERTIME WORK

- A. County Inspector Work Hours: Normal work hours for the County's inspector(s) are defined as any 8-hour period between the hours of 7:00 a.m. and 7:00 p.m. on

the weekdays of Monday through Friday.

- B. Any County Inspector(s) work beyond the aforementioned normal work hours shall be requested in writing 48-hours in advance. All overtime, any County holidays or weekend work compensation for the County's Inspector(s) to work beyond the normal working hours are considered overtime compensation and shall be paid for by the Contractor.
- C. The overtime pay rate will be \$51.00 per hour or the most current rate as listed in the County Fee Directory prepared by the Office of Management and Budget, in section "Orange County Utilities Engineering & Construction", under the heading of "Inspection Fee other than Normal Working Hours".
- D. The Contractor agrees that the County shall deduct charges for work outside normal work hours and for overtime pay from payments due the Contractor.

#### 1.9 MAINTENANCE OF SERVICE

- A. Unless noted otherwise on the plans, the operation of the existing water, reclaimed water or wastewater facility on each of the respective locations shall remain in service until the transfer of service has been completed. The Contractor shall, prior to interrupting any utility service (water, sewer, etc.) for the purpose of making cut-ins to the existing lines or for any other purposes, contact the County and make arrangements for the interruption which will be satisfactory to the County.
- B. Utility lines that are damaged during construction shall be repaired by the Contractor and service restored within 4-hours of the breakage. The County retains the option of repairing any damage to utility pipes in order to expedite service to the customers. The Contractor will remain responsible for all costs associated with the repair.

#### 1.10 TRANSFER OF SERVICE

- A. When the County has accepted a proposed facility and placed it into operation, the transfer of service is complete. The Contractor may begin the work of removing the existing or temporary facilities.

#### 1.11 LABOR

- A. Supervision: The Contractor shall supervise and direct the Work efficiently and with his best skills and attention. The Contractor shall have a competent, English speaking superintendent or representative, who shall be on the site of the Project at all working hours, and who shall have full authority by the Contractor to direct the performance of the Work and make arrangements for all necessary materials, equipment, and labor without delay.
- B. Jurisdictional Disputes: It shall be the responsibility of the Contractor to pay all costs that may be required to perform any of the Work shown on the Drawings or specified herein to avoid any work stoppages due to jurisdictional disputes. The basis for subletting work in question, if any, shall conform to precedent agreements and decisions on record with the Building and Construction Trades Department, AFL-CIO, dated June, 1973, including any amendments thereto.

- C. Apprenticeship: The Contractor shall comply with all of the requirements of Section 446, Florida Statutes, for all contracts in excess of \$25,000 excluding roadway, highway or bridge contracts and the Contractor agrees to insert in any subcontract under this Contract the requirements of this Article.

## 1.12 MATERIALS AND EQUIPMENT

### A. MANUFACTURER

1. All transactions with the manufacturers or Subcontractors shall be through the Contractor, unless the Contractor and the County/Professional request that the manufacturer or Subcontractor communicate directly with the County/Professional. Any such transactions shall not in any way release the Contractor from his full responsibility under this Contract.
2. All workmanship and materials shall be of the highest quality. The equipment shall be the product of manufacturers who are experienced and skilled in the field with an established record of research and development. No equipment will be considered unless the manufacturer has designed and manufactured equipment of comparable type and size and have demonstrated sufficient experience in such design and manufacture.
3. No material shall be delivered to the Site without prior approval of the County/Professional.
4. All apparatus, mechanisms, equipment, machinery, and manufactured articles for incorporation into the Project shall be the new (most current production at time of bid) and unused standard products of recognized reputable manufacturers.
5. Manufactured and fabricated products:
  - a. Design, fabricate and assemble in accord with the best engineering and shop practices.
  - b. Manufacture like parts of duplicate units to standard sizes and gauges, to be interchangeable.
  - c. Any two or more pieces of material or equipment of the same kind, type or classification, and being used for identical types of service, shall be made by the same manufacturer.
  - d. Products shall be suitable for service conditions as specified and as stated by manufacturer.
  - e. Equipment capacities, sizes and dimensions shown or specified shall be adhered to unless variations are specifically approved in writing.
  - f. Do not use material or equipment for any purpose other than that for which it is designed or is specified.

## 1.13 MANUFACTURER'S SERVICE

- A. Where service by the manufacturer is specified to be furnished as part of the cost of the item of equipment, the Work shall be at the Contractor's expense.
- B. The services shall further demonstrate to the County/Professional's complete satisfaction that the equipment will satisfactorily perform the functions for which it has been installed.

## 1.14 INSPECTION AND TESTING

#### A. General

1. All materials and equipment furnished by the Contractor shall be subject to the inspection, review and acceptance of the County and meet the requirements as outlined in the Orange County Utilities Standards and Construction Specifications Manual. If in the testing of any material or equipment it is ascertained by the County/Professional that the material or equipment does not comply with the Contract, the Contractor shall be notified thereof, and the Contractor will be directed to refrain from delivering said material or equipment, or to remove it promptly from the Site or from the Work and not accepted by the County shall be replaced with acceptable material, without cost to the County.
2. Tests of electrical and mechanical equipment and appliances shall be conducted in accordance with recognized test codes of the ANSI, ASME, or the IEE, except as may otherwise be stated herein.
3. The Contractor shall give notice in writing to the County sufficiently in advance of his intention to commence the manufacture or preparation of materials especially manufactured or prepared for use in or as part of the permanent construction. Such notice shall contain a request for inspection, the date of commencement and the expected date of completion of the manufacture or preparation of materials. Upon receipt of such notice, the County shall arrange to have a representative present at such times during the manufacture as may be necessary to inspect the materials; or the County will notify the Contractor that the inspection will be made at a point other than the point of manufacture; or the County will notify the Contractor that inspection will be waived.
4. When inspection is waived or when the County/Professional so requires, the Contractor shall furnish to the County authoritative evidence in the form of Certificates of Manufacture that the materials to be used in the Work have been manufactured and tested in conformity with the Contract Documents. These certificates shall be notarized and shall include five (5) copies of the results of physical tests and chemical analysis, where necessary, that have been made directly on the product or on similar products of the manufacturer.
5. The Contractor must comply with these provisions before shipping any material. Such inspections by the County shall not release the Contractor from the responsibility for furnishing materials meeting the requirements of the Contract Documents.

#### B. Cost

1. County shall employ and pay for the services of an independent testing laboratory to perform testing indicated on the Contract Documents, or at the County's discretion to

ensure conformity with the Contract Documents.

2. The cost of field leakage and pressure tests and shop tests of materials and equipment specifically called for in the Contract Documents shall be borne by the Contractor. Such costs shall be deemed to be included in the Contract price.
3. The Contractor shall notify the County laboratory a minimum of 48-hours in advance of operations for scheduling of tests. When tests or inspections cannot be performed after such notice, the Contractor shall reimburse County for expenses incurred.
4. The Contractor shall pay for all work required to uncover, remove, replace, retest, etc., any work not tested due to the Contractor's failure to provide the 48-hours advance notice or due to failed tests. The Contractor shall also provide compensation for the County/Professional's personnel for required re-testing due to failed or rescheduled testing.

C. Shop Testing

1. Each piece of equipment for which pressure, duty, capacity, rating, efficiency, performance, function or special requirements are specified shall be tested in the shop of the manufacturer in a manner which shall conclusively prove that its characteristics comply fully with the requirements of the Contract Documents. No such equipment shall be shipped to the worksite until the County/Professional notifies the Contractor, in writing, that the results of such tests are acceptable.
2. The manufacturing company shall provide five (5) copies of the manufacturer's actual shop test data and interpreted results signed by a responsible official of the manufacturing company and notarized, showing conformity with the Contract Documents as a prerequisite for the acceptance of any equipment. The cost of shop tests (excluding cost of County's representative) and of furnishing manufacturer's preliminary and shop test data of operating equipment shall be borne by the Contractor and shall be included in the Contract price.

D. Field Testing:

1. The County shall employ and pay for services of an independent testing laboratory to perform testing specifically indicated in the Contract Documents. Employment of the laboratory shall in no way relieve Contractor's obligations to perform the Work of the Contract. The Contractor shall provide compensation for retesting of all failed tests.
2. The County may at any time during the progress of the Work, request additional testing beyond that which is specified in the Contract. This testing will be at the County's expense. Contractor shall:
  - a. Cooperate with laboratory personnel, provide access to the Project.
  - b. Secure and deliver to the laboratory adequate quantities of representative samples of materials proposed to be used and which require testing.
  - c. Provide to the laboratory the preliminary design mix proposed to be used for concrete, and other material mixes, which require control by the testing laboratory.

- E. Demonstration Tests: Upon completion of the Work and prior to final payment, all equipment and piping installed under this Contract shall be subjected to acceptance or demonstration tests as specified or required to provide compliance with the Contract Documents. The Contractor shall furnish all labor, fuel, energy, water and all other equipment necessary for the demonstration tests at no additional cost to the County.

- F. Final Inspection: Prior to preparation of the final payment application, a final inspection will be performed by the County to determine if the Work is properly and satisfactorily constructed in accordance with the requirements of the Contract Documents. See also Section 01700 "Project Closeout."
- G. Inspection by existing utility owners: The Contractor shall pay for all inspections during the progress of the work required and provided by the owner of all existing public utilities paralleling or crossing the Work, as shown on the Drawings. All such inspection fees shall be deemed included in the appropriate Contract Item or items, or if no specific item is provided therefore, as part of the overhead cost of the Work, and no additional payment will be made therefore.
- H. Inspection by Other Agencies: The Florida Department of Transportation, the Florida Department of Environmental Protection, and other authorized governmental agencies shall have free access to the site for inspecting materials and work, and the Contractor shall afford them all necessary facilities and assistance for doing so. Any instructions to the Contractor resulting from these inspections shall be given through the County. These rights of inspections shall not be construed to create any contractual relationship between the Contractor and these agencies.

## 1.15 PROJECT SITE AND ACCESS

### A. RIGHT-OF-WAY AND EASEMENTS

1. The use of public streets and alleys shall be such as to provide a minimum of inconvenience to the public and to other traffic. Any earth or other excavated material shall be removed by the Contractor and the streets cleaned to the satisfaction of the County.
2. The Contractor shall not enter or occupy private land outside of easements, except by written permission of the property owner.
3. At the time of the Pre-Construction meetings, the Contractor shall become fully acquainted with the status of all easements. Should easements not be acquired by the County in specific areas of the Work, the Contractor shall sequence and schedule his work therein so as not to interfere with the progress of work in other areas of the Project. Any rescheduling of work due to easement acquisitions shall be performed by the Contractor at no additional cost to the County. The County agrees that it will make every effort to acquire all remaining easements with all speed and diligence possible so as to allow the completion of the Work within the Contract time.

### B. ACCESS

1. Neither the material excavated nor the materials or equipment used in the construction of the Work shall be so placed as to prevent free access to all fire hydrants, valves or manholes.
2. Access to businesses located adjacent to the project site must be maintained at all times. Contractor may prearrange the closing of business access with the business Owner. Such prearranged access closing shall not exceed two (2) hours. Property drainage and grading shall be restored and all construction debris removed within 48-hours of backfilling trench.

3. Contractor agrees that representatives of the County and any governmental agents will have access to the Work wherever it is in preparation or progress and that the Contractor shall provide facilities for such access and inspection.

## 1.16 UTILITIES

### A. UTILITY CONSTRUCTION

1. Public utility installations and structures shall be understood to include all poles, tracks, pipes, wires, conduits, house service connections, vaults, manholes and all other appurtenances and facilities pertaining thereto, whether owned or controlled by governmental bodies or privately owned by individuals, firms or corporations, used to serve the public with transportation, traffic control, gas, electricity, telephone, sewerage, drainage or water. Other public or private property, which may be affected by the Work, shall be deemed included hereunder.
2. All open excavations shall be adequately safeguarded by providing temporary barricades, caution signs, lights and other means. The Contractor shall, at his own expense, provide suitable and safe bridges and other crossings for accommodating travel by pedestrians and workmen. Bridges provided for access to private property during construction shall be removed when no longer required.
3. The length of open trench will be controlled by the particular surrounding conditions, but shall always be confined to the limits described by the County. If any excavation becomes a hazard, or if it excessively restricts traffic at any point, the County may require special construction procedures. As a minimum, the Contractor shall conform to the following restoration procedures:
  - a. Interim Restoration: All excavations shall be backfilled and compacted as specified by the end of each working day. For excavations within existing paved areas; limerock base or soil cement base (match existing) shall be spread and compacted to provide a relatively smooth surface free of loose aggregate material. At the end of each workweek, the S-I asphaltic surface course shall be completed and opened to traffic. Contractor shall coordinate his construction activity including density tests and inspections to allow sufficient time to achieve this requirement. All driveway cuts shall be backfilled, compacted, and limerock base spread and compacted immediately after installation. Contractor shall coordinate with the individual property owners prior to removing the driveway section. Any utility crossing an existing roadway, parking lot or other paved area shall be patched by the end of the working day.
  - b. All pipe and fittings shall be neatly stored in a location, which will cause the least disturbance to the public. All debris shall be removed and properly disposed of by the end of each working day.
  - c. Final Restoration Overlay: After completing all installations, and after testing of the pipe (but no sooner than 30-days after applying the S-I asphaltic surface), final restoration shall be performed. In no event shall final restoration begin after substantial completion. Final restoration shall provide an S-III asphaltic overlay as specified in an uninterrupted continuous operation until completion. Any additional restoration required after testing shall be repaired in a timely manner at no additional cost to the County.

- d. Maintenance of all restored facilities shall be the Contractor's responsibility. This maintenance shall be performed on an on-going basis during the course of construction. The Contractor's Progress Schedule shall reflect the above restoration requirements.
- e. Additional Restoration for Work in Business or Commercial Districts: The Contractor shall restore all private property, damaged by construction, to its original condition. Access to businesses located adjacent to the project site must be maintained at all times. Contractor may prearrange the closing of business accesses with the business owner. Such prearranged access closing shall not exceed two (2) hours. Property drainage and grading shall be restored within 24-hours of backfilling trench.

## B. EXISTING UTILITIES

1. The locations of all existing underground piping, structures and other facilities are shown based on information received from the respective owner. The locations are shown without express or implied representation, assurance, or guarantee that they are complete or correct or that they represent a true picture of underground piping, conduit and cables to be encountered. It is the Contractor's responsibility to verify all existing underground piping, structures and other facilities.
2. The Contractor shall, at all times, employ acceptable methods and exercise reasonable care and skill so as to avoid unnecessary delay, injury, damage or destruction of existing utility installations and structures; and shall, at all times in the performance of the Work, avoid unnecessary interference with, or interruption of, utility services; and shall cooperate fully with the owners thereof to that end.
3. When existing facilities are found to be in conflict with the Work, the County reserves the right to modify alignments to avoid interference with existing facilities.
4. All utilities, which do not interfere with the work, shall be carefully protected against damage. Any existing utilities damaged in any way by the Contractor shall be restored or replaced by the Contractor at his expense as directed by the County. Any existing facilities, which require operation to facilitate repairs, shall be operated only by the owner of the respective utility.
5. It is the responsibility of the Contractor to ensure that all utility and/or poles, the stability of which may be endangered by the proximity of excavation, be temporarily stayed and/or shored in position while work proceeds in the vicinity of the pole and that the utility or other companies concerned be given reasonable advance notice of any such excavation.

## C. NOTICES

1. All governmental utility departments and other owners of public utilities, which may be affected by the Work, will be informed in writing by the Contractor two (2) weeks after the execution of the Contract or Contracts covering the Work. Such notice will be sent out in general, and directed to the attention of the governmental utility departments and other owners of public utilities for such installations and structures as may be affected by the Work.
2. The Contractor shall comply with Florida Statute 553.851 regarding protection of underground gas pipelines. Evidence of notification to the gas pipeline owner shall be furnished to the County within two (2) weeks after the execution of the Contract.

3. It shall be the Contractor's responsibility to contact utility companies at least 72-hours in advance of breaking ground in any area or on any unit of the work so maintenance personnel can locate and protect facilities, if required by the utility company.
4. The Contractor shall give a minimum five (5) working day notice to utility personnel prior to interrupting a utility service (water, sewer, etc.).

#### D. EXPLORATORY EXCAVATIONS

1. Exploratory excavations shall be conducted by the Contractor for the purpose of locating underground pipelines or structures in advance of the construction. Test pits shall be excavated in areas of potential conflicts between existing and proposed facilities and at piping connections to existing facilities a minimum of 48-hours or 1,000-feet in advance of work. If there is a potential conflict, the Contractor shall notify the County/Professional immediately. Information on the obstruction to be furnished by the Contractor shall include: Location, Elevation, Utility Type, Material and Size. Test pits shall be backfilled immediately after their purpose has been satisfied and the surface restored and maintained in a manner satisfactory to the County.

#### E. UTILITY CROSSINGS

1. It is intended that wherever existing utilities must be crossed, deflection of the pipe within specified limits and cover shall be used to satisfactorily clear the obstruction unless otherwise indicated on the Drawings. However, when in the opinion of the County this procedure is not feasible, the County may direct the use of fittings for a utility crossing or conflict transition as detailed on the Drawings.

#### F. RELOCATIONS

1. Relocations shown on the Drawings: Public utility installations or structures, including but not limited to poles, signs, fences, piping, conduits and drains that interfere with the positioning of the work which are shown on the Drawings to be removed, relocated, replaced or rebuilt by the Contractor shall be considered as part of the general cost of doing the Work and shall be included in the prices bid for the various contract items. No separate payment shall be made therefore.
2. Relocations not shown on the Drawings
  - a. Where public utility installations or structures are encountered during the course of the work, and are not indicated on the Drawings or in the Specifications, and when, in the opinion of the County, removal, relocation, replacement or rebuilding is necessary to complete the Work, such work shall be accomplished by the utility having jurisdiction, or such work may be ordered, in writing by the County, for the Contractor to accomplish.
  - b. If such work is accomplished by the utility having jurisdiction, it will be carried out expeditiously and the Contractor shall give full cooperation to permit the utility to complete the removal, relocation, replacement or rebuilding as required.
  - c. If such work is accomplished by the Contractor, it will be paid for as a Change Order.
3. All existing castings, including valve boxes, junction boxes, manholes, hand holes, pull boxes, inlets and similar structures in the areas of construction that are to remain in service and in areas of trench restoration and pavement replacement, shall be

- adjusted by the Contractor to bring them flush with the surface of the finished work.
4. All existing utility systems which conflict with the construction of the work herein, which can be temporarily removed and replaced, shall be accomplished at the expense of the Contractor. Work shall be done by the utility unless the utility approves in writing that the Work may be done by the Contractor.

## 1.17 RELATED CONSTRUCTION REQUIREMENTS

### A. PUBLIC INFORMATION OFFICER

1. The Contractor shall provide community interaction and coordination through a designated Public Information Officer (PIO). The PIO will provide resolution to complaints and problems from community members affected by the construction for the entire project duration. The PIO will manage a 24-hour hotline phone number for citizens to call. The PIO will field these calls, provide answers to questions, research issues with the project team or appropriate agencies and follow up each complaint in a timely manner. The PIO will maintain a daily diary of call and/or interactions with the community, as well as a complaint log chronicling all issues and proposed resolutions.
2. The PIO shall attend the project progress meetings and provide the project team with a report of public issues since the last progress meeting. The PIO will also disseminate roadway closures, sewer hookups, temporary and permanent restoration and other relevant construction information to the community, as well as, when appropriate, to the media, emergency services personnel and other interested agencies.
3. The designated PIO shall have previous experience in providing similar services on Orange County Utilities, Orange County Public Works or FDOT construction projects. The PIO shall be fluent in English and Spanish and shall visit the construction site, meeting locations and affected resident's homes as required.

### B. TRAFFIC MAINTENANCE

1. Refer to Section 01570 – Maintenance of Traffic

### C. BARRIER AND LIGHTS

1. The Contractor shall exercise extreme care in the conduct of the Work to protect health and safety of the workmen and the public. The Contractor shall provide all protective measures and devices necessary, in conformance with applicable local, state and federal regulations. Protective measures shall include but are not limited to barricades, warning lights/flashers and safety ropes.
2. All equipment and vehicles operating within 10-feet of the roadway shall have flashing strobe lights attached.

### D. DEWATERING AND FLOTATION

1. The Contractor, with his own equipment, shall do all pumping necessary to dewater any part of the work area during construction operations to insure dry working conditions. The Contractor shall take the necessary steps to protect on-site and off-site structures. Damage to any structures due to dewatering shall be repaired or the structures replaced at the Contractor's expense.

2. The Contractor shall be completely responsible for any tanks, wetwells or similar structures that may become buoyant during the construction and modification operations due to the ground water or floods and before the structure is put into operation. The proposed final structures have been designed to account for buoyancy; however the Contractor may employ methods, means and techniques during construction which may affect the buoyancy of structures. The Contractor shall take the necessary steps to protect structures. Damage to any structures due to floating or flooding shall be repaired or the structures replaced at the Contractor's expense.
3. Contractor shall be responsible for any required permits for the discharge of ground water.

#### E. DUST AND EROSION CONTROL

1. The Contractor shall prevent dust nuisance from his operations or from traffic.
2. Contractor is responsible for providing effective temporary erosion and sediment control measures during construction or until final controls become effective.
3. Temporary erosion controls include, but are not limited to, grassing, mulching, netting, watering and reseeding on-site surfaces and soil and borrow area surfaces and providing interceptor ditches at ends of berms and at those locations which will ensure that erosion during construction will be either eliminated or maintained within acceptable limits as established by the County, FDEP and any other agency having jurisdiction.
4. Temporary sedimentation controls include, but are not limited to; silt dams, traps, barriers, and appurtenances at the foot of sloped surfaces which will ensure that sedimentation pollution will be either eliminated or maintained within acceptable limits as established by the County, FDEP and any other agency having jurisdiction.
5. The construction of temporary erosion and sedimentation control facilities shall be in accordance with the technical provision of section 104 "Prevention, Control, and Abatement of Erosion and Water Pollution" of the FDOT Standard Specifications for Road and Bridge Construction, latest edition.

#### F. LINES AND GRADES

1. All Work under this Contract shall be constructed in accordance with the lines and grades shown on the Drawings, or as given by the County/Professional.
2. When the location of the Work is dimensioned on the Drawings, it shall be installed in that location; when the location of the Work is shown on a scaled drawing, without dimensions, the Work shall be installed in the scaled location unless the County approves an alternate location for the piping. Where fittings are noted on the Drawings, such notation is for the Contractor's convenience and does not relieve the Contractor from laying and jointing different or additional items where required. The County/Professional may require detailed pipe laying drawings and schedules for project control.
3. The Contractor shall, at his own expense, establish all working or construction lines and grades as required from the project control points set by the County, and shall be solely responsible for the accuracy thereof.
4. Water main and forcemain shall be installed to provide long uniform gradient or slope to pipe to minimize air pockets and air release valves. The stationing shown on the Drawings for air and vacuum release valve assemblies are approximate and the

Contractor shall field adjust these locations to locate these valves at the highest point in the pipeline installed. All locations must be accepted by the County.

5. To insure a uniform gradient for gravity pipe and pressure pipe, all lines shall be installed using the following control techniques as a minimum:
  - a. Gravity lines; continuous control, using laser beam technology.
  - b. Pressure lines; control stakes set at 50-foot intervals using surveyors' level instrument.

#### G. TEMPORARY CONSTRUCTION

1. Temporary fences: If, during the course of the Work, it is necessary to remove or disturb any fencing, the Contractor shall at his own expense, provide a suitable temporary fence which shall be maintained until the permanent fence is replaced.
2. Responsibility for Temporary Structures: In accepting the Contract, the Contractor assumes full responsibility for the sufficiency and safety of all temporary structures or work and for any damage which may result from their failure or their improper construction, maintenance or operation.

#### H. DAILY REPORTS

1. The Contractor shall submit to the County's Representative daily reports of construction activities including non-work days. The reports shall be complete in detail and shall include the following information:
  - a. Days from Notice to Proceed; Days remaining to substantial and final completion.
  - b. Weather information
  - c. Work activities with reference to the Critical Path Method (CPM) schedule activity numbers (including manpower, equipment and daily production quantities for each individual activity).
  - d. Major deliveries
  - e. Visitors to site
  - f. Test records
  - g. New problems, and
  - h. Other pertinent information
2. A similar report shall be submitted for/by each Subcontractor.
3. The report(s) shall be submitted to the County Representative within 2 days of the respective report date. Each report shall be signed by the Contractor's Superintendent or Project Manager. Pay request will not be processed unless daily reports are current.
4. If a report is incomplete, in error, or contains misinformation, a copy of the report shall be returned by the County Representative to the Contractor's Superintendent or Project Manager with corrections noted. When chronic errors or omissions occur, the Contractor shall correct the procedures by which the reports are produced.

#### I. CLEANING

1. During Construction
  - a. During construction of the Work, the Contractor shall, at all times, keep the Site free from material, debris and rubbish as practicable and shall remove the same from any portion of the Site if, in the opinion of the County, such material, debris, or rubbish constitutes a nuisance or is objectionable.

- b. Provide on-site containers for the collection of waste materials, debris and rubbish and remove such from the Site periodically by disposal at a legal disposal area away from the Site.
  - c. Clean interior spaces prior to the start of finish painting and continue cleaning on an as-needed basis until painting is finished. Use cleaning materials which will not create hazards to health or property and which will not damage surfaces. Use only those cleaning materials and methods recommended by the manufacturer of the surface material. Schedule operations so that dust and other contaminants resulting from cleaning process will not fall on wet or newly coated surfaces.
  - d. The Contractor shall remove from the site all surplus materials and temporary structures when no longer necessary to the Work at the direction of the County.
2. Final Cleaning
- a. At the conclusion of the Work, all equipment, tools, temporary structures and materials belonging to the Contractor shall be promptly taken away, and the Contractor shall remove and promptly dispose of all water, dirt, rubbish or any other foreign substances. Employ skilled workmen for final cleaning. Thoroughly clean all installed equipment and materials to a bright, clean, polished and new appearing condition. Remove grease, mastic, adhesives, dust, dirt, stains, fingerprints, labels, and other foreign materials from sight-exposed interior and exterior surfaces. Broom clean exterior paved surfaces; rake clean other surfaces of the grounds.
  - b. The Work shall be left in a condition as shown on the Drawings and the remainder of the site shall be restored to a condition equal or better than what existed before the Work.
  - c. Prior to final completion, or County occupancy, Contractor shall conduct an inspection of interior and exterior surfaces, and all work areas to verify that the entire Work is clean. The County will determine if the final cleaning is acceptable.

#### 1.18 CONSTRUCTION NOT PERMITTED

##### A. USE OF EXPLOSIVES

- 1. No blasting shall be done except as approved by the County and the governmental agency or political subdivision having jurisdiction.

#### **PART 2 - PRODUCTS (NOT USED)**

#### **PART 3 - EXECUTION (NOT USED)**

END OF SECTION

## SECTION 01010

### SUMMARY OF WORK

#### PART 1 GENERAL

It is speculated that sediment and biological substances have accumulated in the County water distribution system over the years, which is causing regularly occurring water quality problems. In addition to periodic spot flushing of the system, which is currently being completed, the County will implement a UDF program for up to three (3) area flushes per year under this contract. The Contractor shall provide a Uni-directional Flushing (UDF) Program for the specified areas of the County distribution system.

Work on this Contract consists of reviewing existing UDF plans, confirmation of existing plans or recommendations for revision to such plans with County, establishing a schedule, and phasing for completion of the UDF; including field services and data collection, and conducting the flushing program in accordance with these Specifications and Requirements.

The Contractor shall furnish all labor, materials, equipment, personal protective equipment, tools, supervision, transportation and other incidentals as required to provide services on this contract.

A UDF program typically models and sequentially power flushes a water distribution system. High water velocity is used in order to create a scouring action, which is then discharged through hydrants and blow-off valves, removing the build-up from the pipe, improving water quality. The process is effective in removing accumulated sediments and biofilm from water systems, thus improving overall water quality and helping maintain chlorine residuals at required levels.

County intends to assign approximately 300 miles of distribution network piping to the UDF program annually. The system consists of three major service areas with approximately 1,800 total miles of pipe.

#### 1.1 SUMMARY

- A. The County intends to enter into an open-end contract with a Contractor to provide a Valve Exercising and Uni-directional Flushing (UDF) Program for Orange County Utilities Department.
- B. Work on this contract consists of reviewing existing Orange County Utilities (OCU) UDF plans, provide review, updates and confirmation with those plans, and execute the approved UDF plan.
- C. Execution of the plan includes valve, hydrant and blow-off valve data collection, assessment and exercising prior to running the UDF in accordance with these Specifications and Requirements.

- D. The Contractor shall furnish all labor, materials, equipment, personal protective equipment, tools, supervision, transportation and other incidentals as required to provide services on this contract.
- E. The Contractor shall perform the Work complete, in place, and ready for continuous service, and shall include repairs, testing, permits, cleanup, replacements and restoration required as a result of disruption or damages caused during this Construction.
- F. All materials, equipment, skills, tools and labor which is reasonably and properly inferable and necessary for the proper completion of the Work in a substantial manner and in compliance with the requirements stated or implied by these Specifications, Drawings, Job Quotation Form and Delivery Order shall be furnished and installed by the Contractor without additional compensation, whether specifically indicated in the Contract Documents or not.
- G. The Contractor shall furnish all labor, equipment, tools, services and incidentals to complete all Work required by these Specifications and as shown on the Drawings. If conflicts arise between these specifications and the latest OCU Standards and Construction Specification Manual, then the OCU Standards shall govern.
- H. The Contractor shall perform the Work complete, in place, and ready for continuous service, and shall include repairs, testing, permits, cleanup, replacements and restoration required as a result of disruption or damages caused during this Construction.
- I. All materials, equipment, skills, tools and labor which is reasonably and properly inferable and necessary for the proper completion of the Work in a substantial manner and in compliance with the requirements stated or implied by these Specifications, Drawings, Job Quotation Form and Delivery Order shall be furnished and installed by the Contractor without additional compensation, whether specifically indicated in the Contract Documents or not.
- J. The Contractor shall comply with all Municipal, County, State, Federal, and other codes which are applicable to this Project.

## 1.2 WORKING HOURS

- A. Working hours for the County Inspector are an 8-hour period between the hours of 7:00 a.m. and 7:00 p.m., Monday through Friday.
- B. Some areas may require work to be performed outside the normal working hours of 7:00 a.m. and 7:00 p.m. Monday through Friday.
- C. Any work beyond the 8-hour period is to be requested in writing 48 hours prior and approved by the County.
- D. Any work required on Saturday, Sunday or Holidays shall be requested in writing 48 hours in advance and approved by the County.
- E. No additional payment shall be made to the Contractor for night or weekend work.

- F. All requests must be submitted to the County and approved by the County in advance. Under emergency situations, a verbal request may be made with a follow-up written request.
- G. Flushing operations shall be ceased by 5:00 pm during normal work hours and by 6:00 am during night work hours. Reference Section 13440 part 3.1 for requirements on work plan submittals.

### 1.3 CONTRACTOR'S USE OF PREMISES

- A. The Contractor shall assume full responsibility for the protection and safekeeping of products and materials at the job site. If additional storage or work areas are required, they shall be obtained by the Contractor at no additional cost to the Owner.

### 1.4 SEQUENCE OF WORK

- A. The Contractor shall coordinate the sequence of work with OCU.

### 1.5 PUBLIC UTILITY INSTALLATIONS AND STRUCTURES

- A. The Contractor shall give written notice to all governmental utility departments and other owners of public utilities of the location of the proposed construction operations, at least seventy-two hours in advance of any area or on any unit of the Work.
- B. Some of the utility contacts are listed on the plans for the Contractor's convenience.
- C. The maintenance, repair, removal, relocation or rebuilding of the public utility installation and structures, when accomplished by the Contractor as herein provided, shall be done by methods approved by the utility involved.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

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**SECTION 01025**  
**MEASUREMENT AND PAYMENT**

**PART 1 - GENERAL**

1.1 REQUIREMENTS INCLUDED

- A. This Section specifies administrative and procedural requirements to define pay items and determine payable amounts, and includes but is not limited to:
  - 1. General Provisions
  - 2. Cash Allowances
  - 3. Work Not Paid for Separately
  - 4. Measurement for Payment
  - 5. Partial Payment for Stored Materials and Equipment

1.2 GENERAL PROVISIONS

- A. This specification includes standard descriptions for all bid items. This Contract's specific bid items are listed in the Bid Schedule.
- B. The total Contract Amount shall cover the Work required by the Contract Documents. All costs in connection with the successful completion of the Work, including furnishing all materials, equipment, supplies, and appurtenances; providing all construction, equipment, and tools; and performing all necessary labor and supervision to fully complete the Work, shall be included in the unit and lump sum prices bid. All Work not specifically set forth as a pay item in the Bid Form shall be considered a subsidiary obligation of the Contractor and all costs in connection therewith shall be included in the prices bid.
- C. If used, all estimated quantities stipulated in the Bid Schedule or other Contract Documents are approximate and are to be used only (a) for the purpose of comparing the bids submitted for the Work, and (b) as a basis for determining an initial Contract Amount. The actual amounts of Work completed and materials furnished under unit price items may differ from the estimated quantities. The County does not expressly or by implication represent that the actual quantities involved will correspond exactly to the quantities stated in the Bid Schedule; nor shall the Contractor plead misunderstanding or deception because of such estimate or quantities or of the character, location or other conditions pertaining to the Work. Payment to the Contractor will be made only for the actual quantities of work performed or material furnished in accordance with the Drawings and other Contract Documents, and it is understood that the quantities may be increased or decreased as provided in the General Conditions.

- D. If used, the unit prices listed in the Bid Schedule shall include all services, obligations, responsibilities, labor, materials, devices, equipment, royalties and license fees, supervision, temporary facilities, construction equipment, bonds, insurance, taxes, clean up, traffic control, control surveys, field offices, close out, overhead and profit and all connections, appurtenances and any other incidental items of any kind or nature, as are necessary to complete the Work in accordance with the Contract Documents.
- E. Except for mobilization/demobilization and project record documents, payment for Work will be based on the percent of completed work of each item in the Schedule of Values, including stored materials, as determined by the County. Progress of work in each item of the Schedule of Values will be determined separately by the County. However, the County will issue a single payment certificate for progress on the Contract.
- F. The Contractor agrees that it will make no claim for damages, anticipated profits, or otherwise because of any difference between the amounts of work actually performed and materials actually furnished and the estimated amounts therefore.
- G. Where payment by scale weight is specified under certain items, the Contractor shall provide suitable weighing equipment which shall be kept in accurate adjustment at all times and certified. The weighing of all material shall be performed by the Contractor in the presence and under the supervision of the County.
- H. All schedules included in the Contract Documents are given for convenience and are not guaranteed to be complete. The Contractor shall assume all responsibility for the making of estimates of the size, kind, and quantity of materials and equipment included in work to be done under this Contract.
- I. Where pipe fittings are noted on the Drawings, such notation is for the Contractor's convenience and does not relieve the Contractor from laying and jointing different or additional items where required.
- J. All contracts shall be subject to 10% minimum retainage as defined in the General Conditions and the Agreement.

### 1.3 CASH ALLOWANCES

- A. The Contractor shall include in the Total Bid Amount, all cash allowances stated in the Contract Documents. Items covered by these allowances shall be supplied for such amounts and by such persons as the County may direct.
- B. The Contractor will obtain the County's written acceptance before providing equipment, materials or other Work under a cash allowance. Payments under a cash allowance will be made based on actual costs, excluding costs of general conditions, handling, unloading, storage, installation, testing, etc., which will be considered to be included within the Contract Price. Payments within the limits of any Allowance will exclude overhead and profit and bond and insurance premiums, since those costs will be considered to be included within the Contract Amount. The Contractor shall submit appropriate documentation to validate the actual cost of the item.

- C. The amount of the allowance shall be adjusted accordingly by Change Order to recognize the allowable cost incurred by the Contractor.

#### 14 WORK NOT PAID FOR SEPARATELY

- A. Delivery: Payment for equipment delivery, storage or freight shall be included in the pay items including their installation and no other separate payment will be made therefore.
- B. Bonds: Payment for bonds required by the Contract shall be included in the pay items for the Work covered by the required bonds and no separate payment will be made.
- C. Preparation of Site: Payment for preparation of site shall be included in pay items proposed for the various items of Work and no separate payment will be made therefore. Preparation of site includes setting up construction plant, offices, shops, storage areas, sanitary and other facilities required by the specifications or state law or regulations; providing access to the site; obtaining necessary permits and licenses; payments of fees; general protection, temporary heat and utilities including electrical power; providing shop and working drawings, certificates and schedules; providing required insurance; preconstruction photographs and videos; clearing and grubbing; removal of existing pavements, sidewalks and curbs; trench excavation, sheeting, shoring and bracing; dewatering and disposal of surplus water; structural fill, backfill, compaction and grading; testing materials and apparatus; maintenance of drainage systems; appurtenant work; record drawing and close-out documentation; cleaning up; and all other work regardless of its nature which may not be specifically referred to in a Bid Item but is necessary for the complete construction of the project set forth by the Contract.
- D. Permitting & Permit Fees.
- E. The County reserves the right to delete any item included in the Schedule of Values and decrease the Contract Price by the scheduled amount for the item deleted.

#### 15 MEASUREMENT FOR PAYMENT

- A. Methods of Measurement - Generally:
  - 1. Units of measurement shall be defined in general terms as follows:
    - a. Linear Feet (LF)
    - b. Square Feet (SF)
    - c. Square Yards (SY)
    - d. Cubic Yards (CY)
    - e. Each (EA)
    - f. Sacks (SK)
    - g. Lump Sum (LS)

2. Unit Price Contracts/Items:

- a. Linear Feet (LF) shall be measured along the horizontal length of the centerline of the installed material, unless otherwise specified. Pipe shall be measured along the length of the completed pipeline, regardless of the type of joint required, without deduction for the length of valves or fittings. Pipe included within the limits of lump sum items will not be measured.
- b. Square Feet (SF), Square Yards (SY), Cubic Yards (CY), Each (EA) and Sacks (SK) shall be measured as the amount of the unit of measure installed and compacted within the limits specified and shown in the Specifications and Drawings. Slope angles and elevations shall be measured using land-surveying equipment. Contractor shall provide supporting documentation (i.e. drawings, delivery tickets, invoices, survey calculations, etc.) to verify actual installed quantities.

B. Lump Sum Contracts/Items - Generally:

1. Quantities provided in the Schedule of Values are for the purpose of estimating the completion status for progress payments. Payment will be made for each individual item on a percentage of completion basis as estimated by the Contractor and approved by the County.
2. Adjustments to costs provided in the accepted Schedule of Values may be made only by Change Order.
3. The County reserves the right to delete any item included in the Schedule of Values and decrease the Contract Price by the scheduled amount for the item deleted.

1.6 MEASUREMENT AND PAYMENT ITEMS

- A. ***Only those bid items included in the Bid Schedule are applicable for this Contract.*** The County has standardized the measurement and payment items. Currently, there are approximately 100 measurement and payment items describing approximately 300 bid items. The bid item numbering system comprises five sections that are divided into 23 subsections.

All of the subsections have bid item measurement and payment descriptions. Several bid items in the Project Bid Schedule may be described with the same bid item measurement and payment description in Table A, "Measurement and Payment Items". The bid items in the Project Bid Schedule are related to the Section 01025 measurement and payment items as follows:

1. All of the bid items in the Project Bid Schedule have 8 numerical digits.
2. Table A, "Measurement and Payment Items" for each of the bid items there are five numerical digits followed by ".xxx".
3. The first 5 numerical digits of the bid item in the Project Bid Schedule designate the measurement and payment item found in Table A, "Measurement and Payment Items."

*Table A*

<b>BID ITEM</b>	<b>MEASUREMENT AND PAYMENT ITEMS</b> Pg 1
	<b>10 GENERAL REQUIREMENTS</b>
	<b>10.1 - General</b>

	<b>Indemnification</b>
1	a. Payment: In consideration of the Contractor's Indemnity Agreement as set out in the Contract Documents, the County specifically agrees to give the Contractor a maximum of \$100.00 and other good and valuable consideration, receipt of which is acknowledged upon signing of the Agreement.
	<b>Traffic Control Officer/Off Duty Police Officer</b>
2 26 50 74 98	a. Measurement: Shall be measured as per hour cost to provide a traffic control officer or off-duty police officer. b. Payment: Payment shall be made at the contract unit price bid for each hour of police officer time. Payment shall be inclusive of all labor, materials and equipment necessary to perform required duties.
	<b>12 PRESSURE PIPES</b>
	<b>12.2 – Valves</b>
	<b>Valve Operation and Evaluation (various sizes)</b>
3-8 27-32 51-56 75-80 99-104	a. Measurement: Measurement for Valve Operation and Evaluation shall be made per actual number of valves satisfactorily located, identified, exercised and inspected. b. Payment: Payment for the Valve Operation and Evaluation shall be made based on the authorized quantity at the unit price indicated in the Bid. Payment of the applicable Contract unit price shall be full compensation for furnishing all labor, materials, permits, equipment, and maintenance of traffic, to locate, exercise, inspect, assess and perform preventative maintenance on the valve or hydrant, valve sleeve, pipe, fittings, valve box and all other valve or hydrant appurtenances and data and documentation as specified.

	<b>Blow-off Valve Operation and Evaluation</b>
9 33 57 81 105	<p>a. Measurement: Measurement for Blow-off Valve and Operation shall be made per actual number of blow-off valves satisfactorily located, identified, exercised and inspected.</p> <p>b. Payment: Payment for the Blow-off Valve Operation and Evaluation shall be made based on the authorized quantity at the unit price indicated in the Bid. Payment of the applicable Contract unit price shall be full compensation for furnishing all labor, materials, permits, equipment, and maintenance of traffic, to locate, exercise, inspect, assess and perform preventative maintenance on the valve, valve sleeve, pipe, fittings, valve box and all other hydrant appurtenances and data and documentation as specified.</p>
	<b>Hydrant Operation and Evaluation</b>
10 34 58 82 106	<p>a. Measurement: Measurement for Hydrant Operation and Evaluation shall be made per actual number of blow-off valves satisfactorily located, identified, exercised and inspected.</p> <p>b. Payment: Payment for the Hydrant Operation and Evaluation shall be made based on the authorized quantity at the unit price indicated in the Bid. Payment of the applicable Contract unit price shall be full compensation for furnishing all labor, materials, permits, equipment, and maintenance of traffic, to locate, exercise, inspect, assess and perform preventative maintenance on the hydrant, and data and documentation as specified.</p>
	<b>GPS Valves (various sizes)</b>
11 35 59 83 107	<p>a. Measurement: Measurement for GPS Valves shall be made per actual number of valves satisfactorily GPS located and loaded to the County GIS database in accordance with Specifications.</p> <p>b. Payment: Payment for the GPS Valves shall be made based on the authorized quantity at the unit price indicated in the Bid. Payment of the applicable Contract unit price shall be full compensation for furnishing all labor, materials, permits, equipment, and maintenance of traffic, to locate the valve or hydrant, capture GPS survey coordinates and submit data as specified.</p>
	<b>12.5 - Piping Appurtenances</b>
	<b>Adjust Existing Valve Box in Paved Areas (various depths)</b>
12-13 36-37 60-61 84-85	<p>a. Measurement: Measurement for Adjust Existing Valve Box in Paved Areas shall be made per actual number of existing valve boxes raised or lowered to the finish grade of the proposed road work.</p> <p>b. Payment: Payment for Adjust Existing Valve Box in Paved Areas shall be made based on the authorized quantity at the unit price indicated in the Bid.</p>

108-109	Payment of the applicable Contract unit price shall be full compensation for furnishing all labor, materials, equipment and maintenance of traffic necessary to raise, lower and /or adjust the existing valve boxes to the proposed grade, replace covers with OCU provided heavy duty covers, backfill and temporary pavement restoration.
	<b>Adjust Existing Valve Box in Unpaved Areas (various depths)</b>
14-15 38-39 62-63 86-87 110-111	<p>a. Measurement: Measurement for Adjust Existing Valve Box in Unpaved Areas shall be made per actual number of existing valve boxes raised or lowered to the finish grade of the proposed road work.</p> <p>b. Payment: Payment for Adjust Existing Valve Box in Unpaved Areas shall be made based on the authorized quantity at the unit price indicated in the Bid. Payment of the applicable Contract unit price shall be full compensation for furnishing all labor, materials, equipment, and maintenance of traffic necessary to raise, lower and /or adjust the existing valve boxes to the proposed grade and surface restoration in unpaved areas.</p>
	<b>Replace Valve Box in Paved Areas</b>
16 40 64 88 112	<p>a. Measurement: Measurement for Replace Valve Box in Paved Areas shall be made per actual number of valve boxes replaced with new valve box installed to the finish grade of the proposed road work.</p> <p>b. Payment: Payment for Replace Valve Box in Paved Areas shall be made based on the authorized quantity at the unit price indicated in the Bid. Payment of the applicable Contract unit price shall be full compensation for furnishing all labor, materials, equipment, and maintenance of traffic necessary to remove existing valve box, install new OCU provided valve box, adjust the valve boxes to the proposed grade, backfill and temporary pavement restoration.</p>
	<b>Replace Valve Box in Unpaved Areas</b>
17 41 65 89 113	<p>a. Measurement: Measurement for Replace Valve Box in Unpaved Areas shall be made per actual number of valve boxes replaced with new valve box installed to the finish grade of the proposed road work.</p> <p>b. Payment: Payment for Replace Valve Box in Unpaved Areas shall be made based on the authorized quantity at the unit price indicated in the Bid. Payment of the applicable Contract unit price shall be full compensation for furnishing all labor, materials, equipment, and maintenance of traffic necessary to remove existing valve box, install new OCU provided valve box, adjust the valve boxes to the proposed grade, backfill and surface restoration in unpaved areas.</p>
	<b>Realignment of Valve Boxes in Paved Areas</b>
18 42 66	<p>a. Measurement: Measurement for Realignment of Valve Boxes in Paved Areas shall be made per actual number of valve boxes realigned and matching finish grade of the proposed road work.</p>

90 114	<p>b. Payment: Payment for Realignment of Valve Boxes in Paved Areas shall be made based on the authorized quantity at the unit price indicated in the Bid. Payment of the applicable Contract unit price shall be full compensation for furnishing all labor, materials, equipment, and maintenance of traffic necessary to excavate, realign and reset the valve box to be vertical and match the proposed grade, backfill and temporary pavement restoration.</p>
<b>Realignment of Valve Boxes in Unpaved Areas</b>	
19 43 67 91 115	<p>a. Measurement: Measurement for Realignment of Valve Boxes in Unpaved Areas shall be made per actual number of valve boxes realigned and matching finish grade.</p> <p>b. Payment: Payment for Realignment of Valve Boxes in Unpaved Areas shall be made based on the authorized quantity at the unit price indicated in the Bid. Payment of the applicable Contract unit price shall be full compensation for furnishing all labor, materials, equipment, and maintenance of traffic necessary to excavate, realign and reset the valve box to be vertical and match the proposed grade, backfill and surface restoration.</p>
<b>Replacement of Valve Operating Nuts</b>	
20 44 68 92 116	<p>a. Measurement: Measurement for Replace Valve Operating Nuts shall be made per actual number of valve operating nuts replaced with new nuts.</p> <p>b. Payment: Payment for Replace Valve Operating Nuts shall be made based on the authorized quantity at the unit price indicated in the Bid. Payment of the applicable Contract unit price shall be full compensation for furnishing all labor, materials, equipment, and maintenance of traffic necessary to remove existing valve nuts, and install new OCU provided valve nuts.</p>
<b>Replacement of Valve Operating Nut Extension</b>	
21 45 69 93 117	<p>a. Measurement: Measurement for Replace Valve Operating Nut Extension shall be made per actual number of valve operating nut extensions replaced with new extensions.</p> <p>b. Payment: Payment for Replace Valve Operating Nut Extensions shall be made based on the authorized quantity at the unit price indicated in the Bid. Payment of the applicable Contract unit price shall be full compensation for furnishing all labor, equipment, and maintenance of traffic necessary to remove existing valve nut extensions, and install new OCU provided valve nut extensions.</p>

	<b>15 WATER DISTRIBUTION SYSTEM FLUSHING AND REPORTING</b>
	<b>15.1 Uni-Directional Flushing Program</b>
	<b>Uni-Directional Flushing Program Plans and Sequencing per Area</b>
22 46 70 94 118	<p>a. Measurement: Measurement for Uni-Directional Flushing Program Plans and Sequencing shall be based on satisfactory development of Uni-Directional Flushing Plans and Sequencing for each UDF area.</p> <p>b. Payment: Payment for the Uni-Directional Flushing Program Plans and Sequencing shall be made based on the authorized quantity at the unit price indicated in the Bid. Payment of the applicable Contract unit price shall be full compensation for furnishing all labor, materials, and equipment necessary for reviewing current OCU UDF plans and sequences, proposal of modifications, meetings, correspondence, field investigations, and data review to develop the updated plans and sequences for the Uni-Directional Flushing Program.</p>
	<b>Uni-Directional Flushing Sequences and Documentation</b>
23 47 71 95 119	<p>a. Measurement: Measurement for Uni-Directional Flushing and Documentation shall be based on satisfactory completion of Uni-Directional Flushing and documentation for each successful flushing sequence.</p> <p>b. Payment: Payment for Uni-Directional Flushing and Documentation shall be made based on the authorized quantity at the unit price indicated in the Bid. Payment of the applicable Contract unit price shall be full compensation for all labor, materials, equipment, permits, erosion control measures, and maintenance of traffic necessary to execute the flushing plan and program data, results and documentation as specified.</p>
	<b>Uni-Directional Flushing Final Report</b>
24 48 72 96 120	<p>a. Measurement: Measurement for Uni-Directional Flushing Final Report shall be based on satisfactory completion of Uni-Directional Flushing Report for each UDF area.</p> <p>b. Payment: Payment for Uni-Directional Flushing Final Report shall be made based on the authorized quantity at the unit price indicated in the Bid. Payment of the applicable Contract unit price shall be full compensation for all labor, materials, and equipment necessary to prepare an acceptable Final Report as specified. Payment shall be inclusive of, but not limited to, preparation of draft final reports, review meetings, revisions, and any other work necessary to create an acceptable final report.</p>
	<b>Fire Flow Testing</b>
25 49 73	<p>a. Measurement: Measurement for Fire Flow Testing shall be based on satisfactory completion of Fire Flow Testing performed at the direction of the County.</p>

97 121	b. Payment: Payment for Fire Flow Testing shall be made based on the authorized quantity at the unit price indicated in the Bid. Payment of the applicable Contract unit price shall be full compensation for all labor, materials, equipment, permits, erosion control measures, and maintenance of traffic necessary to execute the Fire Flow Test in accordance with the Specifications.

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION (NOT USED)**

END OF SECTION

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**SECTION 01027**  
**APPLICATIONS FOR PAYMENT**

**PART 1 - GENERAL**

1.1 REQUIREMENT

- A. This Section specifies administrative and procedural requirements governing the Contractor's Applications for Payment.
- B. Prior to submitting a monthly payment application, the Contractor's progressive As-Built Drawings, As-Built Asset Attribute Data, Gravity Main, and Pipe Deflection Tables for the period covered by the monthly payment application shall be submitted and accepted by the County.

1.2 FORMAT

- A. Format and Content: Use the accepted Schedule of Values.
  - 1. Arrange the Schedule of Values in a tabular form with separate columns to indicate the following for each item listed:
    - a. Generic name
    - b. Related specification section
    - c. Name of subcontractor
    - d. Name of manufacturer or fabricator
    - e. Name of supplier
    - f. Dollar value
  - 2. Round amounts off to the nearest whole dollar. The total shall equal the Contract Amount.

1.3 PREPARATION OF APPLICATION

- A. Each Application for Payment shall be consistent with previous applications for payments as certified and paid for by the County.
- B. Payment Application Times: As stated in the General Conditions, Payment Applications shall be submitted monthly on a day of the month established by the County at the Pre-Construction Conference.
- C. Application Preparation: Contractor shall complete every entry on the Pay Application form. The form shall be executed by a person authorized to sign legal documents on behalf of the Contractor and the signature notarized. Incomplete applications will be returned without action. The following procedure shall be followed by the Contractor:
  - 1. Submit applications typed on forms provided by the County.
  - 2. Use data on Bid Form and approved Schedule of Values. Provide dollar value in each column for each line item for portion of Work performed and for stored products.

3. List each authorized Change Order and use additional sheets if necessary, list Change Order number and dollar amount for the original item of work.
  4. Each item shall have an assigned dollar value for the current pay period and a cumulative value for the project to-date.
  5. Submit stored material log, partial waivers of claims and mechanic liens, and Consent of Surety with each application, as further explained below.
- D. Contractor shall submit a stored material log with each application for payment that identifies the type, quantity, and value of all stored material that tracks when the stored materials were installed and deducts the installed material from the stored quantity at that time. Include original invoices for all stored materials for which payment is requested.
- E. Waivers of Claims and Mechanics Lien (Waivers): With each Application for Payment the Contractor shall submit waivers of claims and mechanic liens from Subcontractors, Sub-subcontractors, and suppliers for the construction period covered by the previous application.
1. The Contractor shall submit partial waivers on each item for the amount requested, prior to deduction for retainage, on each item.
  2. When an application shows completion of an item, the Contractor shall submit final or full waivers.
  3. The Contractor shall submit the final Application for Payment with, if not already submitted, the final waivers from every entity involved with performance of work covered by the Application that could lawfully be entitled to a payment claim or lien.
  4. Format of Waiver Forms: The Contractor shall submit executed waivers of claims and liens on forms acceptable to the County.
  5. The County reserves the right to designate which entities involved in the Work must submit waivers.
- F. Transmittal of Pay Applications: Contractor shall submit four (4) executed copies of each Application for Payment to the County. One (1) copy shall include all waivers of lien and similar attachments.
1. The Contractor shall transmit each Pay Application package with a transmittal form that lists attachments and all appropriate information related to the application. The transmittal form shall be acceptable to the County.
  2. The Contractor shall include a certification with each application stating that all previous payments received from the County under the Contract have been applied by the Contractor to discharge, in full, all obligations of the Contractor in connection with the Work covered by prior applications for payment. The Contractor shall also certify that all materials and equipment incorporated into the Work are free and clear of all liens, claims, security interest, and encumbrances.
- G. Initial Application for Payment Submittal: Administrative actions and submittals that must precede or coincide with submittal of the initial Application for Payment include the following:
1. List of Subcontractors
  2. List of principal suppliers and fabricators
  3. Schedule of Values
  4. Contractor's Construction Progress Schedule (accepted)

5. List of Contractor's staff assignments
  6. Copies of building permits
  7. Copies of authorizations and licenses from governing authorities for performance of the Work
  8. Certificates of insurance and insurance policies
  9. Performance and Payment bonds (if required)
  10. Data needed to acquire County's insurance
- H. Monthly Application for Partial Payment Submittals: Administrative actions and submittals that must precede or coincide with submittal of Monthly Applications for Partial Payment include the following, as applicable:
1. Relevant tests
  2. Progressive As-builts Survey Drawings - one (1) paper copy and electronic copy
  3. Table 01050-2 Asset Attribute Data -one (1) paper copy and electronic copy (see Specification Section 01050 "Surveying and Field Engineering" Table 01050-2)
  4. Table 01050-3 Pipe Deflection Table - one (1) paper copy and electronic copy (see Specification Section 01050 "Surveying and Field Engineering" Table 01050-3)
  5. Table 01050-4 Gravity Main Table - one (1) paper copy and electronic copy (see Specification Section 01050 "Surveying and Field Engineering" Table 01050-4)
  6. Boundary Surveys on 8 1/2"X11" format of fee simple and permanent easements for pump stations, treatment facilities, and constructed pipe in easements
  7. An electronic copy of all survey field notes
  8. Partial Release of Lien
  9. Partial Consent of Surety
  10. Site photographs
  11. Updated Progress Schedule: submit one (1) electronic copy and five (5) copies
  12. Summary of Values
  13. Pay Request
  14. On-Site Storage of materials
- I. Substantial Completion Application for Payment Submittal: Following issuance of the Certificate of Substantial Completion, Contractor shall submit an Application for Payment. This Application shall reflect any Certificates of Partial Substantial Completion issued previously for the County's occupancy of designated portions of the Work.
1. Administrative actions and submittals that shall precede or coincide with this application include:
    - a. Occupancy permits and similar approvals
    - b. Warranties (guarantees) and maintenance agreements
    - c. Test/adjust/balance records
    - d. Maintenance instructions
    - e. Meter readings
    - f. Start-up performance reports
    - g. Change-over information related to the County's occupancy, use, operation and maintenance
    - h. Final Cleaning
    - i. Application for reduction of retainage and consent of surety

- j. Advice on shifting insurance coverage
  - k. List of incomplete Work, recognized as exceptions to County's Certificate of Substantial Completion
- J. Final Completion Application for Payment Submittal: Administrative actions and submittals which must precede or coincide with submittal of the final payment Application for Payment include the following:
- 1. Prior to submitting a request for final payment or the County issuing a Certificate of Completion for the Work, the Contractor shall submit the final Record Documents to the County for approval. Retainage funds will be withheld at the County's discretion based on the quality and accuracy of the final Record Documents.
  - 2. Written signed statements by the Contractor
    - a. Completion of project close-out requirements
    - b. Completion of items specified for completion after Substantial Completion
    - c. Assurance that unsettled claims are settled
    - d. Assurance that work not complete and accepted is now completed
  - 3. Transmittal of Record Documents to the County
  - 4. Proof that taxes, fees, and similar obligations have been paid
  - 5. Removal of temporary facilities and services has been completed
  - 6. Removal of surplus materials, rubbish, and similar elements
  - 7. Prepare Application for Final Payment as required in General Conditions

#### 1.4 PAY APPLICATION SUBSTANTIATING DATA

- A. When the County requires substantiating data for a Pay Application, submit data justifying Pay Application line item amounts in question.
- B. Provide one (1) copy of data with a transmittal letter for each copy of Pay Application submittal. The Pay Application number, date, and line item by number and description shall be clearly stated.

### ***PART 2 - PRODUCTS (NOT USED)***

### ***PART 3 - EXECUTION (NOT USED)***

END OF SECTION

**SECTION 01065**  
**PERMITS AND FEES**

**PART 1 - GENERAL**

1.1 REQUIREMENTS

A. General

1. Upon Notice to Proceed, obtain and pay for all appropriate and applicable permits and licenses as provided for in the General Conditions, except as otherwise provided herein.
2. The Contractor shall provide descriptions and details of planned maintenance of traffic. The County will obtain maintenance of traffic permits.
3. The Contractor shall submit for Public Works Right-of-Way permits
4. Schedule all inspections and obtain all written approvals of the agencies required by the permits and licenses.
5. Strictly adhere to the specific requirements of the governmental unit(s) or agency(cies) having jurisdiction over the Work. Whenever there is a difference in the requirements of a jurisdictional body and the Contract Documents, the more stringent shall apply.
6. A copy of the permits obtained by the County are furnished in Appendix C "Permits Obtained by County" of these specifications.
7. Unless otherwise specified, the cost of work specified in the various sections of Division 1, will not be paid for separately but the cost therefore shall be considered incidental to and included in the bid prices of the various Contract items.

B. Building Permit, If Applicable (Orange County)

1. The County will pay the general building permit fee and any related impact fees or assessments to be paid to Orange County for the issuance of that permit only.
2. The Contractor shall pay all fees associated with obtaining Orange County trade permits and any and all inspection fees for the Orange County Building Department providing inspections for this project. The Contractor shall apply for and obtain the building permits from Orange County and schedule and obtain final approval from the building inspectors.
3. Information on Orange County Building Department fees is included in the Instructions to Bidders in Division 0.
4. The Contractor shall be responsible for scheduling all permit inspections and obtaining inspection approval from Orange County, as required by the building and sub-discipline construction permits.

C. Construction Dewatering Permit

The Contractor shall apply and pay for all fees associated with obtaining Florida Department of Environmental Protection District Office construction dewatering permits, if required. The Contractor shall provide all materials and equipment to comply with the permit requirements at no additional cost to the County.

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION (NOT USED)**

END OF SECTION

**SECTION 01070**  
**ABBREVIATIONS AND SYMBOLS**

**PART 1 - GENERAL**

1.1 REQUIREMENTS INCLUDED

- A. Reference to the following standards of any technical society, organization or body shall be construed to mean the latest standard, code or specification or tentative specification adopted and published at the date of advertisement for bids, even though reference has been made to an earlier standard. Such reference is hereby made a part of the Contract the same as if herein repeated in full and in the event of any conflict between any of these specifications, standard codes or tentative specifications and the Contract Documents, the most stringent shall govern.

AA	Aluminum Association
AASHTO	American Association of State Highway and Transportation Officials
ABPA	Acoustical and Board Products Association
ACI	American Concrete Institute
AFBMA	Anti-Friction Bearing Manufacturer's Association
AGA	American Gas Association
AGMA	American Gear Manufacturers Association
AI	The Asphalt Institute
AIA	American Institute of Architects
AIEE	American Institute of Electrical Engineers
AIMA	Acoustical and Insulating Materials Association
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
AMCA	American Moving and Conditioning Association
ANSI	American National Standards Institute
API	American Petroleum Institute
APWA	American Public Works Association
AREA	American Railway Engineering Association
ASA	American Standards Association (now ANSI)
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating, and Air Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASSCBC	American Standard Safety Code for Building Construction
ASTM	American Society for Testing and Materials
AWPA	American Wood Preservers Association
AWBP	American Wood Preservers Board
AWS	American Welding Society
AWWA	American Water Works Association

CRSI	Concrete Reinforcing Steel Institute
CS	Commercial Standard
DOT Spec	Standard Specification for Road and Bridge Construction –
FDOT	Florida Department of Transportation
FAC	Florida Administrative Code
FS	Federal Standard
IEEE	Institute of Electrical and Electronic Engineers
IPCEA	Insulated Power Cable Engineers Association
NACE	National Association of Corrosion Engineers
NASSCO	National Association of Sewer Service Companies
NBFU	National Board of Fire Underwriters
NBS	National Bureau of Standards
NEC	National Electrical Code
NECA	National Electrical Contractor's Association
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
NPT	National Pipe Threads
NSF	National Science Foundation
OSHA	U.S. Department of Labor, Occupational Safety and Health Administration
PCA	Portland Cement Association
PCI	Prestressed Concrete Institute
PS	United States Products Standards
SAE	Society of Automotive Engineers
SDI	Steel Decks Institute
SJI	Steel Joists Institute
SMACNA	Sheet Metal and Air Conditioning Contractors National Association
SSPC	Structural Steel Painting Council
UL	Underwriter's Laboratories, Inc.
USASI	United States of American Standards Institute (Now ANSI)

## B. UNITS OF MEASUREMENT

CU FT	cubic feet
CU IN	cubic inch(es)
CY	cubic yard(s)
DegC	degree(s) Centigrade
DegF	degree(s) Fahrenheit
F	Fahrenheit
FT	feet, foot
G	gram(s)
GA	gage
GAL	gallon(s)
GPH	gallon(s) per hour
GPM	gallon(s) per minute

GPS	gallon(s) per second
HR	hour(s)
IN	inch(es)
IPS	iron pipe size
KG	kilogram(s)
L	liter(s)
LB	pound(s)
LBF-IN	pound (force) inch
LF	linear foot, linear feet
MIN. min.	minute(s), minimum
ml	milliliter
MO	month(s)
OZ	ounce(s)
QT	quart
RH	relative humidity
SF	square foot, square feet
SQ IN	square inch(es)
YD	yard(s)
YR	year(s)

### C. TERMINOLOGY

@	at
AB	anchor bolt
ADJ	adjust, adjustable
ADMIN	administration
AFG	above finished grade
AGGR	aggregate
AL	aluminum
ALT	alternate
APPX	appendix
APX	approximate
ART	article
ASPH	asphalt
ASSY	assembly
AUTO	automatic
AUX	auxiliary
AVE	avenue
AVG	average
AWG	American Wire Gauge
BAR	barrier
BCCMP	bituminous coated corrugated metal pipe
BL	base line
BLDG	building
BLKG	blocking
BM	beam

C to C	center to center
CCB	concrete block, masonry
CEM	cement
CIP	cast iron pipe, cast in place
CJ	construction joint
CL	center line, clearance
CM	Construction Manager
CMP	corrugated metal pipe
CO	cleanout
CONC	concrete
CONN	connection
CONST	construction
CONT	continuous
CONTR	contractor
CU, COP	copper
ORR	corridor
CRIT	critical
CTD	coated
CTR	center
CULV	culvert
d	delta
DBL	double
DEM	demolition, demolish
DEPT	department
DET	detail
DIA, D	diameter
DIAG	diagonal
DIM	dimension
DWG	drawing
FEM	female
FUT	future
FV	field verify
FM	force main
FH, HYD	fire hydrant
ID	inside diameter
MAS	masonry
MATL	material
MAX	maximum
MFD	manufactured
MFG	manufacturing
MFR	manufacturer
MH	manhole, metal hallide
MIN	minimum
MISC	miscellaneous
MTL	material

NAT	natural
NATL	national
NOM	nominal
NTS	not to scale
OD	outside diameter
PP	power pole
R	radius
Rd	road
REIN	reinforce
REL A	relief air
REQD	required
REV	revision
RR	railroad
R/W	right-of-way
RWM	reclaimed water main
RY	railway
SAN	sanitary
SCH	schedule
SECT	section
SLV	sleeve
SQ	square
SST	stainless steel
ST	street
STA	station
STD	standard
SURF	surface
SUSP	suspend(ed)
SYM	Symbol, symmetrical
SYS	system
TEMP	Temperature, temporary
TYP	typical
UTIL	utility
W	West
WLD	welded
WM	water main
W/O	without
WT	weight
YD	yard
YR	year
Y W	wye

END OF SECTION

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**SECTION 01091**  
**REFERENCE SPECIFICATIONS**

**PART 1 - GENERAL**

1.1 GENERAL

- A. Applicable Publications: Whenever in these Specifications references are made to published specifications, codes, standards, or other requirements, it shall be understood that wherever no date is specified, only the latest specifications, standards, or requirements of the respective issuing agencies which have been published as of the date that the Work is advertised for bids, shall apply; except to the extent that said standards or requirements may be in conflict with applicable laws, ordinances, or governing codes. No requirements set forth herein or shown on the Drawings shall be waived because of any provision of or omission from said standards or requirements.
  
- B. Assignment of Specialists: In certain instances, specification test requires (or implies) that specific work is to be assigned to specialist or expert entities who must be engaged for the performance of the Work. Such assignments shall be recognized as special requirements over which the Contractor has no choice or option. These requirements shall not be interpreted so as to conflict with the enforcement of building codes and similar regulations governing the Work. They are not intended to interfere with local union jurisdiction settlements and similar conventions. Such assignments are intended to establish which party or entity involved in a specific unit of Work is recognized as "expert" for the indicated construction processes or operations. Nevertheless, the final responsibility for fulfillment of the entire set of Contract requirements remains with the Contractor.

1.2 REFERENCE SPECIFICATIONS, CODES, AND STANDARDS

- A. Without limiting the generality of other requirements of the Specifications, all Work specified herein shall conform to or exceed the requirements of such referenced documents which are not in conflict with the requirements of these Specifications or applicable codes.
  
- B. References herein to "Building Code" shall mean the Florida Building Code. The latest edition of the code shall apply to the Work herein, including all addenda, modifications, amendments, or other lawful changes thereto.
  
- C. In case of conflict between codes, reference standards, Drawings, and the other Contract Documents, the most stringent requirements shall govern. All conflicts shall be brought to the attention of the Engineer for clarification and directions prior to ordering or providing any materials or labor. The Contractor shall bid the most stringent requirements.

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

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION (NOT USED)**

END OF SECTION

**SECTION 01101**  
**SPECIAL REQUIREMENTS**

**PART 1 - GENERAL**

1.1 REQUIREMENTS

- A. The Contractor shall meet these minimum qualifications for valve operation and water distribution system uni-directional flushing (UDF) program.

1.2 MINIMUM CONTRACTOR QUALIFICATIONS

- A. Reference the contract front end for requirements that shall be met to qualify for the UDF and Valve Operation and Inspection Project.

1. Company Experience

a. Uni-Directional Flushing Program Experience

- (1) Contractor shall submit project references showing a minimum total of 1,000 miles of uni-directional flushing completed within the previous 10-years. Reference projects shall include the following information:

- Brief description of the work completed
- Contracted amount
- Time required completing the project
- Findings of the project
- Contact names, phone numbers, addresses and email of the referenced project contact.

- (2) Contractor shall submit company QA/QC plan and procedures

- (3) Company must have been in business for a minimum of five years in North America

b. Valve Inspection and Operation Experience

- (1) The Contractor is required to have performed valve inspection, operation, rehabilitation and information management work for a minimum of five (5) years.

- (2) The contractor is required to submit references for three (3) valve inspection, operation, and information management projects substantially completed within the past 10 years. At least one of the projects must have at least 30,000 valves completed (not including hydrant isolation valves).

- (3) The Contractor is required to submit references for at least one (1) valve inspection, operation, and information management project substantially completed within the past 10 years that includes a minimum of 5,000 valves that are 16" or larger.

- (4) Contractor is required to submit references for three (3) projects within the past 10 years that included locating and recording a minimum of 50,000 sub-foot, post processed, GPS positions on valves or hydrants.

2. Company equipment

- a. Contractor must have a microprocessor controlled hydraulic valve turning machine with the capability to assure that all large valves 16" and greater in size

Comment [KR1]: did tracy want the 5 yr requirement removed also?

can be safely operated. Contractor shall submit for approval the make, model, year and operating system version for the proposed hydraulic valve turning equipment. Identify the software system used for creating torque charts, including version.

- b. Contractor must have an industrial vacuum with at least a 500 gallon holding capacity and water pump with a minimum pumping capacity of 300 GPM. The Contractor shall submit for approval the make, model, year of the industrial vacuum.
  - c. Contractor must have a power washers for each crew
3. Personnel Qualifications
- a. Uni-Directional Flushing Program Personnel Qualifications
    - (1) UDF Field Supervisor or Foreman shall have served in a similar role on a minimum of two (2) successfully completed UDF programs within the past 5 years that included at least 50 miles of water main
    - (2) The Field Supervisor or Foreman shall have a current Class 3 Water Distribution System Operator Certification for the State of Florida, or equivalent license from another state.
    - (3) All field personnel shall have a minimum of two (2) successfully completed UDF programs within the past five (5) years.
    - (4) All UDF field personnel shall have a current Class 3 Water Distribution System Operator Certification for the State of Florida or equivalent license from another state.
  - b. Valve Inspection and Operation Personnel Qualifications
    - (1) All field personnel shall have a minimum of two (2) valve inspection and operation programs totaling a minimum of 5,000 valves each, within the past 5 years using a microprocessor controlled valve machine
    - (2) All valve inspection and operation field personnel shall have a current Class 3 Water Distribution System Operator Certification for the State of Florida, or equivalent license from another state.
  - c. All field personnel will have and maintain the following certifications:
    - (1) Class 3 Water Distribution System Operator Certification for the State of Florida or equivalent license from another state.
    - (2) State Highway Flagging
    - (3) Confined Space Entry
    - (4) CPR, and First Aid.
  - d. Copies of licenses and certifications of all field personnel shall be submitted with the resumes

### 1.3 SUBMITTALS

- A. The UDF Contractor shall submit a completed qualification form with the required information, company resume and project personnel resumes.
- B. Previous Work Products: The Contractor shall submit one (1) example of previous UDF report for approval. The submitted example shall be the work of the field supervisor or foreman to be used on this Project.

## **PART 2 - PRODUCTS (NOT USED)**

## **PART 3 - EXECUTION**

### **3.1 CONTRACT COORDINATION MEETING**

- A. Prior to commencing field activities, the Contractor shall attend a Coordination Meeting with the County. Contractor shall be prepared to discuss the following agenda items:
  - 1. Project contacts
  - 2. County notification procedures
  - 3. Public notification requirements
  - 4. Inspection QA/QC
  - 5. Deliverables
  - 6. Schedule

### **3.2 CONTRACTOR REPRESENTATIVE**

- A. The Contractor shall designate a project representative who will be the point of contact throughout the project.
- B. The project representative shall coordinate all training with OCU staff, attend training and be responsible to have the project staff trained in OCU procedures and use of the GIS and Maximo systems.
- C. The project representative shall receive and distribute work orders generated for this project and coordinate all contract work.
- D. The project representative shall attend and participate in all project meetings.
- E. The project representative shall, at a minimum, meet the qualifications of the project Foreman as described above.

### **3.3 GENERAL PROGRESSION OF WORK**

- A. Contractor shall submit an updated schedule of inspection activities on a weekly basis.
- B. Contractor shall notify the County a minimum of 48-hours prior to any inspection work.
- C. All work shall be performed in an orderly, organized fashion, progressing through the project area(s) in a systematic manner. Contractor shall adhere to submitted and communicated schedules.

### **3.4 QUALITY ASSURANCE**

- A. The Contractor shall have a QA/QC plan and procedures to ensure accurate data collection, documentation and submittal.
- B. The County will perform QA/QC checks on a minimum 5% of submitted inspection data.

### **3.5 REJECTION OF WORK**

- A. Failure of County QA/QC checks will result in a "quality deficiency" notification to

request from the Contractor how the rejected Work shall be addressed.

- B. Failure to notify County prior to field work being performed in accordance with the County notification procedures may constitute rejection of Work that was performed without notification.
- C. Payment shall be withheld for inspection work not passing the County QA/QC check, until such time that the data is re-submitted and verified accurate.
- D. Subsequent failures of County QA/QC checks may result in the County requiring a change in field supervisor.

END OF SECTION

**SECTION 01200**  
**PROJECT MEETINGS**

**PART 1 - GENERAL**

1.1 REQUIREMENTS INCLUDED

- A. Contractor participation in kickoff meeting, monthly progress meetings and specially called meetings.

1.2 MEETINGS CALLED BY THE COUNTY

- A. The County will schedule and administer a kickoff meeting, monthly progress meetings and specific topic meetings throughout the progress of the Work. The County will:
  - 1. Prepare and distribute a notification of the meeting to required attendees.
  - 2. Establish, prepare and distribute an agenda with the notification.
  - 3. Make physical arrangements for the meetings.
  - 4. Preside at meetings.
  - 5. Prepare and distribute minutes of meetings including significant proceedings and decisions, within 15 working days after each meeting. Minutes will be forwarded to all participants and to parties affected by decisions made at the meeting.
- B. Representatives of the Contractor, Subcontractors and suppliers attending meetings shall be qualified and authorized to act on behalf of the entity each represents.
- C. The meeting location will generally be a central site, convenient for all parties, designated by the County.
- D. All meetings shall be digitally recorded with files provided to all requesting parties.

1.3 KICKOFF MEETING

- A. Attendance:
  - 1. County
  - 2. Contractor and superintendent
  - 3. Subcontractors as appropriate to the agenda
  - 4. Representatives of suppliers and manufacturers as appropriate to the agenda
  - 5. County MBE/WBE representative
  - 6. Other agency representatives (FDEP, EPA, City, etc.)
  - 7. Others as requested by the County or Contractor

B. Suggested Agenda:

1. Distribution and discussion of:
  - a. List of major Subcontractors and suppliers
  - b. Contact information
2. Organizational arrangement of Contractor's forces and personnel, and those of Subcontractors, material and equipment suppliers, and the County
3. Project coordination
  - a. Designation of responsible personnel
  - b. Channels and procedures for communication
4. Procedures and processing of:
  - a. Field decisions
  - b. Proposal requests
  - c. Submittals
  - d. Change orders
  - e. Applications for payment/Schedule of Values
  - f. Contractor quality control
5. Adequacy of distribution of Contract Documents
6. Use of premises:
  - a. Office, work and storage areas
  - b. County's requirements
  - c. Housekeeping
7. Safety and first aid procedures
8. Rules and regulations
9. Security procedures
10. Place, date and time for regular progress meetings
11. Completion time for Contract and liquidated damages

1.4 PROGRESS MEETINGS

- A. The County shall schedule progress meetings at least once per month as required by progress of the Work with the first meeting approximately one (1) month after the pre-construction meeting.
- B. Attendance:
  1. County
  2. Contractor
  3. Subcontractors as appropriate to the agenda
  4. Suppliers as appropriate to the agenda
  5. Others as appropriate

- C. The Contractor's representative is to attend the project meetings and have the authority to act on behalf of the entity represented on field related matters. Contractor's representative is to study previous meeting minutes and current agenda items, in order to be prepared to discuss pertinent topics and provide specific information including but not limited to:
  - 1. Work progress and schedule
  - 2. Status of submittals and actions necessary to expedite them
  - 3. Findings/issues
  - 4. Coordination with County staff
  
- D. To the maximum extent practicable, the Contractor is to assign the same personnel to represent the Contractor at Progress Meetings throughout the progress of the work.
  
- E. The Contractor is to provide copies of the updated Progress Schedule at each project meeting in accordance with the General Conditions including a 3 week look ahead schedule for upcoming events.
  
- F. Suggested Agenda:
  - 1. Review and approve minutes from previous meeting
  - 2. Review of work progress since previous meeting
  - 3. Contractor's/Subcontractor's workforce and equipment
  - 4. Submittals
  - 5. Field observations, problems and conflicts
  - 6. Requests for Information (RFI) status
  - 7. Change Order status
  - 8. Project schedule
    - a. Corrective measures and procedures to regain approved schedule
    - b. Revisions to schedule
    - c. Job progress and schedule for succeeding work period
    - d. Coordination of schedules
  - 9. Maintenance of quality standards
  - 10.
  - 11. Pending requests for information, changes and substitutions
  - 12. Review proposed changes for effect on construction schedule and completion date
  - 13. Pay application status
  - 14. Other business

G. Revision to Minutes:

1. Unless minutes are challenged, in writing, prior to the next regularly scheduled Progress Meeting, they will be accepted as properly summarizing the discussions and decisions of the meeting.
2. Persons challenging minutes shall reproduce and distribute copies of the challenge to all indicated recipients of the particular set of minutes.
3. Challenge to minutes shall be settled as priority portion of "old business" at next regularly scheduled meeting.

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION (NOT USED)**

3.1 KICKOFF MEETING

1. meeting
2. Flushing sequences planned
3. Itemized list of replacement, repairs, or new installation of assets (e.g. replacement/realignment of valve boxes, hydrant chain installation, and other items from Section 01025 Measurement and Payment)

END OF SECTION

## SECTION 01300

### SUBMITTALS

#### PART 1 - GENERAL

Work completed without approved Shop Drawings and/or samples shall be considered installed at the Contractor's risk.

##### 1.1 SHOP DRAWINGS AND DATA

- A. Shop Drawings defined in the General Conditions, shall complement design and construction Drawings, and shall contain sufficient detail to clearly define all aspects of the Construction. These Drawings shall be complete and detailed.
- B. Contractor and Supplier's catalog sheets, brochures, diagrams, illustrations and other standard descriptive data shall be clearly marked with specification title and numbers to identify pertinent materials, product or models. Delete information which is not applicable to the Work by striking or cross-hatching.
- C. If Shop Drawings show variations from Contract requirements because of standard shop practice or for other reasons, the Contractor shall describe such variations in the letter of transmittal. If acceptable, proper adjustment in the Contract shall be implemented where appropriate. If the Contractor fails to describe such variations, the Contractor shall not be relieved of the responsibility for executing the Work in accordance with the Contract, even though such Drawings have been reviewed.
- D. Data on materials and equipment shall include, without limitation, materials and equipment lists, catalog data sheets, cuts, performance curves, diagrams, verification of conformance with applicable standards or codes, materials of construction and similar descriptive material. Materials and equipment list shall, for each item, give the name and location of the Supplier or manufacturer, trade name, catalog reference, size, finish and all other pertinent data.
- E. For all equipment furnished, the Contractor shall provide a list including the equipment name and address and telephone number of the Supplier's representative and service company so that service and/or spare parts can be readily obtained.
- F. The Contractor will obtain an installation list from suppliers and equipment suppliers who propose to furnish equipment or products for submittal to County/Professional along with the required Shop Drawings. The installation list shall include at least 5 installations where identical equipment has been installed and has been in operation for a period of at least 1-year.

## 1.2 REVIEW OF SHOP DRAWINGS AND SAMPLES

- A. The County /Professional's review of Shop Drawings, Data, and Samples as submitted by the Contractor will be to determine if the items(s) generally conform(s) to the information in the Contract Documents and is/are compatible with the design concept. The County/Professional's review and exceptions, if any, will not constitute an approval of dimensions, connections, quantities, and details of the material, equipment, device, or item shown.
- B. The review of drawings and schedules will be general, and shall not be construed:
  - 1. As permitting any departure from the Contract Documents
  - 2. As relieving the Contractor of responsibility for any errors, including details, dimensions, and materials
  - 3. As approving departures from details furnished by the County/Professional, except as otherwise provided herein
- C. If the drawings or schedules as submitted describe variations and show a departure from the Contract Documents which the County/Professional finds to be in the interest of the County and to be so minor as not to involve a change in Contract Price or Contract Time, the County/Professional may return the reviewed drawings without noting an exception.
- D. "Approved As Noted": Contractor shall incorporate County/Professional's comments into the submittal before release to manufacturer. The Contractor shall send a letter to the County/Professional acknowledging the comments and their incorporation into the Shop Drawing.
- E. "Amend and Resubmit": Contractor shall resubmit the Shop Drawing to the County/Professional. The resubmittal shall incorporate the County/Professional's comments highlighted on the Shop Drawing.
- F. "Rejected": Contractor shall correct, revise and resubmit Shop Drawing for review by County/Professional.
- G. Resubmittals will be handled in the same manner as first submittals. For resubmittals the Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, to revisions other than the corrections requested by County/Professional on previous submissions. The Contractor shall make any corrections required by the County/Professional.
- H. If the Contractor considers any correction indicated on the Drawings to constitute a change to the Drawings or Specifications, the Contractor shall give written notice thereof to the County/Professional.

- I. When the Shop Drawings have been completed to the satisfaction of the County/Professional, the Contractor shall carry out the Construction in accordance therewith and shall make no further changes therein except upon written instructions from the County/Professional.
- J. No partial submittals will be reviewed. Submittals not deemed complete will be stamped "Rejected" and returned to the Contractor for resubmittal. Unless otherwise specifically permitted by the County/Professional, make all submittals in groups containing all associated items for:
  - 1. Systems
  - 2. Processes
  - 3. As indicated in specific Specifications Sections  
All drawings, schematics, manufacturer's product data, certifications, and other Shop Drawing submittals required by a system specification shall be submitted at one time as a package to facilitate interfaces checking.
- K. Only the County/Professional shall utilize the color "red" in marking Shop Drawing submittals.
- L. Failure to comply with any of the above may result in the rejection of Shop Drawings.

### 1.3 PRODUCT DATA

- A. Submit not less than 6-copies, unless approved by the County/Professional. Mark each copy to identify applicable products, models, options and other data. Supplement manufacturers' standard data to provide information unique to the Work.

### 1.4 MANUFACTURERS' INSTRUCTIONS

- A. When required in an individual Specification Section, submit manufacturer's printed instructions for delivery, storage, assembly, installation, start-up, adjusting and finishing, in quantities specified for product data.

### 1.5 SAMPLES

- A. Submit full range of manufacturers' standard colors, textures and patterns for the County's selection. Submit samples for selection of finishes within 30-days after Award of Contract. All color and finish selections must be submitted by the Contractor in a single submission, properly labeled and identified.
- B. Submit samples to illustrate functional characteristics of the product, with integral parts and attachment devices. Coordinate submittal of different categories for interfacing work.

- C. Submit the number of samples specified in the respective Specification section, but no less than two (2). After review one (1) will be retained by the County. Reviewed samples that may be used in the Work are indicated in the Specification Section.
- D. Samples shall be delivered to the County as directed. The Contractor shall prepay shipping charges on samples. Materials or equipment for which samples are required shall not be used in the Work until approved by the County/Professional.
- E. Samples shall be of sufficient size to clearly illustrate:
  - 1. Functional characteristics of the product, with integrally related parts and attachment devices
  - 2. Full range of color, texture and pattern
  - 3. Each sample shall have a label indicating:
    - a. Name of Project
    - b. Name of Contractor and Subcontractor
    - c. Material or equipment represented
    - d. Place of origin
    - e. Name of product and brand (if any)
    - f. Location in Project
    - g. Specification title and number
    - h. Submittal number
    - i. Note: Samples of finished materials shall have additional marking that will identify them under the finished schedules.
- F. The Contractor shall prepare a transmittal letter, in triplicate (3) for each shipment of samples containing the information required in paragraph herein. The Contractor shall enclose a copy of this letter with the shipment and send a copy of this letter to the County/Professional. Approval of a sample shall be only for the characteristics or use named in such approval and shall not be construed to change or modify any Contract requirements.
- G. Approved samples not destroyed in testing shall be sent to the County or stored at the site of the Work. Approved samples of the hardware in good condition may be incorporated in the Work if requested in writing by the Contractor and approved in writing by the County/Professional. Samples that failed testing or were not approved will be returned to the Contractor at the Contractor's expense, if so requested at time of submission.

## 1.6 FIELD SAMPLES

- A. Provide field samples of finishes as required by individual Specifications sections. Install the sample completely and finished. Acceptable samples in place may be retained in completed Work.

## 1.7 DRAWINGS, PRODUCT DATA AND CERTIFICATES

- A. Each letter of transmittal shall identify each and every item transmitted by title, drawing number, revision number and date.

- B. The County generally will not check dimensions, quantities or schedules, except in cases where the information is lacking in the Specifications.
- C. The following is applicable to submitted drawings, data and certificates:
  - 1. Show relation to adjacent structures or materials.
  - 2. Clearly identify field dimensions.
  - 3. Show required dimensions and clearances.
  - 4. Performance characteristic and capabilities shall accompany original Shop Drawing submittals.
  - 5. Wiring diagrams and controls shall accompany original Shop Drawing submittals.
  - 6. Installation instructions shall accompany original Shop Drawing submittals.
  - 7. Each submittal shall identify applicable Standards, such as ASTM number or Federal Specification number.
  - 8. All information not pertinent shall be removed from the submittal, or shall be crossed out.
- D. When resubmission is required, the County/Professional will return only two (2) marked up copies. A third submission from the same manufacturer will not be accepted.

## 1.8 SUBSTITUTIONS

- A. The substitution requirements of this Section are in addition to the requirements of the General Conditions and Supplementary Conditions.
- B. When a particular product is specified or called for, it is intended and shall be understood that the proposal tendered by the Bidder includes those products in his Bid. Substitutions will only be considered in cases where original materials are unavailable or in an instance where substitute can be proven superior in its planned application
- C. The intent of these specifications is to provide the County with a quality facility without discouraging competitive bidding. For products specified only by reference standards, performance and descriptive methods, without naming manufacturer's products, the Contractor may provide the products of any manufacturer complying with the Contract Documents, subject to the review of product data by the County/Professional as specified herein.
- D. The County/Professional's approval is required for substitutions.
- E. The Contract is based on the materials, equipment and methods described in the Contract Documents.
- F. The County/Professional will consider proposals for substitution of materials equipment and methods only when such proposals are accompanied by full and complete technical data and all other information required by the County/Professional to evaluate the proposed substitution.

- G. Do not substitute materials, equipment or methods unless such substitution has been specifically approved for this Work by the County/Professional in writing. The Contractor must provide a submittal per this Section specifically requesting approval of the substitution. Failure to specifically identify the requested substitution may invalidate approval of a submittal.

#### 1.9 AVAILABILITY OF SPECIFIED ITEMS

- A. Verify prior to bidding that all specified items will be available in time for installation during Construction for orderly and timely progress of the Work.
- B. In the event that specified items will not be available, notify the County/Professional prior to receipt of proposals.

#### 1.10 OPERATING MANUALS

- A. Submit all manuals in accordance with requirements of Divisions 2 through 16 of the Contract Specifications and Section 01700 "Project Closeout."

#### 1.11 WARRANTIES, GUARANTEES AND BONDS

- A. Provide as required by Technical Sections of the Specifications and Sections 01700 "Project Closeout" and Section 01740 "Warranties and Bonds."

#### 1.12 CADD FILES

- A. The Professional's CADD files will be available on a limited basis to qualified firms at the County's prerogative. The procedure for requesting such files is noted elsewhere in these documents and there is a cost associated with handling and reproduction. Recipients are cautioned that these files may not accurately show actual conditions as constructed. Users are responsible to verify actual field conditions.
- B. The Professional's Drawings are to be used only for background information. If the Professional's Drawings are just reproduced and resubmitted (e.g. for ductwork drawings) they will be rejected.
- C. Copies of data furnished by the County/Professional to Contractor or Contractor to County/Professional that may be relied upon are limited to the printed copies (also known as hard copies). Files in electronic media format of text, data, graphics, or other types are furnished only for the convenience of the receiving party. Any conclusion or information obtained or derived from such electronic files will be at the user's sole risk. If there is a discrepancy between the electronic files and the hard copies, the hard copies govern.

- D. Because data stored in electronic media format can deteriorate or be modified inadvertently or otherwise without authorization of the data's creator, the party receiving electronic files agrees that it will perform acceptance tests or procedures within 60-days, after which the receiving party shall be deemed to have accepted the data thus transferred. Any errors detected within the 60-day acceptance period will be corrected by the transferring party.
- E. When transferring documents in electronic media format, the transferring party makes no representations as to long-term compatibility, usability, or readability of documents resulting from the use of software application packages, operating systems, or computer hardware differing from those used by the data's creator.

#### 1.13 PROGRESS PHOTOGRAPHS

- A. Photographs and digital pictures shall be in color. Provide 1 copy of each digital picture on each of three (3) CDs and provide 1 print of each photograph in two (2) separate albums.
- B. Photographs shall be from locations to illustrate the condition of Construction and state of progress adequately.
- C. Provide up to 12 digital photographs of views randomly selected by the County, taken prior to any construction and prior to each scheduled Application for Payment.
- D. Deliver electronic images, prints, and negatives to the County.
- E. Each print shall be single weight paper with glossy finish and the overall dimension shall be 7-1/2-inch x 10-inches (19.05 x 25.4 cm). The print shall be clear, sharp and free of distortion after the enlargement from the negative.
- F. Provide loose-leaf albums for each set of photographs to hold prints with a maximum of 50-leaves per binder.
- G. Each print shall be protected by flexible, transparent acetate or plastic sheet protector leaves with metal reinforced holes. Two (2) extra leaves shall be provided in each binder.
- H. Capture and provide digital, ortho-rectified, true-color, aerial photographs of the complete project site prior to start of Construction and at final completion. A final 6-inch or less ground pixel resolution is required. If using traditional photography, the photos will need to be captured at an appropriate scale and scanned at a high enough dpi to yield a final ground pixel size of 6-inches or less. If captured digitally, a final 6-inches or less ground sample distance is required. The final orthorectified photos shall use a projection of NAD 27, State Plane West and all vertical reference shall be NAVD 88, US feet. All orthophoto mosaics shall meet a final accuracy of plus or minus 5-feet.

- I. Provide a total of four (4) true-color, color balanced orthophoto mosaic prints. Three (3) prints each of the pre and post construction (final completion) orthophoto mosaics, for a total of six (6). Each orthophoto mosaic print shall be on double-weight paper with glossy finish and shall have overall dimensions of 36-inches x 58-inches. Two (2) copies of each of the digital orthophoto mosaics shall be supplied in Geotiff format on disk for each time period (pre and post construction). The final color balanced, true-color orthophoto mosaics will be projected in NAD 27, State Plane West and all vertical reference shall be NAVD 88, US feet and shall meet a final accuracy of plus or minus 5-feet.
- J. The Contractor shall provide before and after photographs of each portion of the site. The below ground facilities shall include all equipment, walls, floor, piping, supports and entrance. At major locations, photographs shall include before, during, and after prints and all prints shall be placed in binders in ascending date order to show the Work as it progresses.
- K. Descriptive Information:
  - 1. Each photograph shall have a permanent title block on the back and shall contain the typed information and arrangement as follows:
    - a. ORANGE COUNTY, FLORIDA
    - b. (ENTER PROJECT NAME)
    - c. BID No. (Enter Bid Number)
    - d. CONTRACTOR: (Name of Contractor)
    - e. DATE: (When photo was taken)
    - f. PHOTO NO.: (Consecutive Numbers)
    - g. PHOTO BY: (Firm Name of Photographer)
    - h. LOCATION: (Description of Location and View)
  - 2. The Contractor shall provide the Professional with a written description of each photograph. This description shall be included in the binders and a copy shall be submitted with the CDs.

#### 1.14 PROJECT RECORD DOCUMENTS

Project Record Documents shall be submitted in accordance with Section 01720 "Project Record Documents" of these specifications.

### **PART 2 - PRODUCTS (NOT USED)**

### **PART 3 - EXECUTION**

#### 3.1 SUBMITTAL PROCEDURES

- A. Article 9 of the General Conditions contains additional provisions regarding submittals.

- B. Preliminary Shop Drawing Data: Within 20-days after the Award of the Contract or before the Pre-Construction Meeting, the Contractor shall submit to the County/Professional a complete listing of manufacturers for all items for which Shop Drawings are to be submitted.
- C. Shop Drawing Submittal Schedule: Within 30-days after the Notice to Proceed, the Contractor shall submit to the County/Professional a complete schedule of Shop Drawings submittals with the respective dates for submission, the beginning of manufacture, testing and installation of materials, supplies and equipment, noting those submittals critical to the progress schedule.
- D. Submittal Log: An accurate updated log of submittals will be maintained by the Contractor and subject to review by the County/Professional at each scheduled progress meeting.
- E. If the Contractor considers any correction indicated on the Drawings to constitute a change to the Contract Drawings or specifications, the Contractor shall give written notice thereof to the County/Professional. This does not constitute a change order until accepted by the County.
- F. Shop Drawing and submittal data shall be reviewed by the County/Professional for each original submittal and first resubmittal; thereafter review time for subsequent resubmittals shall be charged to the Contractor. The Contractor shall reimburse the County for services rendered by the County/Professional at the rate multiplied by the County's Professional multiplier based on the fee schedule provided to the County for this Project. If a County engineer is performing any portion of the review, this fee is based upon the hourly rate of the engineer times the County's multiplier for overhead, benefits, and expenses. The Contractor agrees that the County shall deduct such charges from the Contract Amount by a deductive Change Order.
- G. Contractor Shop Drawing and Sample submittals shall include 5 copies in addition to any other copies that the Contractor wants returned. The County will retain 5 copies of approved submittals.
- H. Identify Project, Project Number, date, dates of previous submittals, Contractor, Sub-Contractors, suppliers with their addresses, pertinent Drawings by sheet and detail number, and Specification Section number, as appropriate. Identify all deviations from the Contract Documents. Provide space for Contractor and Professional review stamps.
- I. Contractor's delivery of Shop Drawings for review shall follow a reasonable sequence, as is necessary to support the dates on the Progress Schedule and avoid an overload of Shop Drawings awaiting review at any one time. Coordinate submittal of related items.

- J. Submit Shop Drawings per the schedule of Shop Drawing submittals, inserted in 1 loose-leaf binder, with tabs and index to the County/Professional. All individual submittal sheets inserted in said binder must be clearly marked and referenced to proper paragraph and subparagraph of specifications. Cross out any items on sheets which constitute information not pertaining to equipment specified. Clearly mark all components that are provided as "optional" by manufacturer. Shop Drawings shall be approved by the Contractor prior to submittal to the County/Professional. Shop Drawings will be reviewed by the County/Professional. After County/Professional approval, reproduce and distribute in accordance with requirements herein.
- K. All submissions of Shop Drawings, brochures and catalog cuts shall be accompanied by a transmittal letter listing the Drawings submitted by number and title.
- L. When engineering calculations and/or professional certification of performance criteria of materials, systems, and/or equipment are required, the County is entitled to rely upon the accuracy and completeness of such calculations and certifications submitted by the Contractor. Calculations, when required, shall be submitted in a neat, clear and in an easy to follow format. Such calculations and/or certifications shall be signed and sealed by a Professional Engineer registered in the State of Florida.
- M. Distribute copies of reviewed submittals to concerned parties. Instruct recipients to promptly report any inability to comply with provisions.
- N. Prior to submission of Shop Drawings and samples, the Contractor shall stamp and sign the submittals. Any submission which, upon examination by the County, shows evidence of not having been thoroughly checked, or is not in compliance with the provisions of this Section will be returned to the Contractor for completion before it will be considered for review.
- O. Notify the County of the need for making any changes in the arrangement of piping, connections, wiring, manner of installation, etc., which may be required by the material or equipment Contractor proposes to supply.
- P. On resubmittals, direct specific attention in writing or on the revised Drawings or sample to revisions other than the corrections required by County on previous submissions.
- Q. All drawings, schematics, manufacturer's product data, certifications and other drawing submittals required for a system specification shall be submitted at one time as a package to facilitate interface checking.
- R. The County will distribute Shop Drawings as follows for the indicated action taken:

## SHOP DRAWING SUBMITTAL DISTRIBUTION

Representative Party	No Exception Taken or Make Correction Noted			Rejected or Revise & Resubmit		
	Submittal Transmittal	Shop Drawing	Review Comment Sheet	Submittal Transmittal	Shop Drawing	Review Comment Sheet
Engineer	2 Copies	File Copy	1 Copy	Original	File Copy	1 Copy
Contractor (see Note 1)	2 Copies	1 Copy Each Submittal	1 Copy	1 Copy	All Copies Except Engineers	1 Copy
County	1 Copy	1 Copy Each Submittal	1 Copy	1 Copy	None	1 Copy
Inspector	2 Copies	1 Copy Each Submittal	1 Copy	1 Copy	None	1 Copy
Project Record Data (see Note 2)	1 Copy	1 Copy Each Submittal	1 Copy	1 Copy	None	1 Copy

**NOTES:**

1. Contractor shall distribute additional copies to Subcontractors as required.
2. Stored by Contractor to be furnished to County upon closeout.

- S. All Shop Drawings shall be accompanied with a transmittal letter providing the following information:
1. Project Title and Contract Number
  2. Date
  3. Contractor's name and address
  4. The number of each Shop Drawing, project data, and sample required
  5. Notification of Deviations from Contract Documents
  6. Submittal Log Number conforming to specification section numbers
    - a. Submit each specification section separately.
    - b. Identify each Shop Drawing item required under respective specification section.
    - c. Identify resubmittal using specification section followed by A (first resubmittal), B (second resubmittal)...etc.

### 3.2 CONTRACTOR'S REVIEW

- A. Contractor's Responsibility for Coordination: Where the dimension, size, shape, location, capacity or other characteristic affects another item, and where the Contractor selects, fabricates or installs related or adjacent products to be used, the Contractor shall be responsible for coordination of related items. The Contractor shall insure that a proper exchange of information takes place prior to or during preparation of each submittal and that submittals reflect such coordination. The notation "verify" or "coordinate" on the Drawings indicates the necessity for Contractor coordination in the particular instances used.

- B. Contractor's Checking: When checking submittals from Subcontractors and suppliers, the Contractor shall mark all sets, indicating his corrections and comments in blue or green. Copies marked in red may be returned for revision.
- C. The Contractor is responsible to deliver and pick-up all submittals in a timely manner at the County/Professional's designated office. The Contractor is responsible for all related costs and expenses for the transmittal of such submittals.

### 3.3 COUNTY'S / PROFESSIONAL'S REVIEW

- A. Corrections or comments made on Shop Drawings during review do not relieve the Contractor from compliance with the requirements of Drawings and Specifications. This check is only for review of general conformance with the design concept of this Project and general compliance with information given in Contract Documents. Any substitutions or changes shall be properly noted.
- B. No action will be taken on "rough-in" Shop Drawings for plumbing and electrical connections when the items of equipment are not included in the same submittal.
- C. Review Time:
  - 1. On a normal basis, each submittal will be returned to the Contractor within 15 working days of the date it is received. Some submittals may require additional time.
  - 2. If, for any reason, the above schedule cannot be met, the Contractor will be so informed within a reasonable period and the Schedule of Submittals revised. If the specific submittal affects the critical path, the Contractor shall immediately notify the County/Professional in writing. In the event of separate submittals of individual components of a system, these submittals may be held until all components of the system are submitted, and the Contractor will be so notified.

END OF SECTION

**SECTION 01310**  
**PROGRESS SCHEDULES**

**PART 1 - GENERAL**

1.1 REQUIREMENT

- A. The Contractor will submit precedence method cost loaded Critical Path Method (CPM) Progress Schedules to the County depicting the approach to prosecution and completion of the Work. This requirement includes, but is not limited to the Contractor's approach to Activity cost loading, recovering schedule and managing the effect of changes, substitutions and Delays on Work sequencing.
- B. The Progress Schedule shall show how the Contractor's priorities and sequencing for the Work (or Work remaining) conform to the Contract requirements and the sequences of Work indicated in or required by the Contract Documents; reflect how the Contractor anticipates foreseeable events, site conditions and all other general, local and prevailing conditions that may affect cost, progress, schedule, furnishing and performance of the Work; and show how the Contractor's Means and Methods translate into Activities and logic.
- C. The Progress Schedule will consist of the Initial Submittal, Payment Submittals and Revision Submittals. Upon acceptance by the County, the Initial submittal will become the As-Planned Schedule for the Work. Revision submittals upon acceptance will become the As-Planned Schedule for the Work remaining to be completed as of the submittal date for that Revision.
- D. References to the Critical Path Method (CPM) are to CPM construction industry standards that are consistent with the requirements of this Section.

1.2 GLOSSARY OF TERMS

- A. The following terms, whether or not already defined elsewhere in the Contract Documents, have the following intent and meanings within this Section:
  - 1. Activity Value (Value): That portion of the Contract Price representing an appropriate level of payment for the part of the Work designated by the Activity.
  - 2. As-Planned Schedule: The first, complete Initial Progress Schedule submitted by the Contractor with the intent to depict the entire Work as awarded and accepted by the County or returned as no resubmittal required.
  - 3. Contract Float: Days between the Contractors anticipated date for completion of the Work, or of a specified portion of the Work, if any, and the corresponding Contract Time.

4. CPM Schedule: The Progress Schedule based on the Critical Path Method (CPM) of scheduling. The term Critical Path means any continuous sequence of Activities in the Progress Schedule controlling, because of their sum duration, the Early Date of a pertinent, specified Contract Time.
5. Early/Late Dates: Early/late times of performance, based on CPM calculations, for an Activity in the Progress Schedule. Early Dates will be based on proceeding with all or part of the Work on the date when the corresponding Contract Time commences to run. Late Dates will be based on completing all or part of the Work on the corresponding Contract Time, even if the Contractor plans early completion.
6. Milestones: Key, pre-determined points of progress in the completion of a facility, denoting interim targets in support of the Contract Times. Milestones may pinpoint targets for key excavation and substructure events, significant deliveries, critical path transition from superstructure to piping and electrical rough in and building enclosure. Also, hook-up of mechanical and electrical equipment, availability of power for testing, equipment shakedown, training of County personnel, start-up, I. Substantial Completion and other events of like import.
7. Official Schedule: The Initial or most recent Revision Submittal accepted by the County or returned as no resubmittal required and the basis for Payment Submittals until another Revision Submittal is submitted and accepted. The accepted Initial Submittal is also the As-Planned Schedule.
8. Payment Submittal: A monthly Progress Schedule update reflecting progress and minor adjustments on the Activities, sequencing and restraints for Work remaining.
9. Total Float: Days by which an activity may slip from its Early Dates without necessarily extending a pertinent Contract Time. Total Float at least equals Contract Float. Total Float may also be calculated and reported in working Days. When an activity is delayed beyond Early Dates by its Total Float it becomes a Critical Path activity and if delayed further will impact a Contract Time.

### 1.3 QUALITY ASSURANCE

- A. The Contractor may self-perform the Work covered by this Section or employ a Subcontractor, subject to the County's consent. Employment of a scheduling Subcontractor shall not in any way alter or reduce the Contractor's obligations under the Contract Documents.
- B. The Contractor will obtain a written interpretation from the County, if the Contractor believes that the selection of activities, logic ties and/or restraints requires a written interpretation of the Contract Documents. With each submission, the Contractor will point out by specific, written notation, any Progress Schedule feature that may reflect variations from any requirements of the Contract Documents.
- C. It is the Contractor's responsibility to obtain information directly from each Subcontractor and Supplier when scoping their respective Activities, Values, logic ties and restraints.

- D. Neither Acceptance nor Review of any Progress Schedule will relieve the Contractor from the obligation to comply with the Contract Times and any sequence of Work indicated in or required by the Contract Documents and to complete, within the Contract Times, any Work omitted from that Progress Schedule.
- E. Neither Acceptance nor Review of any Progress Schedule will imply approval of any interpretation of or variation from the Contract Documents, unless expressly approved by the County through a written interpretation or by a separate, written notation on the returned Progress Schedule Submittal.

#### 1.4 MILESTONES AND SCHEDULE RECOVERY

- A. The County will select Milestones and Milestone Dates on the basis of the As-Planned Schedule. As the Official Schedule is revised, Milestone Dates will be revised accordingly. Milestone Dates will serve as target dates.
- B. Whenever any Activity slips by 14 or more Days from the Late Date for an activity in the Official Schedule, Milestone Dates selected by the County, or a pertinent Contract Time, the Contractor will deliver a Revision Submittal documenting the Contractor's schedule recovery plan and/or a properly supported request for an extension in the Contract Time. The narrative will identify the Delay and actions taken by the Contractor to recover schedule, whether by adding labor, Subcontractors or construction equipment, activity re-sequencing, expediting of submittals and/or deliveries, overtime or shift Work, and so forth. Activity shortening and overlapping shall be explained as to their basis (and be supported by increases in resources).
- C. Upon evaluation of that Revision Submittal, if the County determines there is sufficient cause, the County may withhold liquidated damages or provide a notice of intent to do so, if schedule is indeed not recovered, and/or may give a notice of default.

#### 1.5 PROGRESS SCHEDULE SOFTWARE

- A. The scheduling software employed by the Contractor to process the Progress Schedule will be the current version of Primavera P6.0®, or Primavera® Contractor 5.0 CPM scheduling software.
- B. If the Contractor intends to use companion schedule reporting, analysis or graphics software tools, the Contractor will furnish to the County descriptive materials and samples describing such software tools.

#### 1.6 NON-PERFORMANCE

- A. The County may refuse to recommend all or any part of any payment, if the Contractor fails, refuses or neglects to provide the required Progress Schedule information on a timely basis. Partial payments without a properly updated Progress Schedule shall be returned to the Contractor as non-conforming.

- B. If justified under the circumstances, the County also may prepare alternate Progress Schedules, as appropriate, and deduct from the Contract Amount all related costs by Change Order and/or take other action commensurate with the breach.

## 1.7 REPORTS, SCHEDULES AND PLOTS

- A. Schedule Reports will include Activity (ID) code and description, duration, calendar, Early Dates, Late Dates and Total Float. Separate Schedule Reports will tabulate, for each Activity, all preceding and succeeding logic types and lead times, whether CPM Plots displaying logic ties are appended or not.
- B. CPM Schedule Plots will be plotted on a suitable time scale and identify the Contract Times, Critical Paths, phases and work areas on 24-inch x 36-inch or smaller sheets. Activities will be shown on the Early Dates with Total Floats noted by Late Date flags. For Payment and Revision Submittals plot a target comparison based on the current Official Schedule.
- C. The Activity Value report will tabulate Activity code and description and Activity Value, percent complete and earned value as calculated by the scheduling software. Cash flow plots shall be provided showing the monthly and cumulative actual and planned earned values with curves shown for Early and Late Dates in the schedules. For Payment and Revision Schedule submittals, the cash flow curves shall also plot the most current Official Schedule planned earnings curves.
- D. Each submittal shall include listings of all added and deleted activities, logic, constraints, Activity Value changes and update information vs. the previous Progress Schedule submittal. This list may be manually prepared or generated by accessory software that will generate such listings.

## 1.8 NARRATIVE REQUIREMENTS

- A. The Initial Submittal narrative will describe the Contractor's approach to prosecution of the Work and the basis for determination of activity durations, sequence and logic, including the Contractor's management of the site, e.g., lay down, staging, parking, etc.; Contractor's phasing of the Work; use of crewing and construction equipment; identification of non-work County/Professional's, shifts, weekend Work and multiple calendars applied to activities and an explanation of the basis for restraint dates.
- B. Revision and Payment Submittal narratives will explain any changes to the approach or planning referred to in Paragraph A above on account of any change, delay, schedule recovery, substitution and/or Contractor-initiated revision occurring since the previous submittal.
- C. Each narrative will list the Critical Path Activities and compare Early and Late Dates against Contract Times and Milestone Dates. Narratives shall also recap progress and Days gained or lost vs. the current Official Schedule, and identify delays, their extent and causes.

- D. The Initial Submittal narrative will describe all delays occurring since Contract Award and all pending and anticipated "or equal" and substitution proposals. Payment and Revision Submittal narratives will describe any new delays and shall certify that the Contractor has not been delayed, as of the cut off date, by any acts or omissions of the County, except as otherwise specifically stated.

## 1.9 ACTIVITY REQUIREMENTS

- A. Separate activities will identify permits, design when included in the Work, construction, Submittal preparation and review (and resubmission and re-review), deliveries (site or storage), testing, start-up, commissioning and Punch List.
- B. Activities will be detailed to the extent required to show the transition of trade Work. Activities will delineate the progression of the Work.
- C. Activities will not combine separate or non-concurrent items of Unit Price or lump sum Work.
- D. Activity durations will equal the Work Days required to sufficiently complete the Work designated by the Activity, (i.e., when finish-to-start successors could start, even if the Activity is not quite 100% complete). Installation Activities will last from 10 to 40 workdays. Submittal review activity durations shall conform to specified timeframes.
- E. Activities will be assigned consistent descriptions and identification codes. Sort codes will group Activities by meaningful schemes.
- F. Activities will be assigned Activity Values as appropriate and needed to reasonably allocate the Contract Amount to the time periods that they will be earned and eligible for payment based on the Progress Schedule and Schedule of Values. Separate pay activities may be used to simplify cost loading of the Progress Schedule. When used, pay activities shall be loaded with the cost of Work that is included, at no cost, in related (generally, concurrent) CPM activities. Pay activities shall not control the rate of progress; however, their start and finish dates shall be consistent with those of their related CPM activities to ensure accurate Early Date and Late Date cash-flow plots.

## 1.10 FLOAT TOLERANCES AND FLOAT OWNERSHIP

- A. Any Progress Schedule with Early Dates after a Contract Time will yield negative Total and Contract Floats, whether shown/calculated or not. Any Revision Submittal with less than negative 20-days of Float will be returned as "Revise and Resubmit," unless a time extension is requested or the County assesses liquidated damages or gives notice of intent to do so, in the event schedule is not recovered.
- B. Float calculated from the definitions given in this Section supersede any conflicting Float values in any early completion Progress Schedule.

- C. Neither the County nor the Contractor own the Float time, the Project owns the Float time. Neither the County nor the Contractor use of positive Total Float will impact a Contract Completion Date or justify an extension of Contract Time.

#### 1.11 SUBMITTALS

- A. Each Progress Schedule Submittal will consist of a narrative, 5 copies of the required reports and plots and an optical ROM data disk with the Contractor's corresponding schedule and schedule layout files in Primavera ".XER" format.
- B. The County will review Progress Schedule Submittals and return a review copy within 14-days after receipt and the Contractor shall, if required, resubmit within 7-days after return of the review copy.
- C. Requirements for the Initial Submittal:
  - 1. Within 20-days after receipt of Notice to Proceed and prior to commencing Work on the Project, prepare and submit to the County the Initial Submittal of the Progress Schedule for the Work. The Initial Submittal will show the Work as awarded, without delays, Change Orders or substitutions.
    - a. Activity Values will prorate Schedule of Values costs and/or pay items through to Activities. Provide a cross-reference listing with two parts; a part that will list each activity with the respective amounts allocated from each Schedule of Values and Unit Price Item making up the total value of each activity and a second part that will list the Schedule of Values and Unit Price Items with the respective amounts allocated from each activity that make up the total value of each item.
  - 2. After the As-Planned Schedule is established, the County will select Milestones and record the Milestone Early and Late Dates. As the Official Schedule evolves, Milestone Dates will be revised accordingly.
  - 3. If the County refuses to endorse the Initial Submittal (or a resubmission) as "Resubmittal Not Required," the As-Planned Schedule will not be established. In that event, the Contractor will continue to submit Payment and Revision Submittals reflecting progress and the Contractor's approach to remaining Work. The County will rely on the available Payment and Revision Submittals, subject to whatever adjustments it determines appropriate.
- D. Requirements for Payment Submittals:
  - 1. Payment Submittals with progress up to the closing date and updated Early Dates and Late Dates for progress and remaining Activities will be due with each Progress Payment. As-built data will consist of actual dates, percent complete, earned payment, changes, Delays and other significant events occurring before the closing date.
  - 2. Activity percent complete and earned value should indicate a level of completion that corresponds to the Application for Progress Payment for the same period. The earned value should be calculated by the scheduling software as Activity Value times percent complete. Explanation should be provided whenever the cumulative earned value of activities in a Payment Submittal is not within 10% of the value of Work completed as represented in the corresponding Application for Progress for Payment.

3. At the Contractor's option, a Payment Submittal may overlay minor adjustments on activities and sequencing for Work remaining. This excludes Activity re-scoping to reflect Delays, changes, schedule recovery or substitutions.

E. Requirements for Revision Submittals:

1. Revision Submittals will be submitted when necessary because of major changes or delays affecting activities, sequencing or restraints for Work remaining and/or to put forth a schedule recovery plan. Revision Submittals may also be required because of Contractor-initiated re-planning, or when Contractor plans to perform Work ahead or out-of-sequence that will require additional testing or inspection personnel, or when requested by the County when Work is performed out-of-sequence from the current Official Schedule such that the number of Days gained or lost can not be determined or the scheduled dates of completion of the Work in a Payment Submittal are not viewed as reliable.
2. If requesting a time extension, the Revision Submittal should show the impact of the delay after incorporating reasonable mitigation to minimize the impact and illustrate how the number of Days requested time extension was determined. The delay should be determined as the change in the forecast Contract Completion Date(s) resulting solely from delays that entitle the Contractor to a time extension as provided in the General Conditions. Any and all Contractor slippage and delay occurring prior to and concurrent with the delay potentially entitling the Contractor to a time extension shall be incorporated in the Revision and explained such that the concurrent and non-concurrent periods of delay are indicated. If the Contractor does not follow the procedures contained in this Section or, if the Contractor's analysis is not verifiable by an independent, objective evaluation by the County using the electronic files and data furnished by the Contractor, any such extension in Contract Time will not be granted.

F. Retrospective Delay Analysis.

1. If the County/Professional refuses to endorse any Revision Submittal as "Resubmittal Not Required," the Contractor and County will use the latest Official Schedule when evaluating the effect of Delays on Contract Time and/or Contract Price. The procedure to be used will consist of progressively updating the latest Official Schedule at key closing dates corresponding to starting and finishing dates of the delays and/or dates the delays became critical or dates the Critical Path may have changed for other reasons. For each Progress Schedule iteration, slippage between actual Milestone Dates and Initial Milestone Dates will be correlated to Delays occurring solely in that iteration.
2. For each iteration, revisions in Activities, logic ties and restraints affecting Work after the closing date will be included in that Progress Schedule only if they meet any of the following conditions. First, they are Progress Schedule revisions that the County consented to contemporaneously (i.e., before the closing date) in writing. Second, they reflect comments or objections raised by or on behalf of the County and that were actually confirmed by the as-built progress. Lastly, they represent Contractor's schedule recovery plans or other Progress Schedule revisions that were actually confirmed by the as-built progress.

**PART 2 - PRODUCTS (NOT USED)**

**PART 3 - EXECUTION (NOT USED)**

END OF SECTION

**SECTION 01370**  
**SCHEDULE OF VALUES**

**PART 1 - GENERAL**

1.1 DEFINITION

- A. Schedule of Values: Schedule that divides the Contract Amount into pay items, such that the sum of all pay items equals the Contract Amount for the Work, or for any portion of the Work having a separate specified Contract Amount.

1.2 REQUIREMENT

- A. The Schedule of Values established as provided in the General Conditions will serve as the basis for progress payments and will be incorporated into a form of Application for Payment acceptable to the County. Progress payments on account of Unit Price Work will be based on the number of units completed and shall be prorated by the percent complete on the number of units installed not meeting all requirements of the Contract including testing
- B. No payment will be made for Work performed on a lump sum contract or a lump sum item until the appropriate Schedule of Values is approved by the County.
- C. The equitable value of Work deleted from a lump sum contract or lump sum item shall be determined from the approved Schedule of Values.

1.3 SUBMITTALS

- A. Submit 3 copies of a Preliminary Schedule of Values within 15-days after the recommended award of the Contract.
- B. Submit 3 copies of a proposed final Schedule of Values within 20-days after receipt of Notice to Proceed as per the General Conditions.
- C. Submit the Schedule of Values, typed, on EJCDC 1910-8-E form or Orange County forms or spreadsheets provided by County. The Contractor's standard form or electronic media printout will be considered for acceptability by the County.
- D. List installed value of each major item of Work and each subcontracted item of Work as a separate line item to serve as a basis for computing values for Progress Payments. Round off values to nearest dollar.
- E. Coordinate listings with the Progress Schedule.
- F. For items on which payments will be requested for stored materials or equipment, list sub-values for cost of stored products with taxes paid and provide corresponding schedule of value item number. Stored materials quantities shall not exceed installed quantities on bid tab or as required by the Contract Documents.

- G. Submit a sub-schedule for each separate stage of Work specified in Section 01010 "Summary of Work."
- H. The sum of values listed shall equal the total Contract Amount for the Work or the Contract Amount for a part of the Work with a separate Contract Amount provided for by the Contract Documents.
- I. When the County requires substantiating information, submit data justifying line item amounts in question.

#### 1.4 UNIT PRICE CONTRACTS

- A. For unit price contracts, the bid item prices on the Project Bid Schedule shall be used as the basis for the schedule of values. The Contractor shall resubmit the bid item prices in the format described herein, and may, at its option, or if requested by the County, divide the items in the Project Bid Schedule into sub-items to provide a more detailed basis of payment.

#### **PART 2 - PRODUCTS (NOT USED)**

#### **PART 3 - EXECUTION (NOT USED)**

END OF SECTION

**SECTION 01400**  
**QUALITY CONTROL**

**PART 1 - GENERAL**

1.1 SITE INVESTIGATION AND CONTROL

- A. Contractor shall verify all dimensions in the field and check field conditions continuously during construction. Contractor shall be solely responsible for any inaccuracies built into the Work due to Contractor's failure to comply with this requirement.
- B. Contractor shall inspect related and appurtenant Work and report in writing to County any conditions which will prevent proper completion of the Work. Failure to report any such conditions shall constitute acceptance of all site conditions, and any required removal, repair, or replacement caused by unsuitable conditions shall be performed by the Contractor at Contractor's sole cost and expense.

1.2 INSPECTION OF THE WORK

- A. The Work shall be conducted under the general observation of representatives of the County acting on behalf of the County to ensure strict compliance with the requirements of the Contract Documents. Such inspection may include mill, plant, shop, or field inspection, as required. The County shall be permitted access to all parts of the Work, including plants where materials or equipment are manufactured or fabricated. Inspection by the County are in addition to the inspections required of Contractor by his QC Representatives.
- B. The presence of the County, however, shall not relieve the Contractor of the responsibility for the proper execution of the Work in accordance with all requirements of the Contract Documents. Compliance is a duty of the Contractor, and said duty shall not be avoided by any act or omission on the part of the County. Further, no requirement of this Contract may be waived or modified except by change order or formal (written) substitution approval.
- C. All materials and articles furnished by the Contractor shall be subject to rigid inspection, and no materials or articles shall be used in the Work until they have been inspected and accepted by the County. No Work shall be backfilled, buried, cast in concrete, hidden, or otherwise covered until it has been inspected. Any Work so covered in the absence of inspection shall be subject to uncovering. Where uninspected Work cannot be uncovered, such as in concrete cast over reinforcing steel, all such Work shall be subject to demolition, removal, and reconstruction under proper inspection and no additional payment will be allowed therefore.

- D. The Contractor is responsible for the Quality of his own work and shall designate a qualified individual, to be approved by the County, who will ensure that all work is performed in strict accordance with the Contract Documents. This quality representative shall inspect the work for the Contractor and provide to the County and the Contractor a report outlining all work accomplished, all inspections, and all testing performed for all days when work is performed. The objective of this report is to provide "Objective Evidence of Compliance" by the Contractor with the requirements of the Contract.

### 1.3 TIME OF INSPECTION AND TESTS

- A. Samples and testing required under these Specifications shall be furnished and prepared in ample time for the completion of the necessary tests and analyses before said articles or materials are to be used. Except as otherwise provided in the Contract Documents, performance of the required tests will be by the Contractor and all costs therefore will be borne by the Contractor at no cost to the County. Whenever the Contractor is ready to backfill, bury, cast in concrete, hide, or otherwise cover any Work under this Contract, the County shall be notified not less than 24-hours in advance to request inspection before beginning any such Work of covering. Failure of the Contractor to notify the County at least 24-hours in advance of any such inspections shall be reasonable cause for the County to order a sufficient delay in the Contractor's schedule to allow time for such inspection, any remedial, or corrective work required, and all costs of such delays, including its impact on other portions of the Work, shall be borne by the Contractor.

### 1.4 SAMPLING AND TESTING

- A. When not otherwise specified, all sampling and testing shall be in accordance with the methods prescribed in the current standards of the ASTM, as applicable to the class and nature of the article or materials considered. However, the County reserves the right to use any generally accepted system of inspection which, in the opinion of the County, will ensure the County that the quality of the workmanship is in full accord with the Contract Documents.
- B. Any waiver of any specific testing or other quality assurance measures, whether or not such waiver is accompanied by a guarantee of substantial performance as a relief from the specified testing or other quality assurance requirements as originally specified, and whether or not such guarantee is accompanied by a performance bond to assure execution of any necessary corrective or remedial work, shall not be construed as a waiver of any technical or qualitative requirements of the Contract Documents.
- C. Notwithstanding the existence of such waiver, the County shall reserve the right to make independent investigations and tests as specified in the following paragraph and, upon failure of any portion of the Work to meet any of the qualitative requirements of the Contract Documents, shall be reasonable cause for the County to require the removal or correction and reconstruction of any such Work.

- D. In addition to any other inspection or quality assurance provisions that may be specified, the County shall have the right to independently select, test, and analyze, at the expense of the County, additional test specimens of any or all of the materials to be used. Results of such tests and analyses shall be considered along with the tests or analyses made by the Contractor to determine compliance with the applicable specifications for the materials so tested or analyzed provided that wherever any portion of the Work is discovered, as a result of such independent testing or investigation by the County which fails to meet the requirements of the Contract Documents, all costs of such independent inspection and investigation and all costs of removal, correction, reconstruction, or repair of any such Work shall be borne by the Contractor.

#### 1.5 RIGHT OF REJECTION

- A. The County shall have the right at all times and places to reject any articles or materials to be furnished hereunder which, in any respect, fail to meet the requirements of the Contract Documents, regardless of whether the defects in such articles or materials are detected at the point of manufacture or after completion of the Work at the site. If the County or inspector, through an oversight or otherwise, has accepted materials or Work which is defective or which is contrary to the Contract Documents, such material, no matter in what stage or condition of manufacture, delivery, or erection, may be rejected by County.
- B. Contractor shall promptly remove rejected articles or materials from the site of the Work after notification or rejection.
- C. All costs of removal and replacement of rejected articles or materials, as specified herein, shall be borne by the Contractor.
- D. If the Contractor fails to remove or replace defective work after notification to do so, the County may have the work removed and replaced by others and deduct all costs from the Contractor's pay requests.

#### 1.6 TESTING LABS

- A. All geotechnical testing laboratory services for field testing will be paid by the County. The lab(s) shall function as independent lab(s) and report independently to the County and the Contractor. The test lab(s) may not approve or allow any deviation from the Contract Documents.

### **PART 2 - PRODUCTS (NOT USED)**

### **PART 3 - EXECUTION (NOT USED)**

END OF SECTION

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**SECTION 01560**  
**EROSION AND SEDIMENTATION CONTROL**

**PART 1 - GENERAL**

1.1 WORK INCLUDED

- A. The Work specified in this Section consists of designing, providing, maintaining and removing temporary erosion and sedimentation controls as necessary to protect the Work and prevent sedimentation from the Contractor's activities from entering water bodies or enter other parts of the County's or other property owners sites outside the Construction limits.
- B. Temporary erosion controls include, but are not limited to; grassing, mulching, netting, watering and reseeded on-site surfaces and soil and borrow area surfaces, and providing interceptor ditches at end of berms and at those locations which will ensure that erosion during Construction will be either eliminated or maintained within acceptable limits as established by the regulatory agencies having jurisdiction.
- C. Temporary sedimentation controls include, but are not limited to; silt dams, traps, barriers, and appurtenances at the foot of sloped surfaces which will ensure that sedimentation pollution will be either eliminated or maintained within acceptable limits as established by the regulatory agencies having jurisdiction.

1.2 REQUIREMENTS

- A. The Contractor is responsible for providing effective temporary erosion and sediment control measures during Construction or until final controls become effective.
- B. The Contractor shall be responsible for filing Notice of Intent for Construction Activities with regulatory agencies (SJRWMD, SFWMD, and FDEP) as required by law, if thresholds are expected to be exceeded.
- C. The areas of unstabilized soil cover shall be minimized at all times to limit erosion and sedimentation.

1.3 SUBMITTALS:

- A. The Contractor shall prepare and submit an Erosion and Sedimentation Control Plan (Stormwater Pollution Prevention Plan) for County review and approval. The Plan shall be in effect throughout the Construction duration.

## **PART 2 - PRODUCTS**

### **2.1 EROSION CONTROL**

- A. Seed: Scarified Argentine Bahia.
- B. Sod: Bermuda grass, Argentine Bahia grass, Pensacola Bahia grass or St. Augustine. Grassing and Sodding Materials: As specified in Section 981 FDOT Specification for Road & Bridge Construction.
- C. Netting: Polypropylene mesh netting 5/8-inch x 3/4-inch (16 x 19mm) mesh with interwoven curlex fibers as manufactured by American Excelsior Company or equal. Netting: Fabricated of material in conformance with Section 985 FDOT Specification for Road & Bridge Construction.

### **2.2 SEDIMENTATION CONTROL**

- A. Bales: Clean, synthetic hay type. Minimum dimensions of 14-inch by 18-inch by 36-inches at the time of placement.
- B. Netting: Fabricated of material in conformance with Section 985 FDOT Specification for Road & Bridge Construction.
- C. Sediment Control Fencing (Silt Fencing): As manufactured by American Excelsior Company or equal.
- D. Filter stone: Crushed stone conforming to Florida Department of Transportation Specifications.
- E. Concrete block: Hollow, non-load bearing type.
- F. Concrete: Exterior grade not less than 1-inch thick.
- G. Turbidity Barriers: Floating or staked as required.

## **PART 3 - EXECUTION**

### **3.1 TEMPORARY EROSION CONTROL**

- A. See Section 02578 "Solid Sodding."

### **3.2 SEDIMENTATION CONTROL**

- A. Install and maintain silt fences and dams, traps, barriers, and appurtenances as shown on the approved descriptions and working Drawings. Replace deteriorated hay bales and dislodged filter stone. Repair portions of any devices damaged at no additional expense to the County.

- B. Install all sediment control devices in a timely manner to ensure the control of sediment. At sites where exposure to sensitive areas is likely, complete installation of all sediment control devices before starting earthwork.
- C. Use approved temporary erosion control features to correct conditions that develop during Construction that were not foreseen when the Erosion and Sedimentation Control Plan was first approved.

### 3.3 PERFORMANCE

- A. Should any of the temporary erosion and sediment control measures employed by the Contractor fail to produce results that comply with the requirements of the Regulatory agency having jurisdiction, the County or the Professional, the Contractor shall immediately take whatever steps necessary to correct the deficiency at its own expense to protect the Work and any adjacent property to the site, as well as to prevent contamination of any river, stream, lake, tidal waters, reservoir, canal or other water impoundments.
- B. The side slope areas with unstabilized or unprotected soil cover shall be minimized at all times to limit erosion and sedimentation.
- C. Incorporate permanent erosion control features into the Project at the earliest practical time.
- D. Remove temporary erosion and sedimentation controls when the Work is complete and in accordance with the Erosion and Sedimentation Control Plan (Stormwater Pollution Prevention Plan) and the Notice of Intent for Construction Activities filed with regulatory agencies.

### 3.4 MAINTENANCE OF EROSION AND CONTROL FEATURES

- A. Provide routine maintenance of permanent and temporary erosion control features, at no expense to the County, until the Project is complete and accepted.

END OF SECTION

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**SECTION 01570**  
**MAINTENANCE OF TRAFFIC**

**PART 1 - GENERAL**

1.1 DESCRIPTION

This section includes identifying safety hazards and then furnishing all necessary labor, materials, tools, and equipment including, but not limited, to signs, barricades, traffic drums, cones, flashers, construction fencing, flag persons, variable message boards, uniformed police officers, warning devices, temporary pavement markings, temporary sidewalk, delineators, etc., to maintain vehicular and pedestrian traffic through and adjacent to the project area. These measures and actions shall be taken to safely maintain the accessibility of public and construction traffic by preventing potential construction hazards. All materials, work and incidental costs related to Maintenance of Traffic will be included in the contract line items as described in Section 01025.

1.2 REQUIREMENTS

- A. The Traffic Control Plan shall conform to the following standards:
  - 1. Standard Specifications for Road and Bridge Construction, latest edition including all subsequent supplements issued by the Florida Department of Transportation, (FDOT).
  - 2. Manual on Uniform Traffic Control Devices for Streets and Highways by U.S. Department of Transportation, Federal Highway Administration.
  - 3. Right-of-Way Utilization Regulations, Orange County, Florida, latest edition.
- B. All references to the respective agencies in the above referenced standards shall be construed to also include the municipality as applicable for this Work.
- C. Sequence the Work in a manner that will minimize disruption of vehicular and pedestrian access through and around the construction area.
- D. Traffic planning and control for the maintenance and protection of pedestrian and vehicular traffic affected by the Contractor's Work includes, but is not limited to:
  - 1. Construction and maintenance of any necessary detour equipment and facilities.
  - 2. Providing necessary facilities for access to residences and businesses.
  - 3. Furnishing, installing, and maintenance of traffic control and safety devices (e.g. signage, barricades, barriers, message boards, etc.), and flag persons as appropriate during Construction.
  - 4. Control of water runoff, dust and any other special requirements for safe and expeditious movement of traffic.

- E. Planning, maintenance and control of traffic shall be provided at the Contractor's expense. The Contractor will bear all expense of maintaining the vehicle and pedestrian traffic throughout the work area.
- F. The Contractor will ensure all personnel involved in traffic control are and capable of communicating with the public. The Contractor may be required to hire off-duty uniformed police officers, in addition to flag persons, to direct and maintain traffic. Locations and conditions requiring such uniformed police officers shall be as directed by the County. The Contractor shall be required to utilize uniformed police officers for work within FDOT maintained ROW, road closures affecting school traffic and during all night work involving a road closure or crossing on nonresidential roads.
- G. The Contractor will remove temporary equipment and facilities when no longer required, restore grounds to original, or to specified conditions.

### 1.3 SUBMITTALS

- A. Submit at Contractor's own expense a Traffic Control Plan for approval by the controlling roadway agency (FDOT, Orange County Public Works or other local government) having jurisdiction over the road for approval.
  - 1. The Traffic Control Plan will detail procedures and protective measures proposed by the Contractor to provide for protection and control of traffic affected by the Work consistent with the following applicable standards:
    - a. Standard Specifications for Road and Bridge Construction, latest edition including all subsequent supplements issued by the Florida Department of Transportation, (FDOT Spec.).
    - b. Manual of Traffic Control and Safe Practices for Street and Highway Construction, Maintenance and Utility Operations, FDOT.
    - c. Right-of-Way Utilization Regulations, Orange County, Florida, latest edition.
- B. All references to the respective agencies in the above referenced standards shall be construed to also include the municipality as applicable for this Work.
- C. The Traffic Control Plan will be signed and sealed by a Professional Engineer registered in the state of Florida and shall include proposed locations and time durations of the following, as applicable:
  - 1. Pedestrian and public vehicular traffic routing.
  - 2. Lane and sidewalk closures, other traffic blockage and lane restrictions and reductions anticipated to be caused by construction operations. Show and describe the proposed location, dates, hours and duration of closure, vehicular and pedestrian traffic routing and management, traffic control devices for implementing pedestrian and vehicular movement around the closures, and details of barricades.
  - 3. Location, type and method of shoring to provide lateral support to the side of an excavation or embankment parallel to an open travel-way.
  - 4. Allowable on-street parking within the immediate vicinity of worksite.
  - 5. Access to buildings immediately adjacent to worksite.
  - 6. Driveways blocked by construction operations.

7. Temporary traffic control devices, temporary pavement striping and marking of streets and sidewalks affected by construction
  8. Temporary commercial and industrial loading and unloading zones.
  9. Construction vehicle reroutes, travel times, staging locations, and number and size of vehicles involved.
- D. Contractor plans shall be submitted to the County. The County will acquire the MOT permits.
- E. Contractor shall obtain and submit an Orange County Public Works Right-of-Way permit prior to work, or otherwise impacting traffic.

## **PART 2 - PRODUCTS**

### **2.1 MATERIALS AND EQUIPMENT**

- A. The Contractor shall furnish, erect, and maintain all necessary traffic control devices, including flag person, in accordance with the Manual of Uniform Traffic Control Devices for Streets and Highways published by the U.S. Department of Transportation, Federal Highway Administration.
1. FLAG PERSONS
- a. All flag persons used on this Project will adhere to the following requirements:
  - b. Any person acting as a flag person on this Project will have attended a training session taught by a Contractor's qualified trainer before the start date of this Contract.
  - c. The Contractor's qualified trainer will have completed a "Flag person Train the Trainer Session" in the 5-years previous or before the start date of this Contract and will be on file as a qualified flag person trainer.
  - d. The flag person trainer's name and Qualification Number will be furnished by the Contractor at the Pre-Construction meeting. The Contractor will provide all flag persons with the Flag Person Handbook and will observe the rules and regulations contained therein. This handbook will be in the possession of all flag person while flagging on the Project.
  - e. Flag persons will not be assigned other duties while working as authorized flag persons.
  - f. Any person replacing flag person for break shall have the same training.

## **PART 3 - EXECUTION**

### **3.1 NOTIFICATIONS**

- A. The Contractor will notify individual owners, owner's agents, and tenants of buildings affected by the construction, with copies to the county, 72-hours in advance of any construction activities.
- B. The Contractor shall notify residents and pedestrians via variable message boards no later than 10 days prior to the closure of any road, lane or pedestrian thoroughfare.

- C. The Contractor shall notify Emergency Management Services agencies, Lynx and OCPS no less than 7 days prior to such closures or whenever roads are impassable.
- D. Implement closing of vehicle or pedestrian thoroughfare in accordance with the construction drawings and the approved Traffic Control Plan.
- E. The Contractor will immediately notify the County of any vehicular or pedestrian safety or efficiency problems incurred as a result of the construction of the Project.

### 3.2 GENERAL TRAFFIC CONTROL

- A. The Contractor will sequence and plan construction operations and will generally conduct Work in such a manner as not to unduly or unnecessarily restrict or impede normal traffic.
- B. Unless otherwise provided, all roads within the limits of the Work will be kept open to all traffic by the Contractor. The Contractor will keep the portion of the project being used by public traffic, whether it is through or local traffic, in such condition that traffic will be adequately accommodated.
- C. The Contractor will be responsible for installation and maintenance of all traffic control devices and requirements for the duration of the construction period. Necessary precautions for traffic control will include, but not be limited to, warning signs, signals, lighting devices, markings, barricades, canalizations, and hand signaling devices.
- D. The Contractor will provide and maintain in a safe condition temporary approaches or crossings and intersections with trails, roads, streets, businesses, parking lots, residences, garages and farms.
- E. The Contractor will provide emergency access to all residences and businesses at all times. Residential and business access will be restored and maintained at all times outside of the Contractor's normal working hours.
- F. Traffic is to be maintained on one section of existing pavement, proposed pavement, or a combination thereof. Alternating one-way traffic may be utilized and limited to a maximum length of 500-feet during construction hours. Lane width for alternating one-way traffic will be kept to a minimum width of 10-feet, or as directed by the County.
- G. Travel lanes and pedestrian access will be kept reasonably smooth, dry, and in a suitable condition at all times.
- H. The Contractor will make provisions at all "open cut" street crossings to allow for free passage of vehicles and pedestrians, either by bridging or other temporary crossing structures. Such structures will be of adequate strength and proper construction and will be maintained by the Contractor in such a manner as not to constitute an undue traffic hazard.

- I. The Contractor will keep all signs in proper position, clean, and legible at all times. Care will be taken so that weeds, shrubbery, construction materials, equipment, and soil are not allowed to obscure any sign, light, or barricade. Signs that do not apply to construction conditions should be removed or adjusted so that the legend is not visible to approaching traffic.
- J. The County may determine the need for, and extent of, additional striping removal and restriping.
- K. Excavated material, spoil banks, construction materials, equipment and supplies will not be located in such a manner as to obstruct traffic, as practicable. The Contractor will immediately remove from the site all demolition material, exercising such precaution as may be directed by the County. All material excavated shall be disposed of so as to minimize traffic and pedestrian inconvenience and to prevent damage to adjacent property.
- L. During any suspension, the Contractor will make passable and open to traffic such portions of the Project and/or temporally roadways as directed by the County for accommodation of traffic during the anticipated period of suspension. Passable conditions will be maintained until issuance of an order for the resumption of construction operations. When Work is resumed, the Contractor will replace or renew any Work or materials lost or damaged because of such temporary use in every respect as though its prosecution had been continuous and without interferences.

### 3.3 TEMPORARY SHORING

- A. Use shoring to maintain traffic when it is necessary to provide lateral support to the side of an excavation or embankment parallel to an open travel-way. Provide shoring when a theoretical 2:1 or steeper slope from the bottom of the excavation or embankment intersects the existing ground line closer than 5-feet (1.5 m) from the edge of pavement of the open travel-way.
- B. The Contractor will furnish, install, and remove sheeting, shoring, and bracing necessary to maintain traffic at locations shown on the Traffic Control Plan and other locations determined during construction.

END OF SECTION

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**SECTION 01580**  
**PROJECT IDENTIFICATION AND SIGNS**

**PART 1 - GENERAL**

**1.1 REQUIREMENTS INCLUDED**

- A. The Contractor shall furnish, install, and maintain all sign materials including sign posts, weighted stands, brackets, any required mounting hardware, and miscellaneous materials required for temporary signs for the purpose of:
  - 1. Project Identification.
  - 2. Informational signs to direct traffic
  - 3. On-site safety signs as appropriate for the Work
- B. Remove temporary signs on completion of Construction prior to obtaining Certificate of Occupancy and Substantial Completion.
- C. Allow no other signs to be displayed without written approval of the County.

**1.2 SUBMITTALS**

- A. Submit complete Shop Drawings identifying locations, material, layout, sign content, font type and size, and sample colors. Make sign and lettering to scale, clearly indicating condensed lettering if used. The sign details will be submitted to the County for approval prior to fabrication.
- B. Submit method of erection to include materials, fasteners, and other items to assure compliance with the requirements for wind pressures as required by the authorities having jurisdiction.
- C. Submit signs in accordance with any details provided in the Drawings.
- D. Prior to erection obtain and submit all required permits from the authorities having jurisdiction.

**1.3 PROJECT IDENTIFICATION SIGN**

- A. Provide 1 painted sign at the site, or at each end of the Work if a linear project, or at each of the separate sites of Work, if applicable. The sign will be not less than 32-square feet area, with a minimum dimension of 4-feet and painted graphics with content to include:
  - 1. Title of Project
  - 2. Orange County Government name and logo
  - 3. Names and titles of the Board of County Commissioners, County Administrator, Director of Orange County Utilities Department, the Consulting Engineer, and the Contractor

- B. Erect on the site at a lighted location of high public visibility, adjacent to main entrance to site, as approved by the County. The sign must be located 5-feet from all rights-of-way and 20-feet from all property lines.

#### 1.4 INFORMATIONAL SIGNS

- A. All signs and other traffic control devices shall conform to the requirements for shape, color, size, and location as specified in the latest Manual on Uniform Traffic Control and Safe Streets and Highways and the Florida Manual of Traffic Control and Safe Practices for Street and Highway Construction, Maintenance and Utility Operations. Information as to the above may be obtained from FDOT Division engineers.

### **PART 2 - PRODUCTS**

#### 2.1 SIGN MATERIALS

- A. Structure and Framing: New construction grade lumber, structurally adequate and suitable for exterior application and specified finish.
- B. Sign Panels: New A-B Grade, exterior type, APA DF plywood with inset hardwood edges and mitered corners, standard large sizes to minimize joints.
  - 1. Thickness: As required by standards to span framing members, to provide even, smooth surface without waves or buckles, minimum 3/4-inch.
- C. Rough Hardware: Galvanized steel, of sizes and types to enable sign assemblies to resist wind pressures as required by the authorities having jurisdiction but not less than a wind velocity of 50-mph.
  - 1. Use minimum 1/2-inch diameter button head carriage bolts to fasten sign panels to supporting structures. Bolt heads to be painted to match sign face.
- D. Paint: Exterior quality, as specified in Division 9 or as a minimum as specified herein.
  - 1. Primer and finish coat: exterior, semi-gloss, alkyd enamel.
  - 2. Colors for structure, framing, sign surfaces, and graphics: As shown on the Drawings or as selected by the County.
- E. Safety Sign Number Tags
  - 1. Removable aluminum or galvanized steel, with 4-inch high, blue numerals and steel tag hooks.

### **PART 3 - EXECUTION**

#### 3.1 PROJECT IDENTIFICATION SIGN

- A. Install project identification signs within 10-days of the Notice to Proceed date. Failure to erect the signs may be reason to delay approval of the initial Application for Payment.

- B. Paint exposed surfaces of supports, framing, and surface material; one (1) coat of primer and two (2) coats of finish paint.
- C. Set signs plumb and level and solidly brace as required to prevent displacement during the Construction period. If mounted on posts, sink posts 3-feet to 4-feet below grade, leaving a minimum of 8-feet of each post above grade for mounting the sign.
- D. Install informational signs at a height for optimum visibility, on ground mounted poles or attached to temporary structural surfaces.

### 3.2 MAINTENANCE

- A. Maintain signs and supports in a neat, clean condition; repair damages to structure, framing, or sign.
- B. Relocate informational signs as required by the progress of the Work.
- C. Poorly maintained, defaced, damaged, or dirty signs shall be replaced, repaired, or cleaned without delay.
- D. Special care must be taken to ensure that construction materials and dust are not allowed to obscure the face of a sign.
- E. Signs not in effect shall be covered or removed.

### 3.3 REMOVAL

- A. Remove signs, framing, supports, and foundations at Substantial Completion of the Work.
- B. Leave areas clean and patch as required to remove any traces of temporary signs.

END OF SECTION

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**SECTION 01700**  
**PROJECT CLOSEOUT**

**PART 1 - GENERAL**

1.1 DESCRIPTION

The term "Project Closeout" is defined to include requirements near the end of the Contract Time, in preparation for Delivery Order acceptance final acceptance, final payment, and similar actions evidencing completion of the Work. Time of closeout is directly related to Delivery Order completion; therefore, the time of closeout will be a series of time periods for individual elements of Work (Delivery Orders) that has been certified as complete at different dates. This time variation, if any, will be applicable to the other provisions of this section.

1.2 SCOPE OF WORK

- A. This Section specifies administrative and procedural requirements for project closeout, including but not limited to:
  - 1. Delivery Order Completion
  - 2. Final Acceptance

1.3 RELATED WORK

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 1 Specification Sections, apply to this Section.
- B. .
- C. Section 01720 "Project Record Documents"

1.4 PREREQUISITES FOR DELIVERY ORDER COMPLETION.

When the Contractor considers the Work as complete, submit to the County a written notice stating so and requesting an inspection to determine the status of completion. The Contractor will attach to the notice a list of items known to be incomplete or yet to be corrected. Complete the following before requesting the County's inspection for certification of completion.

- A. In the progress payment request that coincides with or is the first request following, the date completion is claimed, show 100% completion or list incomplete items, the value of incomplete Work, and reasons for the Work being incomplete. Inspection procedures include supporting documentation for completion as indicated in these Contract Documents.
- B. Submit a statement showing an accounting of changes to the Contract Sum.
- C. Obtain and submit lien releases enabling the County's full, unrestricted use of the Work and access to services and utilities.
- D. Consult with County before submitting Record Documents in accordance with Section 01720 "Project Record Documents."
- E. Submit all required data deliverables.
- F. Complete final cleaning requirements necessary for Completion.

#### 1.5 FINAL CLEANING.

Complete the following cleaning operations prior to Substantial Completion or Owner occupancy.

- A. Remove from job site all tools, surplus materials, construction equipment, storage sheds, debris, waste and temporary services.
- B. Clean the site, including landscape development areas, of rubbish, litter and other foreign substances. Sweep paved areas broom clean; remove stains, spills and other foreign deposits. Rake grounds that are neither paved nor planted, to a smooth even-textured surface.

#### 1.6 COMPLETION INSPECTION PROCEDURES

- A. Upon receipt of the Contractor's request for inspection, the County will either proceed with inspection or advise the Contractor of incomplete prerequisites.
- B. Following the initial inspection, the County will either approve the Work for invoicing, or advise the Contractor of Work which must be performed before payment will be processed. The County will repeat the inspection when requested in writing and when assured that the Work has been completed.
- C. Results of the completed inspection will form the initial "punch list" for final acceptance.

#### 1.7 PREREQUISITES FOR FINAL ACCEPTANCE.

Complete the following before requesting the County's final inspection for certification of final acceptance, and final payment. List known exceptions, if any, in the request.

- A. Submit the final payment request with final releases and supporting documentation not previously submitted and accepted. Include certificates for insurance for products and completed operations where required.

B. Submit written certification that:

1. The County's final punch list of itemized Work to be completed or corrected, stating that each item has been completed or otherwise resolved for acceptance.
2. The Contract Documents have been reviewed and Work has been completed in accordance with Contract Documents.

3. Equipment and systems have been tested in the presence of the County and are operational.
4. Work is completed and ready for final inspection.

C. Submit consent of surety.

D. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

#### 1.8 FINAL ACCEPTANCE INSPECTION PROCEDURES

A. The County will re-inspect the Work upon receipt of the Contractor's written notice that the Work, including punch list items resulting from earlier inspections, has been completed, except for those items for which completion has been delayed because of circumstances that are acceptable to the County.

B. Upon completion of re-inspection, the County will either prepare a certificate of final acceptance or advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled, which are required for final acceptance.

C. If necessary, the re-inspection procedure will be repeated.

#### **PART 2 - PRODUCTS (NOT USED)**

#### **PART 3 - EXECUTION (NOT USED)**

END OF SECTION

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**SECTION 01720**  
**PROJECT RECORD DOCUMENTS**

**PART 1 - GENERAL**

1.01 DESCRIPTION

- A. The purpose of the Project Record Documents is to provide the County with factual information regarding all aspects of the Work, both concealed and visible.
- B. To insure the Work was constructed in conformance with the Contract Drawings, the following survey documents are required to be prepared and certified by a Surveyor as per Spec Section 01050 Surveying and Field Engineering:
  - 1. Asset Attribute Data Form
  - 2. Pipe Deflection Table
  - 3. Gravity Main Data
  - 4. Boundary Survey and Survey Map Report for pump stations and easements with constructed improvements

The Asset Attribute Data and Pipe Deflection Table forms can be found on the County's web site:

<http://www.orangecountyfl.net/WaterGarbageRecycling/UtilitiesCapitalImprovementProgram.aspx>

1.02 DEFINITIONS

- A. Boundary Survey: Boundary survey, map and report certified by a Surveyor shall be provided that meets the requirements of Chapter 5J-17 'Minimum Technical Standards', FAC.
- B. Surveyor: Contractor's Surveyor that is licensed by the State of Florida as a Professional Surveyor and Mapper pursuant to Chapter 472, F.S.

1.03 QUALITY ASSURANCE

- A. Delegate the responsibility for maintenance of the Record Documents to one person on the Contractor's staff as approved by the County.
- B. Thoroughly coordinate changes within the Record Documents, making adequate and proper entries on each page of specifications and each sheet of Drawings and other documents where such entry is required to show progress and changes properly.
- C. Make entries within 24-hours after receipt of information has occurred.

## 1.04 RECORD DOCUMENTS AT SITE

- A. Maintain at the site and always available for County's use one (1) record copy of:
  - 1. Construction Contract, Drawings, Specifications, General Conditions, Supplemental Conditions, Bid Proposal, Instruction to Bidders, Addenda, and all other Contract Documents
  - 2. Change Orders, Verbal Orders, and other modifications to Contract
  - 3. Written instructions by the County as well as correspondence related to Requests for Information (RFIs)
  - 4. Accepted Shop Drawings, Samples, product data, substitution and "or-equal" requests
  - 5. Field test records, inspection certificates, manufacturer certificates and construction photographs
  - 6. Paper copies of the Progressive As-Built Drawings
  - 7. Current Surveyor's tables for the Assets Attribute Data, Pipe Deflection Data, and Gravity Main Data
- B. Maintain the documents in an organized, clean, dry, legible condition and protected from deterioration, loss and damage until completion of the Work, transfer of all record data to the final As-built Drawings for submittal to the County.
- C. Store As-Built Documents and samples in Contractor's office apart from documents used for construction. Do not use As-Built document for construction purposes. Label each document "AS-BUILT" in neat large printed letters. File documents and samples in accordance with CSI/CSC format.
- D. Record information concurrently with construction progress. Do not conceal any Work until required information is recorded.

## **PART 2 - PRODUCTS**

### 2.01 AS-BUILT SURVEY DRAWINGS

- A. Maintain the electronic As-Built Drawings to accurately record progress of Work and change orders throughout the duration of the Contract.
- B. Date all entries. Enter RFI No., Change Order No., etc. when applicable.
- C. Call attention to the entry by highlighting with a "cloud" drawn around the area affected or other means. In the event of overlapping changes, use different colors for entries of the overlapping changes.
- D. Design call-outs shall have a thin strike line through the design call-out and all As-Built information must be labeled (or abbreviated "AB") and be shown in a bolder text that is completely legible.
- E. Entries shall consist of graphical representations, plan view and profiles, written comments, dimensions, State Plane Coordinates, details and any other information as required to document field and other changes of the actual Work completed. As a

minimum, make entries to also record:

1. Depths of various elements of foundation in relation to finish floor datum and State Plane Coordinates and elevations.
2. As-Built Asset Attribute Data tables shall be completed in the Drawings.
3. When electrical boxes, or underground conduits and plumbing are involved as part of the Work, record true elevations and locations, dimensions between boxes.
4. Actually installed pipe or other work materials, class, pressure-rating, diameter, size, specifications, etc. Similar information for other encountered underground utilities, not installed by Contractor, their owner and actual location if different than shown in the Contract Documents.
5. Details, not on original Contract Drawings, as needed to show the actual location of the Work completed in a manner that allows the County to find it in the future.
6. The Contractor shall mark all arrangements of conduits, circuits, piping, ducts and similar items shown schematically on the construction documents and show on the As-Built Drawings the actual horizontal and vertical alignments and locations.
7. Major architectural and structural changes including relocation of doors, windows, etc. Architectural schedule changes according to Contractor's records and Shop Drawings.

## 2.02 RECORD DOCUMENTS

- A. Three (3) paper copy sets and three (3) digital media sets of the following final Record Documents below.
  1. The following documents shall be signed and sealed by the Surveyor:
    - a. As-built survey drawings as previously described in paragraph 2.01.
    - b. As-built Asset Attribute Data (see Specification Section 01050 "Surveying and Field Engineering," Table 01050-2 for an example)
    - c. Boundary Survey on a 8 1/2"x11" format of fee simple and/or permanent easement sites for pump stations, treatment facilities, etc.. As a minimum the Boundary Survey shall show all above ground and underground structures or equipment, pipe, and conduit. All property or easement corners and the center of wetwell shall be shown with GPS coordinates. The Boundary Survey field work shall be dated after the Work has been completed.
    - d. Boundary Survey on a 8 1/2"x11" format for Work related to constructed pipes within any permanent easements. As a minimum the Boundary Survey shall show the location of the pipe centerline and property corners with GPS coordinates. The Boundary Survey field work shall be dated after the Work has been completed within the easements.
    - e. Gravity Main Table (see Specification Section 01050 "Surveying and Field Engineering", Table 01050-4 for an example)
    - f. Pipe Deflection Table (see Specification Section 01050 "Surveying and Field Engineering" Table 01050-3 for an example). An electronic blank table will be supplied by the County.
  2. Provide an encompassing digital AutoCAD file in the Engineer's current version of AutoCAD and the file shall be saved under in the format dwg. The file includes all the information of the As-Built Survey and any other graphical information in the As-Built Drawings. It shall include the overall Work, utility system layout and

associated parcel boundaries and easements. Feature point, line and polygon information for new or altered Work and all accompanying geodetic control and survey data shall be included. The Surveyor's certified As-Built Asset Attribute Data shall be added to the As-Built Drawings.

3. Provide Scanned "As-Built" Drawing sets complete and include the title sheet, plan/profile sheets, cross-sections, and details. Each individual sheet contained in the printed set of the As-Built Drawings shall be included in the electronic drawings, with each sheet being converted into an individual tif (tagged image file). The plan sheets shall be scanned in tif format Group 4 at minimum of 400 dpi resolution to maintain legibility of each drawing. Then, the tif images shall be embedded into a single pdf (Adobe Acrobat) file representing the complete plan set.
4. Provide Scanned Record Documents reflecting changes from the Contract Documents.

### **PART 3 - EXECUTION**

#### **3.01 FINAL RECORD DOCUMENTS SUBMITTAL**

- A. Submit the Final Record Documents within 20-days after Substantial Completion.
  1. Participate in review meetings as required and make required changes and promptly deliver the Final Record Documents to the County.

END OF SECTION

**SECTION 01740**  
**WARRANTIES AND BONDS**

**PART 1 - GENERAL**

1.01 SCOPE OF WORK

- A. This Section specifies general administrative and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturer's standard warranties on products and special warranties.

1.02 RELATED WORK

- A. Refer to Conditions of Contract for the general requirements relating to warranties and bonds.
- B. General closeout requirements are included in Section 01700 "Project Closeout."
- C. Specific requirements for warranties for the Work and products and installations that are specified to be warranted are included in the individual Sections of Division 2 through 16.

1.03 DEFINITIONS

- A. Standard Product Warranties are preprinted written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the County.
- B. Special Warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the County.

1.04 SUBMITTALS

- A. Submit written warranties to the County prior to requesting a Substantial Completion Inspection as outlined in Section 01700 "Project Closeout." If the Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the County.
- B. When a designated portion of the Work is completed and occupied or used by the County, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the County within 15-days of completion of that designated portion of the Work.

- C. When a special warranty is required to be executed by the Contractor, or the Contractor and a Subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the County for approval prior to final execution.
- D. Refer to individual Sections of Divisions 2 through 16 for specific content requirements, and particular requirements for submittal of special warranties.
- E. Prior to Substantial Completion Inspection, submit to the County two (2) copies of each required warranty and bond properly executed by the Contractor, or by the Contractor, Subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.
  - 1. Bind warranties and bonds in heavy-duty, commercial quality, durable 3-ring vinyl covered loose-leaf binders, thickness as necessary to accommodate contents and sized to receive 8-1/2-inch by 11-inch three-hole punched paper.
  - 2. Table of Contents will be neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification Section in which specified and the name of the product or work item.
  - 3. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product and the name, address and telephone number of the installer, supplier and manufacturer.
  - 4. Identify each binder on the front and the spine with the typed or printed title "WARRANTIES AND BONDS", the project title or name and the name, address and telephone number of the Contractor.
  - 5. When operating and maintenance manuals are required for warranted construction, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

#### 1.05 WARRANTY REQUIREMENT

- A. The Contractor will warrant all equipment in the Contractor's one-year warranty period even though certificates of warranty may not be required. For all major pieces of equipment, the Contractor shall submit a warranty from the equipment manufacturer. "Major" equipment is defined as a device having a 5 HP or larger motor or which lists for more than \$1,000.00.
- B. In the event that an equipment manufacturer or supplier is unwilling to provide a one-year warranty commencing at Substantial Completion, the Contractor will obtain from the manufacturer a warranty of sufficient length commencing at the time of equipment delivery to the job site, such that the warranty will extend to at least 1-year past substantial completion.
- C. If an individual specification section requires a particular warranty more stringent than that required by this Section or the General Conditions, the more stringent requirements will govern for the applicable portion of the Work.

- D. Related Damages and Losses: When correcting warranted Work that has failed, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.
- E. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty will be equal to the original warranty with an equitable adjustment for depreciation.
- F. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the County has benefited from use of the Work through a portion of its anticipated useful service life.
- G. County's Recourse: Written warranties made to the County are in addition to implied warranties, and will not limit the duties, obligations, rights and remedies otherwise available under the law, nor will warranty periods be interpreted as limitations on time in which the County can enforce such other duties, obligations, rights, or remedies.
- H. Rejection of Warranties: The County reserves the right to reject warranties and to limit selections to products with warranties not in conflict with requirements of the Contract Documents.
- I. The County reserves the right to refuse to accept Work for the project where a special warranty, certification, or similar commitment is required on such work or part of the Work, until evidence is presented that entities required to counter-sign such commitments are willing to do so.
- J. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and Subcontractors required to countersign special warranties with the Contractor.

## **PART 2 - PRODUCTS (NOT USED)**

## **PART 3 - EXECUTION**

### **3.01 DELIVERABLES**

- A. Assemble warranties, bonds and service and maintenance contracts, executed by each of the respective manufacturers, suppliers, and Subcontractors, and bind into a commercial quality standard 3-ring binder; submit 5 copies of the warranties and bonds to the County for review.
  - 1. The warranties and bonds shall include:
    - a. Equipment or product description
    - b. Manufacturer's name, principal, address and telephone number

- c. Contractor, name of responsible principal, address and telephone number
- d. Local supplier's or representatives name and address
- e. Scope of warranty or bond
- f. Proper procedure in case of failure
- g. Instances which might affect the validity of warranty or bond
- h. Date of beginning of warranty, bond or service and maintenance contract
- i. Duration of warranty, bond or service maintenance contract

B. Warranties

1. Furnish an extended warranty for sanitary sewer main liner certified by the manufacturer for specified material properties for a particular job. The manufacturer warrants the liner to be free from defects in raw materials for 1-year from the date of acceptance. During the warranty period, any defects which affect the integrity or strength of the pipe shall be repaired at the Contractor's expense in a manner acceptable to the County.
2. Furnish an extended warranty for sanitary lateral liner certified by the manufacturer for specified material properties for a particular job. The manufacturer warrants the liner to be free from defects in raw materials for 1-year from the date of acceptance. During the warranty period, any defects which affect the integrity or strength of the pipe shall be repaired at the Contractor's expense in a manner acceptable to the County.

END OF SECTION

**SECTION 02050**  
**DEMOLITION OF EXISTING STRUCTURES**

**PART 1 - GENERAL**

1.01 DESCRIPTION

A. Scope of Work

1. This Section specifies the labor, materials, equipment, and incidentals required for the demolition, relocation, and/or disposal of all structures, building materials, equipment, and accessories to be removed as shown on the Drawings and as specified herein.
2. There may be existing and active stormwater, wastewater, water, and other facilities on site as indicated on the Drawings. It is essential that these facilities, when encountered, remain intact and in service during the proposed demolition. Consequently, the Contractor shall be responsible for the protection of these facilities and shall diligently direct all his activities toward maintaining continuous operation of the existing facilities and minimizing operational inconvenience.
3. Demolition generally includes:
  - a. Complete demolition and removal of manholes, valve vaults, wetwells, piping, and mechanical and electrical equipment related to the Work as shown on the Drawings and specified herein.
  - b. Complete demolition and removal of all above and below ground structures, concrete slabs and foundations, vaults, and underground utilities (water, wastewater, electrical, etc.) as shown on the Drawings and specified herein.
  - c. All material, equipment, rubble, debris, and other products of the demolition shall become the property of the Contractor for his disposal off-site in accordance with all applicable laws and ordinances at the Contractor's expense. The sale of salvageable materials by the Contractor shall only be conducted off-site. The sale of removed items on the site is prohibited by the County.
4. The Contractor shall examine the various Drawings, visit the site, determine the extent of the Work, the extent of work affected therein, and all conditions under which he is required to perform the various operations.
5. The Contractor shall fill and compact all voids left by the removal of pipe, structures, etc. with materials described herein to a grade that will provide for positive drainage of the disturbed area to drain run-off in direction consistent with the surrounding area. The Contractor shall provide all fill materials to the site as needed. Compaction of fill shall match the compaction of adjacent undisturbed material.

1.02 QUALITY ASSURANCE

- A. Permits and Licenses: Contractor shall obtain all necessary permits and licenses for performing the Work and shall furnish a copy of same to the County prior to commencing the Work. The Contractor shall comply with the requirements of the permits.

- B. Notices: Contractor shall issue written notices of planned demolition to companies or local authorities owning utility conduit, wires, or pipes running to or through the project site. Copies of said notices shall be submitted to the County.
- C. Utility Services: Contractor shall notify utility companies or local authorities furnishing gas, water, electrical, telephone, or sewer service to remove any equipment in the structures to be demolished and to remove, disconnect, cap, or plug their services to facilitate demolition.
- D. Contractor shall notify the Orange County Risk Management Department in writing prior to beginning any demolition work.

### 1.03 SHOP DRAWINGS AND SUBMITTALS

- A. Submittals shall be submitted to the County for review and acceptance prior to construction in accordance with the General Conditions and specifications Section 01300 "Submittals."
- B. Submit to the County for their approval, 2 copies of proposed methods and operations of demolition or relocation of the structures specified below prior to the start of Work. Include in the schedule the coordination of shut-off, capping, and continuation of utility service as required.
- C. Provide a detailed sequence of demolition and removal work to ensure the uninterrupted progress of the County's operations.
- D. Before commencing demolition work, all structure relocation, bypassing, capping, or modifications necessary will be completed. Actual work will not begin until the County has inspected and approved the prerequisite work and authorized commencement of the demolition work.
- E. The above procedure must be followed for each individual demolition operation.

### 1.04 SITE CONDITIONS

- A. Prior to demolition, the Contractor shall obtain written verification from the utility owner(s) that the existing utilities, including stormwater, wastewater, and/or water facilities, are not operational and are ready for demolition.
- B. The County assumes no responsibility for the actual condition of the structures to be demolished or relocated.
- C. Conditions existing at the time of inspection for bidding purposes will be maintained by the County insofar as practicable. However, variations within each site may occur prior to the start of demolition work.
- D. No additional payment will be made for pumping or other difficulties encountered due to water.

- E. Certain information regarding the reputed presence, size, character and location of existing underground structures, pipes and conduit has been shown on the Drawings. There is no certainty of the accuracy of this information, and the location of underground structures shown may be inaccurate and other obstructions than those shown may be encountered. The Contractor hereby distinctly agrees that the County is not responsible for the correctness or sufficiency of the information given; that in no event is this information to be considered as a part of the Contract; that he shall have no claim for delay or extra compensation on account of incorrectness of information regarding obstructions either revealed or not revealed by the Drawings; and that he shall have no claim for relief from any obligation or responsibility under this Contract in case the location, size, or character of any pipe or other underground structure is not as indicated on the Drawings, or in case any pipe or other underground structure is encountered that is not shown on the Drawings.

#### 1.05 RESTRICTIONS

- A. No building, tank or structure, or any part thereof, shall be demolished until an application has been filed by the Contractor with the Building Department Inspector and a permit issued if a permit is required. The fee for this permit shall be the Contractor's responsibility. Demolition shall be in accordance with applicable provisions of the Building Code of the State of Florida.
- B. No explosives shall be used at any time during the demolition. No burning of combustible material will be allowed.
- C. Contractor shall notify the Orange County Risk Management Department prior to beginning any demolition work.

#### 1.06 DISPOSAL OF MATERIAL

- A. All salvageable or useable material or equipment to be retained by the County shall be shown on Drawings, and shall be moved to a designated area by Contractor for pick up by County. The Contractor shall promptly remove all other materials from the site as indicated or shown on the Drawings.
- B. All materials not retained by the County shall become the Contractor's property and shall be removed off-site.
- C. The on-site storage of removed items is prohibited by the County. Off-site sale of salvageable material by the Contractor is acceptable.

#### 1.07 TRAFFIC AND ACCESS

- A. Conduct work to ensure minimum interference with on-site and off-site roads, streets, sidewalks, and occupied or used facilities.

- B. Special attention is directed towards maintaining safe and convenient access to the existing facilities remaining in operation by plant personnel and plant associated vehicles, including trucks and delivery vehicles.
- C. Do not close or obstruct streets, sidewalks, or other occupied or used facilities without permission from the County. Provide alternate routes around closed or obstructed traffic in access ways.

#### 1.08 PROTECTION

- A. Conduct operations to minimize damage by falling debris or other causes to adjacent buildings, structures, roadways, other facilities, and persons. Provide interior and exterior shoring, bracing, or support to prevent movement or settlement or collapse of structures to be demolished and adjacent facilities to remain.

#### 1.09 DAMAGE

- A. Promptly repair damage caused to adjacent facilities by demolition operations as directed by the County at no cost to the County.

#### 1.10 UTILITIES

- A. Maintain existing utilities as directed by the County to remain in service and protect against damage during demolition operations.
- B. Do not interrupt existing utilities serving occupied or operational facilities, except when authorized by County. Provide temporary services during interruptions to existing utilities as acceptable to the County.
- C. The Contractor shall cooperate with the County to shut off utilities serving structures of the existing facilities as required by demolition operations.
- D. The Contractor shall be solely responsible for making all necessary arrangements and for performing any necessary work involved in connection with the interruption of all public and private utilities or services.
- E. All utilities being abandoned shall be terminated at the service mains in conformance with the requirement of the utility companies or the municipality owning or controlling them.

#### 1.11 EXTERMINATION

- A. If required, before starting demolition, the Contractor shall employ a certified rodent and vermin exterminator and treat the facilities in accordance with governing health laws and regulations. Any rodents, insects, or other vermin appearing before or during the demolition shall be killed or otherwise prevented from leaving the immediate vicinity of the demolition work.

## 1.12 POLLUTION CONTROL

- A. For pollution control, use water sprinkling, temporary enclosures, and other suitable methods as necessary to limit the amount of dust rising and scattering in the air to the lowest level of air pollution practical for the conditions of work. The Contractor shall comply with the governing regulations.
- B. Clean adjacent structures and improvements of all dust and debris caused by demolition operations as directed by the County. Return areas to conditions existing prior to the start of Work.

## **PART 2 - PRODUCTS (NOT USED)**

## **PART 3 - EXECUTION**

### 3.01 SEQUENCE OF WORK

- A. The sequence of demolition and relocation of existing facilities shall be in accordance with the approved critical path schedule as specified in paragraph 1.03 above.

### 3.02 REMOVAL OF EXISTING PROCESS EQUIPMENT, PIPING, AND APPURTENANCES

- A. Equipment to be retained by the County will be designated for retention by the County prior to bidding as specified in Paragraph 1.06 above. Subject to the constraints of maintaining existing facilities in operation as shown on the Drawings, all other process equipment, non-buried valving and piping, and appurtenances shall be removed from the site.

### 3.03 DEMOLITION PROCEDURES

The Contractor shall adhere to the following demolition procedures as referenced on the Drawings:

- A. **TO BE DEMOLISHED:** Demolition shall be the breaking up, cutting, filling of any holes resulting, final grading of the area, performing any other operations required, and the removal from the site of all structures and equipment (structures, substructures, floor slabs, equipment, tanks, pipes, fittings, electrical systems, light poles, wiring, underground conduits and wiring, isolated slabs, and sidewalks) as indicated on the Drawings. All pieces of concrete, metal, and any other demolished material shall be removed to a depth of at least 5-feet below existing grade. Broken pieces of concrete may be size reduced by an on-site crusher, but in any event must be removed from the project site.

Before commencing structural demolition, remove all mechanical, electrical, piping, and miscellaneous appurtenances. Completely remove the structure by thoroughly breaking up concrete into pieces no more than 2-feet across the largest dimension.

- B. TO BE REMOVED: Where indicated on the Drawings, the structures and equipment shall be completely removed from the site with all associated connecting piping or electrical service. The item shall be taken whole or in parts to be salvaged or disposed of by the Contractor.
- C. TO BE ABANDONED: Where indicated on the Drawings, the structures and equipment shall be left in place, drained, and the contents properly disposed. The upper 4-feet of the structure shall be cut and removed, including the cover slab and access port, frame, and cover. All structures to be abandoned with bottom slabs shall be drilled (2 holes minimum, 2.0-inch diameter each) or hole punched to prevent flotation and filled with common fill.
- D. PIPING TO BE REMOVED: Where indicated on the Drawings, pipe (and conduit) shall be drained and the contents properly disposed. The pipe (or conduit) shall then be completely removed from the site, including fittings, valves, and other in-line devices. Connections to existing piping to remain shall be plugged by mechanical means (M.J. plugs, tie-rods, or thrust blocks). Piping shall be removed in accordance with Specification Section 02080 "Abandonment, Removal and Salvage or Disposal of Existing Pipe."
- E. PIPING TO BE ABANDONED: Where indicated on the Drawings, piping (or conduit) shall be left in place. All such piping shall be drained and the contents properly disposed. The pipe (or conduit) shall then be filled with grout (flowable fill) and each end of the pipe (or conduit) shall be plugged using a concrete plug in a manner acceptable to the County. Piping shall be abandoned in accordance with Specification Section 02080 "Abandonment, Removal and Salvage or Disposal of Existing Pipe."
- F. TO BE PROTECTED: Where indicated on the Drawings, the utility service, fence, structure, tree, or device so designated shall be temporarily protected during the prosecution of the demolition work as specified in Division 1.
- G. TO REMAIN: Where indicated on the Drawings, the designated facilities shall remain intact and in service during the prosecution of the demolition work.

### 3.04 DEWATERING OF EXISTING PROCESS UNITS AND DISPOSAL OF RESIDUE

The Contractor shall notify the County prior to beginning the dewatering work on any existing process units which contain wastewater, grit, or sludge. The Contractor, at his own expense, shall remove the entire contents of each structure and dispose off site. The proper transport and disposal of all residues shall remain the responsibility of the Contractor.

END OF SECTION

## **SECTION 02140**

### **DEWATERING**

#### **PART 1 - GENERAL**

##### **1.1 DESCRIPTION**

- A. Scope of Work: This Section specifies the furnishing of equipment; labor and materials necessary to remove storm or subsurface waters from excavation areas in accordance with the requirements set forth, as shown on the Drawings, and/or geotechnical report.

##### **1.2 QUALITY ASSURANCE**

- A. Qualifications: The Contractor shall engage a Geotechnical Engineer registered in the State of Florida, to design the temporary dewatering system. The Contractor shall submit conceptual plan for the dewatering system prior to commencing work. The dewatering system installed shall be in conformity with the overall construction plan and certification of this shall be provided by the Geotechnical Engineer. The dewatering system shall be designed by a firm who regularly engages in the design of dewatering systems and who is fully experienced, reputable and qualified in the design of such dewatering systems.
- B. The dewatering of any excavation areas and the disposal of the water shall be in strict accordance with the latest revision of all local and state government rules and regulations.
- C. Permits: The Contractor shall obtain and pay respective fees for all local, state, and federal permits (including the Orange County, St. Johns River Water Management District, and/or South Florida Management District discharge permits) required for the withdrawal, treatment and disposal/discharge of water from the dewatering operation, prior to start of work.
- D. Comply with Florida Administrative Code, Chapter 62-621.300 (2).

##### **1.3 SHOP DRAWINGS AND SUBMITTALS**

- A. Submittals shall be submitted to the County for review and acceptance prior to construction in accordance with the General Conditions and specifications Section 01300 "Submittals."
- B. In accordance with FAC 62-621.300(2), submit analytical test results from a certified laboratory for the parameters listed in the FDEP "Generic Permit for the Discharge of Produced Ground Water from Any Non-Contaminated Site Activity" to the FDEP and the County. The submitted information shall show the location of the work, where the water will be going to, as well as an estimate for the amount, rate and duration of discharge being proposed.

- C. Provide notification to all jurisdictional permitting agencies in accordance with the requirements of the respective agency.
- D. Provide a detailed plan and operation schedule for dewatering of excavations.
  - 1. Provide descriptive literature of the dewatering system.
  - 2. Provide a plan for erosion and sedimentation control during dewatering.
  - 3. Provide copies of all permits/approvals for disposal/discharge of water during dewatering.

## **PART 2 - PRODUCTS (NOT USED)**

## **PART 3 - EXECUTION**

### **3.1 GENERAL**

- A. The Contractor shall have on-site and available the analytical test results performed in accordance with the FDEP "Generic Permit for the Discharge of Produced Ground Water from Any Non-Contaminated Site Activity" (FAC 62-621.300(2)).
- B. The Contractor shall provide adequate equipment for the removal of storm or subsurface waters which may accumulate within the excavation.
- C. The Contractor's attention is directed to the water surface elevations discussed in the report(s) on subsurface investigations. Water levels will normally vary from season to season.
- D. The Contractor shall be required to monitor the performance of the dewatering system during the progress of the Work and make such modifications as may be required to assure that the systems will perform satisfactorily. The dewatering system shall be designed in such a manner as to preserve the undisturbed bearing capacity of the sub-grade soils at the bottom of the trench or excavation.
- E. Prior to excavation, the Contractor shall submit his proposed method of dewatering and maintaining dry conditions to the County. Approval of the dewatering plan shall not relieve the Contractor of the responsibility for the satisfactory performance of the system. The Contractor shall be responsible for correcting any disturbance of natural bearing soils or damage to structures caused by an inadequate dewatering system or by interruption of the continuous operation of the system as specified.
- F. If subsurface water is encountered, the Contractor shall utilize suitable equipment to adequately dewater the excavation. A wellpoint system or other County acceptable dewatering method shall be utilized if necessary to maintain the excavation in a dry condition for preparation of the trench bottom and for pipe laying. Within and adjacent to residential areas and other areas as required by the County, engines driving dewatering pumps shall be equipped with residential type mufflers and the noise shall not exceed 55 decibels within 50-feet.

### 3.2 DEWATERING AND DISPOSAL

- A. The Contractor shall construct and place all pipelines, structures, concrete work, structural fill, backfill and bedding material in-the-dry. In addition, the Contractor shall make the final 24-inches of excavation in-the-dry and not until the water level is a minimum of 2-foot below proposed bottom of excavation. For purposes of this Contract, in-the-dry is defined as  $\pm 2\%$  of the optimum moisture content of the soil.
- B. The Contractor shall, at all times during construction, provide and maintain proper equipment and facilities to remove promptly and dispose of all water entering excavations. Contractor shall keep excavations dry so as to obtain a satisfactory undisturbed subgrade foundation condition until the fill, structure, or pipes have been completed to such extent that they will not be floated or otherwise damaged by allowing water levels to return to natural elevations.
- C. Dewatering shall at all times be conducted in such a manner as to preserve the natural undisturbed bearing capacity of the subgrade soils at proposed bottom of excavation.
- D. It is expected that dewatering will be required for pre-drainage of the soils prior to final excavation for most of the in-ground structures or piping and for maintaining the lowered groundwater level until construction has been completed so that the structure, pipeline or fill will not be floated or otherwise damaged.
- E. If wellpoints are used, Contractor shall adequately space wellpoints to maintain the necessary dewatering. Provide suitable filter sand and/or other means to prevent pumping of fine sands and silts. A continual check shall be maintained by the Contractor to ensure that the subsurface soil is not being removed by the dewatering operations. Pumping from wellpoints shall be continuous and standby pumps shall be provided.
- F. The Contractor's proposed method of dewatering shall include groundwater observation wells to determine the water level during construction. Observation wells shall be installed along pipelines as required to verify depth to water level and at locations approved by the County.
- G. At all times, site grading shall promote drainage. Surface runoff shall be diverted from excavations. Water entering the excavation from the surface shall be collected in shallow ditches around the perimeter of the excavation, drained to sumps, and pumped or drained by gravity to maintain an excavation bottom free from standing water.
- H. Flotation shall be prevented by the Contractor by maintaining a positive and continuous removal of water. The Contractor shall be fully responsible for all damages which may result from failure to adequately keep excavations dewatered.
- I. The Contractor shall dispose of water from the Work in a suitable manner without damage to adjacent properties or facilities. No water shall be discharged without appropriate treatment for adverse contaminants. No water shall be drained in work built or under construction without prior consent from the County. Water shall be filtered to remove sand and fine soil particles before disposal into any drainage system.

- J. Dewatering of excavations shall be considered incidental to the construction of the Work and all costs shall be included in the various Contract prices in the Bid Form, unless a separate bid item has been established for dewatering.

### 3.3 GROUNDWATER TREATMENT (IF REQUIRED)

- A. If concentrations of tested groundwater quality parameters exceed those allowable in the FDEP Generic Permit for the Discharge of Produced Groundwater from any Non-Contaminated Site Activity (62-621.300(2), F.A.C.), the Contractor shall treat the effluent.
- B. The Contractor shall immediately notify the County and discuss the parameters that exceed allowable limits.
- C. The Contractor shall meet with the FDEP to determine alternatives that are acceptable to the FDEP.
- D. The Contractor shall apply for and obtain any and all permits and/or treatment approvals that FDEP requires including but not limited to:
  - 1. Generic Permit for Discharges from Petroleum Contaminated Sites (62-621.300(1)). Allows discharges from sites with automotive gasoline, aviation gasoline, jet fuel, or diesel fuel contamination; or
  - 2. Permit for all Other Contaminated Sites (62-04; 62-302; 62-620 & 62-660). The coverage is available only through the individual NPDES permit issued by FDEP, allows discharges from sites with general contaminant issues i.e. ground water and/or soil contamination other than petroleum fuel contamination; or
  - 3. Generic Permit for the Discharge of Produced Ground Water from Any Non-Contaminated Site Activity (62-621.300(2), F.A.C.); or
  - 4. Generic Permit for Stormwater Discharge from Large or Small Construction Activities (62-621.300(4)(a), F.A.C.); or
  - 5. An Individual Wastewater Permit (62-604.300(8) (a))
- E. The Contractor shall implement the appropriate treatment that is acceptable to FDEP and County to attain compliance for all excess limits encountered during dewatering activities. Treatment may include, but is not limited to: Chemical, Biological, Electrolysis or any combination of the three.
- F. The Contractor shall make every effort to minimize the spread of contamination into uncontaminated areas. Provide for the health and safety of all workers at the job site and make provisions necessary for the health and safety of the public that may be exposed to any potentially hazardous conditions. Ensure provision adhere to all applicable laws, rules or regulations covering hazardous conditions and will be in a manner commensurate with the level of severity of the conditions.
- G. If necessary, provide contamination assessment and remediation personnel to handle site assessment, determine the course of action necessary for site security and perform the necessary steps under applicable laws, rules and regulations for additional assessment and/or remediation work to resolve the contaminations issue.

- H. Delineate the contamination area(s) and any staging or holding area required and develop a work plan that will provide the schedule of projected completion dates for the final resolution of the contamination issue.
- I. Maintain jurisdiction over activities inside any delineated contamination areas and any associated staging or holding areas. Be responsible for the health and safety of workers within the delineated areas. Provide continuous access to representatives of regulatory or enforcement agencies having jurisdiction.

#### 3.4 REMOVAL

Immediately upon completion of the dewatering system, the Contractor shall remove all of his equipment, materials, and supplies from the site of the Work, remove all surplus materials and debris, fill in all holes or excavations, and grade the site to elevations of the surface levels which existed before work started. The site shall be thoroughly cleaned and approved by the County.

END OF SECTION

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**SECTION 02215**  
**FINISH GRADING**

**PART 1 - GENERAL**

1.1 DESCRIPTION

- A. Scope of Work: Provide finish grading to all areas within the limits of construction.
- B. Grade sub-soil. Cut out areas to receive stabilizing base course materials for paving and sidewalks. Place, finish grade, and compact topsoil.

1.2 PROTECTION

- A. Prevent damage to existing fencing, trees, landscaping, natural features, benchmarks, pavement, and utility lines. Correct damage at no cost to the County.

1.3 SHOP DRAWINGS AND SUBMITTALS

- A. Submittals shall be submitted to the County for review and acceptance prior to construction in accordance with the General Conditions and specifications Section 01300 "Submittals."

**PART 2 - PRODUCTS**

2.1 MATERIALS

- A. All material supplied shall be one of the products specified in Appendix D "List of Approved Products" appended to these technical specifications.
- B. Topsoil: Friable loam free from subsoil, roots, grass, excessive amount of weeds, stones, and foreign matter; acidity range (pH) of 5.5 to 7.5; containing a minimum of 4% and a maximum of 25% organic matter. The topsoil shall be suitable for the proposed plant growth shown on the Drawings and specified. Use topsoil stockpiles on site if conforming to these requirements. If there is not sufficient topsoil available at the project site, the Contractor shall furnish additional topsoil as required to complete the Work at no additional cost to the County.

**PART 3 - EXECUTION**

3.1 SUB SOIL PREPARATION

- A. Rough grade sub-soil systematically to allow for a maximum amount of natural settlement and compaction. Eliminate uneven areas and low spots. Remove debris, roots, branches, stones, etc. Remove sub-soil that has been contaminated with petroleum products.

- B. Cut out areas to subgrade elevation which are to receive stabilizing base for paving and sidewalks.
- C. Bring sub soil to required levels, profiles, and contours. Make changes in grade gradual. Blend slopes into level areas.
- D. Slope grade away from building a minimum of 2-inches in 10-feet unless indicated otherwise on the Drawings.
- E. Cultivate subgrade to a depth of 3-inches where topsoil is to be placed. Repeat cultivation in areas where equipment used for hauling and spreading topsoil has compacted sub-soil.

### 3.2 PLACING TOPSOIL

- A. Place topsoil in areas where seeding, sodding, and planting is to be performed. Place to the following minimum depths, up to finished grade elevations.
  - 1. 6-inches for seeded areas
  - 2. 4-1/2-inches for sodded areas
  - 3. 24-inches for shrub beds
  - 4. 18-inches for flower beds
- B. Use topsoil in relatively dry state. Place during dry weather.
- C. Fine grade topsoil eliminating rough and low areas to ensure positive drainage. Maintain levels, profiles, and contours of subgrades.
- D. Remove stones, roots, grass, weeds, debris, and other foreign material while spreading.
- E. Manually spread topsoil around trees, plants, and buildings to prevent damage which may be caused by grading equipment.
- F. Lightly compact placed topsoil.

### 3.3 SURPLUS MATERIAL

- A. Remove surplus sub soil and topsoil from site.
- B. Leave stockpile areas and entire job site clean and raked, ready to receive landscaping.

END OF SECTION

**SECTION 02220**  
**EXCAVATING, BACKFILLING, AND COMPACTING**

**PART 1 - GENERAL**

1.1 DESCRIPTION

- A. Scope of Work: Excavate, backfill, and compact as required for the construction of the utility system consisting of piping and appurtenances, and structural construction as shown on the Drawings and specified herein. The Contractor shall furnish all labor, materials, equipment, and incidentals necessary to perform all excavation, backfill, compaction, grading, and slope protection to complete the Work. The Contractor shall be responsible for having determined to his satisfaction, prior to the submission of his bid, all under ground utilities locations and appurtenances shown on the construction Drawings.
- B. Definitions:
1. Maximum Density: Maximum weight in pounds per cubic foot of a specific material as determined by AASHTO T-180 (ASTM D155).
  2. Optimum Moisture: Percentage of water in a specific material at maximum density.
  3. Rock Excavation: Excavation of any hard natural substance which requires the use of explosives and/or special impact tools such as jack hammers, sledges, chisels, or similar devices specifically designed for use in cutting or breaking rock, but exclusive of trench excavating machinery.
  4. Suitable: Suitable materials for fills shall be non-cohesive, non-plastic granular local sand and shall be free from vegetation, organic material, marl, silt, or muck. The Contractor shall furnish all additional fill material required.
  5. Unsuitable: Unsuitable materials are highly organic soil (peat or muck) classified as A-8 in accordance with AASHTO Designation M 145.
- C. Plan For Earthwork: The Contractor shall be responsible for having determined to his satisfaction, prior to the submission of his bid, the conformation of the ground, the character and quality of the substrata, the types and quantities of materials to be encountered, the nature of the groundwater conditions, the prosecution of the Work, the general and local conditions, and all other matters which can in any way affect the Work under this Contract. Prior to commencing the excavation, the Contractor shall submit a plan of his proposed operations, including maintenance of traffic, to the County for review. The Contractor shall consider, and his plan for excavation shall reflect, the equipment and methods to be employed in the excavation. The prices established in the Proposal for the Work to be done will reflect all costs pertaining to the Work.

## 1.2 QUALITY ASSURANCE

- A. Testing laboratory employed by the County will make such tests as are deemed advisable. The Contractor shall schedule his work to permit a reasonable time for testing before placing succeeding lifts and shall keep the laboratory informed of his progress. Costs for initial testing shall be paid by the County; however, tests which have to be repeated because of the failure of the tested material to meet specification shall be paid for by the Contractor and the cost of re-testing shall be deducted from payments due the Contractor.
- B. Standards
  - 1. AASHTO: American Association of State Highway and Transportation Officials
  - 2. ANSI: American National Standards Institute
  - 3. ASCE: American Society of Civil Engineers
  - 4. ASTM: American Society for Testing and Materials
  - 5. AWWA: American Water Works Association
  - 6. OSHA 29 CFR Subpart P – Excavations and Trenches a) 1926.650, 1926.651, 1926.652
  - 7. OSHA 29 CFR Subpart J - a) 1910.146 for Confined Space Entry

## 1.3 JOB CONDITIONS

- A. Existing Utilities
  - 1. The Contractor is responsible for subsurface verification of existing utilities prior to construction. Locate existing utilities in the area of work in accordance with Sunshine State One Call regulations, Chapter 556, "Underground Facility Damage Prevention and Safety Act", FS.
  - 2. Should uncharted or incorrectly charted piping or other utility be encountered during excavation, notify the County. Keep all facilities in operation and repair damaged utilities to the satisfaction of the County.
  - 3. Damage and repair costs to such piping or utilities are the Contractor's responsibility.
  - 4. If utilities are to remain in place, the Contractor shall provide adequate means of protection.
- B. Test borings and the sub-surface exploration data if previously done on the site will be made available upon request and are for the Contractor's information only.

## 1.4 PROTECTION

- A. Sheeting and Bracing
  - 1. Requirements of the Trench Safety Act shall be adhered to at all times.

2. Furnish, put in place, and maintain such sheeting and bracing as may be required to support the sides of excavations, to prevent any movement which could in any way diminish the width of the excavation below that necessary for proper construction, to protect adjacent structures and power poles from undermining, and to protect workers from hazardous conditions or other damage. Such support shall consist of braced steel sheet piling, braced wood lagging and soldier beams or other acceptable methods. If the County is of the opinion that at any point sufficient or proper supports have not been provided, the County may order additional supports put in at the expense of the Contractor, and compliance with such order shall not relieve or release the Contractor from his responsibility for the sufficiency of such supports. Care shall be taken to prevent voids outside of the sheeting, but if voids are formed, they shall be immediately filled and compacted. Where soil cannot be properly compacted to fill a void, lean concrete shall be used as backfill at no additional expense to the County.
3. The Contractor shall construct the sheeting outside the neat lines of the foundation unless indicated otherwise for the method of operation. Sheeting shall be plumb and securely braced and tied in position. Sheeting and bracing shall be adequate to withstand all pressure to which the structure or trench will be subjected. Any movement or bulging which may occur shall be corrected by the Contractor at their own expense so as to provide the necessary clearances and dimensions.
4. Where sheeting and bracing is required to support the sides of excavations for structures, the Contractor shall engage a Professional Geotechnical Engineer, registered in the State of Florida, to design the sheeting and bracing. The sheeting and bracing installed shall be in conformity with the design, and the Professional Engineer shall provide certification of this.
5. The installation of sheeting, particularly by driving or vibrating, may cause distress to existing structures. The Contractor shall evaluate the potential for such distress and, if necessary, take all precautions to prevent distress of existing structures because of sheeting installation.
6. The Contractor shall leave in place to be embedded in the backfill all sheeting and bracing not shown on the Drawings but which the County may direct him in writing to leave in place at any time during the progress of the Work for the purpose of preventing damage to structures, utilities, or property, whether public or private. The County may direct that timber used for sheeting and bracing be cut off at any specified elevation.
7. All sheeting and bracing not left in place shall be carefully removed in such manner as not to endanger the construction or other structures, utilities, or property. All voids left or caused by withdrawal of sheeting shall be immediately refilled with sand by ramming with tools especially adapted to that purpose, or otherwise as may be directed by the County.
8. The right of the County to order sheeting and bracing left in place shall not be construed as creating any obligation on the County's part to issue such orders, and their failure to exercise this right shall not relieve the Contractor from liability for damages to persons or property occurring from or upon the Work occasioned by negligence or otherwise, growing out of a failure on the part of the Contractor to leave in place sufficient sheeting and bracing to prevent any caving or moving of the ground.

9. No wood sheeting is to be withdrawn if driven below mid-diameter of any pipe, and under no circumstances shall any wood sheeting be cut off at a level lower than 1-foot above the top of any pipe.

B. Pumping and Drainage:

1. The Contractor shall at all times during construction provide and maintain proper equipment and facilities to remove all water entering excavations, and shall keep such excavations dry so as to obtain a satisfactory undisturbed subgrade foundation condition until the fills, structures, or pipes to be built thereon have been completed to such extent that they will not be floated or otherwise damaged by allowing the water level to return to the natural level as stipulated in Section 02140 "Dewatering." The Contractor shall engage a Professional Geotechnical Engineer registered in the State of Florida to design the dewatering systems. The Contractor shall submit to the County for a plan for dewatering systems prior to commencing work. The dewatering system installed shall be in conformity with the overall construction plan, and the Professional Engineer shall provide certification of this. The Professional Engineer shall be required to monitor the performance of the dewatering systems during the progress of the Work and require such modifications as may be required to assure that the systems are performing satisfactorily.
2. Dewatering shall at all times be conducted in such a manner as to preserve the undisturbed bearing capacity of the subgrade soils at the proposed bottom of excavation and to preserve the integrity of adjacent structures. Dewatering by trench pumping will not be permitted if migration of fine grained natural material from bottom, sidewalls, or bedding material will occur.
3. Water entering the excavation from surface runoff shall be collected in shallow ditches around the perimeter of the excavation, drained to sumps, and pumped from the excavation to maintain a bottom free from standing water.
4. The Contractor shall take all additional precautions to prevent uplift of any structure during construction.
5. Permission to use any storm sewers or drains for water disposal purposes shall be obtained from the authority having jurisdiction. Any requirements and costs for such use shall be the responsibility of the Contractor. However, the Contractor shall not cause flooding by overloading or blocking up the flow in the drainage facilities, and he shall leave the facilities unrestricted and as clean as originally found. Any damage to facilities shall be repaired or restored as directed by the County or the authority having jurisdiction, at no cost to the County.
6. The Contractor shall prevent flotation by maintaining a positive and continuous operation of the dewatering system. The Contractor shall be fully responsible and liable for all damages which may result from failure of this system.
7. Removal of dewatering equipment shall be accomplished after compaction/density testing has been completed and the system is no longer required. The Contractor shall remove the material and equipment constituting the system.
8. The Contractor shall take all necessary precautions to preclude the accidental discharge of fuel, oil, or other contaminants in order to prevent adverse effects on groundwater quality.

## 1.5 TESTING AND INSPECTION SERVICE

- A. The County will provide a geotechnical testing and inspection service. The services include testing soil materials and quality control testing during filling and backfilling operations. Samples of soil materials shall be furnished to the testing service by the Contractor. The County shall pay costs of initial geotechnical testing. The Contractor shall pay for any subsequent testing required due to failure and laboratory stand-by charges incurred.
- B. The Contractor shall provide monthly density testing reports to the County during backfilling activities. Density testing reports not submitted in a timely manner shall result in rejection of the pipe installed and rejection of the density testing reports until such time that density re-testing is coordinated and repeated at the Contractors expense.
- C. Density testing scheduled subsequent to backfilling activities shall be coordinated with, and witnessed by the County. Failure by the Contractor to coordinate or have the County present shall result in rejection of the submitted density testing reports and re-testing at the Contractor's expense.
- D. Dewatering systems shall not be removed until compaction/density testing has been completed.

## PART 2 - PRODUCTS

### 2.1 MATERIALS

- A. General:
  - 1. All fill material shall be subject to the review and acceptance of the County.
  - 2. All fill material shall be free of organic material, trash, or other objectionable material. The Contractor shall remove excess or unsuitable material from the job site.
- B. Common Fill Material: Common fill shall consist of mineral soil, substantially free of clay, organic material, muck, loam, wood, trash, and other objectionable material which may be compressible or which cannot be compacted properly. Common fill shall not contain stones larger than 3-1/2-inches in any dimension in the top 12-inches or 6-inches in any dimension in the balance of fill area. Common fill shall not contain asphalt, broken concrete, masonry, rubble or other similar materials. It shall have physical properties that allow it to be easily spread and compacted during filling. Additional common fill shall be no more than 12 % by weight finer than the No. 200 mesh sieve, unless finer material is approved for use in a specific location by the County. Select Common Fill shall be as specified as above from common fill, except that the material shall contain no stones larger than 1/2-inches in largest dimension, and shall be no more than 5 % by weight finer than the No. 200 mesh sieve.

- C. Structural Fill: Structural fill shall be reasonably well graded sand to gravelly sand having the following gradation:

US Sieve Size	Percent Passing By Weight
No. 1	100
No. 4	75 - 100
No. 40	15 - 80
No. 100	0 - 30
No. 200	0 - 12

- D. Class 1 Soils\*: Manufactured angular, granular material, 1/4 to 1-1/2-inches (6 to 4 mm) size, including materials having significance such as crushed stone or rock, broken coral, crushed slag, cinders, or crushed shells. Sieve analysis for crushed stone is given below separately.

Crushed Stone: Crushed stone shall consist of clean mineral aggregate free from clay, loam or organic matter, conforming to ASTM C33 stone size No. 89 and with particle size limits as follows:

U.S. Sieve Size	% Passing By Weight
1/2	100
3/8	100
No. 4	20 - 25
No. 8	5 - 30
No. 16	0 - 10
No. 50	0 - 2

- E. Class II Soils\*\*:

1. GW: Well graded gravels and gravel-sand mixtures, little or no fines. Fifty percent or more retained on No. 4 sieve. More than 95 % retained on No. 200 sieve. Clean.
2. GP: Poorly graded gravels and gravel-sand mixtures, little or no fines. Fifty percent or more retained on No. 4 sieve. More than 95 % retained on No. 200 sieve. Clean.
3. SW: Well graded sands and gravelly sands, little or no fines. More than passes No. 4 sieve. More than 95 % retained on No. 200 sieve. Clean.
4. SP: Poorly graded sands and gravelly sands, little or no fines. More than 50 % passes No. 4 sieve. More than 95 % retained on No. 200 sieve. Clean.

\*Soils defined as Class I materials are not defined in ASTM D2487.

\*\*In accordance with ASTM D2487, less than 5 % pass No. 200 sieve.

- F. Coarse Sand: Sand shall consist of clean mineral aggregate with particle size limits as follows:

U.S. Sieve Size	Percent Passing By Weight
3/8	100
No. 10	85 – 100
No. 40	20 – 40
No. 200	0 - 12

- G. Other Material: All other material, not specifically described, but required for proper completion of the Work shall be selected by the Contractor and acceptable by the County.

## **PART 3 - EXECUTION**

### **3.1 PREPARATION**

- A. Clearing:
1. The construction areas shall be cleared of all obstructions and vegetation including large roots and undergrowth within 10-feet of the lines of the excavation.
  2. Strip and stockpile topsoil on the site at the location to be determined by the County.

### **3.2 EXCAVATION**

- A. General: Excavations for roadways, structures, and utilities must be carefully executed in order to avoid interruption of utility service.
- B. Excavating for Roadways/Structures/Utilities:
1. Excavation shall be made to such dimensions as will give suitable room for building the foundations and the structures, for bracing and supporting, for pumping and draining, and for all other work required.
    - a. Excavation for precast or prefabricated structures shall be carried to an elevation 2-feet lower than the proposed outside bottom of the structure to provide space for the select backfill material. Prior to placing the select backfill, the excavation shall be measured by the County to verify that the excavation has been carried to the proper depth and is reasonably uniform over the area to be occupied by the structure.
    - b. Excavation for structures constructed or cast in place in dewatered excavations shall be carried down to the bottom of the structure where dewatering methods are such that a dry excavation bottom is exposed and the naturally occurring material at this elevation leveled and left ready to receive construction. Material disturbed below the founding elevation in dewatered excavations shall be replaced with Class B concrete.
    - c. Footings: Cast-in-place concrete footing sides shall be formed immediately after excavation.
  2. Immediately document the location, elevation, size, material type and function of all new subsurface installations, and utilities encountered during the course of construction.

3. Excavation equipment operators and other concerned parties shall be familiar with subsurface obstructions as shown on the Drawings and should anticipate the encounter of unknown obstructions during the course of the Work.
4. Encounters with subsurface obstructions shall be hand excavated.
5. Excavation and dewatering shall be accomplished by methods that preserve the undisturbed state of subgrade soils. Subgrade soils which become soft, loose, "quick" or otherwise unsatisfactory for support of structures as a result of inadequate dewatering or other construction methods shall be removed and replaced by crushed stone as required by the County at the Contractor's expense.
6. The bottom of excavations shall be rendered firm and dry before placing any piping or structure.
7. All pavements shall be cut with saws or approved power tools prior to removal.
8. Excavated material shall be stockpiled in such a manner as to prevent nuisance conditions. Surface drainage shall not be hindered. Excavated material not suitable for backfill shall be removed from the site and disposed of by the Contractor.

### 3.3 DRAINAGE

- A. The Contractor shall at all times during construction provide and maintain proper equipment and facilities to remove promptly and dispose of properly all water entering excavations, and keep such excavations dry so as to obtain a satisfactory undisturbed subgrade foundation condition. The dewatering method used shall prevent disturbance of earth below grade.
- B. All water pumped or drained from the Work shall be disposed of in a suitable manner without undue interference with other work, without damage to surrounding property, and in accordance with pertinent rules and regulations.
- C. No construction, including pipe laying, shall be allowed in water. No water shall be allowed to contact masonry or concrete within 24-hours after being placed. The Contractor shall constantly guard against damage due to water and take full responsibility for all damage resulting from his failure to do so.
- D. The Contractor will be required at his expense to excavate below grade and refill with crushed stone (gradation 57 or 89) or other acceptable fill material if the County determines that adequate dewatering has not been provided.

### 3.4 UNDERCUT

- A. If the bottom of any excavation is below that shown on the Drawings or specified because of Contractor error, convenience, or unsuitable subgrade due the Contractor's excavation methods, he shall refill to normal grade with fill at his own cost. Fill material and compaction method shall be approved by the County.

### 3.5 FILL AND COMPACTION

- A. Compact and backfill excavations and construct embankment according to the following schedule. (Modified Proctor standard shall be ASTM D-1557):

#### STRUCTURES AND ROADWORK

Area	Material	Compaction
Beneath Structures	Structural Fill	12-inch lifts, compacted to 98% maximum density as determined by AASHTO T-180. Fill Should not be placed over any in-place soils until those deposits have been compacted to 98% Modified Proctor.
Around Structures	Structural Fill	12-inch lifts, 95% of maximum density as determined by AASHTO T-180. Rubber Tire or vibratory plate compactors shall be used
Beneath Paved Surfaces	Common Fill	12-inch lifts, 98% by maximum density as determined by AASHTO T-180 or as required by the FDOT Standards.
Open Areas	Common Fill	12-inch lifts, 95% by maximum density as determined by AASHTO T-180.

- B. Pipe shall be laid in open trenches unless otherwise indicated on the Drawings or elsewhere in the Contract Documents.
- C. Excavations shall be backfilled to the original grade or as indicated on the Drawings. Deviation from this grade because of settling shall be corrected. The backfill operation shall be performed to comply with all rules and regulations and in such a manner that it does not create a nuisance or safety hazard.
- D. Embankments shall be constructed true to lines, grades, and cross sections shown on the plans or ordered by the County. Embankments shall be placed in successive layers of not more than 8-inches in thickness, loose measure, for the full width of the embankment. As far as practicable, traffic over the Work during the construction phase shall be distributed so as to cover the maximum surface area of each layer.
- E. If the Contractor requests approval to backfill material utilizing lifts and/or methods other than those specified herein, such request shall be in writing to the County. Acceptance will be considered only after the Contractor has performed tests, at the Contractor's expense, to identify the material used and density achieved throughout the backfill area utilizing the method of backfill requested. The County's acceptance shall be in writing.
- F. One compaction test location shall be required for each 300 linear feet of pipe and for every 100 square feet of backfill around structures as a minimum. The County may determine that more compaction tests are required to certify the installation depending on field conditions. The locations of the compaction tests within the trench shall be in conformance with the following schedule:
  - 1. At least one test at the spring line of the pipe.

2. At least one test for each 12-inch layer of backfill within the pipe bedding zone for pipes 24-inches and larger.
3. One test at an elevation of 1-foot above the top of pipe.
4. One test for each 2-feet of backfill placed from 1-foot above the top of the pipe to finished grade elevation.
5. Density testing is required for sanitary sewer manholes. Tests shall be staggered around the manhole within 3-feet of the structure's outside diameter.
  - a. First test shall be 1-foot above the structure base.
  - b. Second test shall be 2-feet above the first test and subsequent tests every 2-feet up the finished grade.
6. The Contractor shall provide additional compaction and testing prior to commencing further construction if the County's testing reports and inspection indicate that the fill has been placed below specified density.
7. The Contractor shall coordinate testing with the County approved testing laboratory and shall provide monthly test results to the County in a timely manner during construction activities. Density testing scheduled subsequent to backfilling activities shall be coordinated with the County and witnessed by the County representative. Failure by the Contractor to coordinate or have the County representative present shall result in rejection of the submitted density testing reports and re-testing at the Contractor's expense. Density testing reports not submitted in a timely manner shall result in rejection of the pipe installed and rejection of the density testing reports until such time that density re-testing is coordinated and repeated at the Contractor's expense as deemed necessary by the County's representative.
8. Dewatering systems shall not be removed until compaction/density testing has been completed.

END OF SECTION

**SECTION 02570**  
**STABILIZED SUBGRADE**

**PART 1 - GENERAL**

1.1 DESCRIPTION

- A. Scope of Work: All labor, materials, and equipment required to install stabilized subgrade.

1.2 REFERENCES

- A. American Association of State Highway and Transportation Officials (AASHTO) latest edition:
  - 1. AASHTO T-180 – Moisture-Density Relations of Soils Using a 10-lb Rammer and 18-in Drop
- B. Florida Department of Transportation Standard Specifications for Road and Bridge Construction, latest edition:
  - 1. Section 914 – Stabilization Materials

1.3 QUALITY ASSURANCE

- A. Field compaction density, stability, and thickness testing frequencies of the subgrade shall be tested once every 300 linear feet of paving per 24-foot wide strip, staggered left, center, and right of centerline. Where less than 300 linear feet of asphalt is placed in 1-day, provide minimum of 1 test for each per day's construction at a location designated by the County.

1.4 SHOP DRAWINGS AND SUBMITTALS

- A. Submittals shall be submitted to the County for review and acceptance prior to construction in accordance with the General Conditions and specifications Section 01300 "Submittals."
  - 1. Materials certificates signed by material producer and Contractor, certifying that each material item complies with specified requirements.

1.5 SYSTEM DESCRIPTION

- A. Stabilize the roadbed below the proposed base to provide a firm and unyielding subgrade.
- B. Provide a finished roadbed section that meets the bearing value requirements regardless of the quantity of stabilizing materials necessary to be added.

## **PART 2 - PRODUCTS**

### **2.1 GENERAL**

- A. All material supplied shall be one of the products specified in Appendix D "List of Approved Products" appended to these technical specifications.
- B. The Contractor may choose the type of stabilizing material.
- C. Materials may be lime rock, shell rock, cemented coquina, or shell-base sources approved by the FDOT.
- D. At least 97% by weight of the total material shall pass a 3-1/2-inch (90-mm) sieve. Material having a plasticity index greater than 10 or a liquid limit greater than 40 shall not be used as a stabilizer.

### **2.2 LIMEROCK**

- A. For limerock, carbonates of calcium and magnesium shall be at least 70%.

### **2.3 CRUSHED SHELL**

- A. Crushed shell for this use shall be mollusk shell (i.e., oysters, mussels, clams, cemented coquina). Steamed shell will not be permitted.
- B. At least 50% by weight of the total material shall be retained on the No. 4 (4.75  $\mu$ m) sieve.
- C. Not more than 20% by weight of the total material shall pass the No. 200 (75  $\mu$ m) sieve. The determination of the percentage passing the No. 200 (75  $\mu$ m) sieve shall be by washing only.

### **2.4 LOCAL MATERIALS**

- A. Local materials used for this stabilizing may be soils or recyclable materials such as crushed concrete, roof tiles, asphalt coated base, or reclaimed pavement. However, no materials that deteriorate over time, cause excessive deformations, contain hazardous substances, contaminates, or do not improve the bearing capacity of the stabilized material may be used.

## **PART 3 - EXECUTION**

### **3.1 GENERAL**

- A. Prior to the beginning of stabilizing operations, construct the area to be stabilized to an elevation such that, upon completion of stabilizing operations, the completed stabilized subgrade will conform to the lines, grades, and cross-section shown in the plans. Prior to spreading any additive stabilizing material, bring the surface of the roadbed to a plane approximately parallel to the plane of the proposed finished surface.

- B. Process the subgrade to be stabilized in 1 course, unless the equipment and methods being used do not provide the required uniformity, particle size limitation, compaction, and other desired results, in which case, the County will direct that the processing be done in more than 1 course.

### 3.2 APPLICATION OF STABILIZING MATERIAL

- A. When additive stabilizing materials are required, spread the designated quantity uniformly over the area to be stabilized.
- B. When materials from an existing base are to be used in the stabilizing at a particular location, place and spread all of such materials prior to the addition of other stabilizing additives.
- C. Spread commercial stabilizing material by the use of mechanical material spreaders, except that where use of such equipment is not practicable, use other means of spreading, but only upon written approval of the proposed alternate method.

### 3.3 MIXING

- A. Perform mixing using rotary tillers or other equipment meeting the approval of the County. The Contractor may mix the materials in a plant of an approved type suitable for this Work. Thoroughly mix the area to be stabilized throughout the entire depth and width of the stabilizing limits.
- B. Perform the mixing operations as specified (either in place or in a plant) regardless of whether the existing soil, or any select soils placed within the limits of the stabilized sections, have the required bearing value without the addition of stabilizing materials.

### 3.4 MAXIMUM PARTICLE SIZE OF MIXED MATERIALS

- A. At the completion of the mixing, ensure that the gradation of the material within the limits of the area being stabilized is such that 97% will pass a 3-1/2-inch sieve and that the material does not have a plasticity index greater than 8 or liquid limit greater than 30. Note that clay balls or lumps of clay size particles (2 microns or less) cannot be considered as individual particle sizes. Remove any materials not meeting the plasticity requirements from the stabilized area. The Contractor may break down or remove from the stabilized area materials not meeting the gradation requirements.

### 3.5 COMPACTION

- A. Compact the materials at a moisture content permitting the specified compaction. If the moisture content of the material is improper for attaining the specified density, either add water or allow the material to dry until reaching the proper moisture content for the specified compaction.

### 3.6 FINISH GRADING

- A. Shape the completed stabilized subgrade to conform to the finished lines, grades, and cross-section indicated in the Drawings. Check the subgrade using elevation stakes or other means approved by the County.

### 3.7 CONDITION OF COMPLETED SUBGRADE

- A. After completing the stabilizing and compacting operations, ensure that the subgrade is firm and substantially unyielding to the extent that it will support construction equipment and will have the bearing value required by the Drawings.
- B. Remove all soft and yielding material, and any other portions of the subgrade that will not compact readily. Replace yielding material with suitable material so that the whole subgrade is brought to line and grade with proper allowance for subsequent compaction.

### 3.8 MAINTENANCE OF COMPLETED SUBGRADE

- A. After completing the subgrade, maintain it free from ruts, depressions, and any damage resulting from the hauling or handling of materials, equipment, and tools. The Contractor is responsible for maintaining the required density until the subsequent base or pavement is in place including any repairs or replacement of curb and gutter or sidewalk which might become necessary in order to recompact the subgrade in the event of underwash or other damage occurring to the previously compacted subgrade. Perform any such recompaction at no expense to the County. Construct and maintain ditches and drains along the completed subgrade section.

### 3.9 FIELD QUALITY CONTROL

- A. When proper moisture conditions are attained, compact the material to not less than 98% of maximum density determined by AASHTO T-180, and a minimum LBR of 40.

END OF SECTION

**SECTION 02571**  
**LIMEROCK BASE**

**PART 1 - GENERAL**

1.1 DESCRIPTION

- A. Scope of Work: Furnish and install a base course composed of limerock.

1.2 REFERENCES

- A. American Association of State Highway and Transportation Officials (AASHTO) latest edition:
- B. Florida Department of Transportation (FDOT) Standard Specifications for Road and Bridge Construction, latest implemented edition.

1.3 QUALITY ASSURANCE

- A. Density, thickness, and moisture content shall be determined and tested in accordance with this specification.

1.4 SHOP DRAWINGS AND SUBMITTALS

- A. Submittals shall be submitted to the County for review and acceptance prior to construction in accordance with the General Conditions and specifications Section 01300 "Submittals."
  - 1. Lime rock design mix.

**PART 2 - PRODUCTS**

2.1 GENERAL

- A. All material supplied shall be one of the products specified in Appendix D "List of Approved Products" appended to these technical specifications.

2.2 MATERIALS

- A. The minimum of carbonates of calcium and magnesium in the limerock material shall be 70%.
- B. The maximum percentage of water-sensitive clay mineral shall be 3%.

- C. The liquid limit shall not exceed 35 and the material shall be non-plastic.
- D. Limerock material shall not contain cherty or other extremely hard pieces, lumps, balls, or pockets of sand or clay size material in sufficient quantity as to be detrimental to the proper bonding, finishing, or strength of the limerock base.
- E. At least 97% (by weight) of the material shall pass a 3-1/2-inch sieve and the material shall be graded uniformly to dust. The fine material shall consist entirely of dust of fracture. All crushing or breaking-up which might be necessary in order to meet such size requirements shall be done before the material is placed on the road.
- F. Limerock shall have an average LBR of not less than 100.

## **PART 3 - EXECUTION**

### **3.1 GENERAL**

- A. The limerock shall be transported to the point where it is to be used, over rock previously placed if practicable, and dumped on the end of the preceding spread. Hauling over the subgrade and dumping on the subgrade will be permitted only when, in the County's opinion, these operations will not be detrimental to the base.

### **3.2 SPREADING LIMEROCK**

- A. The limerock shall be spread uniformly. All segregated areas of fine or coarse rock shall be removed and replaced with properly graded rock.
- B. When the specified compacted thickness of the base is greater than 6-inches, the base shall be constructed in 2 courses. The thickness of the first course shall be approximately one-half the total thickness of the finished base, or enough to bear the weight of the construction equipment without disturbing the subgrade.
- C. All operations for constructing limerock base for shoulder construction at any particular location shall be done prior to placing the final course of pavement on the traveled roadway. In the construction of limerock base on the shoulders, the Contractor shall assure that the dumping of the limerock material shall be at such points and in such manner, that no significant material is allowed on the adjacent pavement, to scar or contaminate the pavement surface. Any limerock material which is deposited on the surface course for any reason shall be immediately swept off.

### **3.3 COMPACTING AND FINISHING BASE**

- A. For single course base, after the spreading is completed the entire surface shall be scarified and then shaped so as to produce the required grade and cross section after compaction.

- B. For double course base, the first course shall be cleaned of foreign material and bladed and brought to a surface cross section approximately parallel to that of the finished base. Prior to the spreading of any material for the upper course, the density tests for the lower course shall be made and the County shall have determined that the required compaction has been obtained. After the spreading of the material for the second course is completed, its surface shall be finished and shaped so as to produce the required grade and cross section after compaction, and free of scabs or laminations.
- C. When the material does not have the proper moisture content to insure the required density, wetting or drying will be required. When water is added it shall be uniformly mixed in by disking to the full depth of the course which is being compacted. Wetting or drying operations shall involve manipulation, as a unit, of the entire width and depth of the course which is being compacted.
- D. As soon as proper conditions of moisture are attained the material shall be compacted to a density of not less than 98% of maximum density as determined by AASHTO T-180. The minimum density which will be acceptable at any location outside the traveled roadway (such as intersections, crossovers, turnouts, shoulders, etc.) shall be 98% of such maximum.
- E. At least 3 density determinations shall be made on each day's final compaction operations on each course, and the density determinations shall be made at more frequent intervals if deemed necessary by the County. During final compaction operations, if grading of any areas is necessary to obtain the true grade and cross section, the compacting operations for such areas shall be completed prior to making the density tests on the finished base.

### 3.4 CORRECTION OF DEFECTS

- A. If at any time the subgrade material should become mixed with the base course material, the Contractor shall without additional compensation dig out and remove the mixture, reshape and compact the subgrade, and replace the materials removed with clean base material.
- B. If cracks or checks appear in the base, either before or after priming, which in the opinion of the County would impair the structural efficiency of the base, the Contractor shall remove the cracks or checks by re-scarifying, reshaping, adding base material where necessary, and re-compacting.

### 3.5 TESTING SURFACE

- A. The finished surface of the base course shall be checked with a template cut to the required crown and a 15-foot straightedge placed parallel to the center line of the road. Both templates shall be provided by the Contractor. All irregularities greater than 1/4-inch shall be corrected by scarifying and removing or adding limerock as required, after which the entire area shall be re-compacted.

### 3.6 PRIMING AND MAINTAINING

- A. The prime coat shall be applied when the base meets the specified density requirements and moisture content in the top half of the base does not exceed 90% of the optimum moisture of the base material. At the time of priming, the base shall be firm, unyielding, and in such condition that no undue distortion will occur.
- B. The Contractor shall be responsible for assuring that the true crown and template are maintained, with no rutting or other distortion, and the base meets all the requirements at the same time the surface course is applied.

### 3.7 THICKNESS REQUIREMENTS

- A. Thickness of the base shall be measured in intervals of not more than 200-feet. Measurements shall be taken at various points on the cross section, through holes not less than 3-inches in diameter.
- B. Where the compacted base is deficient by more than 3/8-inches from the thickness called for in the Drawings, the Contractor shall correct such areas by scarifying and adding limerock. The base shall be scarified and limerock added for a distance of 100-feet in each direction from the edge of the deficient area. The affected areas shall then be brought to the required state of compaction and to the required thickness and cross section.

END OF SECTION

**SECTION 02572**  
**SOIL CEMENT BASE**

**PART 1 - GENERAL**

1.1 DESCRIPTION

- A. Scope of Work: Furnish and install base course using a combination of soil, Portland cement, and water.

1.2 REFERENCES

- A. American Association of State Highway and Transportation Officials (AASHTO) latest edition:
  - 1. AASHTO T-88: Particle Size Analysis of Soils
  - 2. AASHTO T-89: Determining the Liquid Limit of Soils
  - 3. AASHTO T-90: Determining the Plastic Limit and Plasticity Index of Soils
  - 4. AASHTO T-134: Moisture-Density Relations of Soil-Cement Mixtures
  - 5. AASHTO T-135: Wetting and Drying Test of Compacted Soil-Cement Mixtures
  - 6. AASHTO T-267: Determination of Organic Content in Soils by Loss on Ignition
- B. Florida Department of Transportation (FDOT) Standard Specifications for Road and Bridge Construction, latest implemented edition:
  - 1. Specification Section 911: Limerock Material for Base and Stabilized Base
  - 2. Specification Section 916: Bituminous Materials
  - 3. Specification Section 921: Portland Cement and Blended Cement

1.3 QUALITY ASSURANCE

- A. For density and thickness determination, a LOT is defined as 2,500 square yards of base, plus any small section of base at the end of a day's operation in the preceding LOT. The County may include small irregular areas as part of another LOT. Areas such as an intersection, crossover, and ramp will be considered as a separate LOT. No LOT shall include more than 3,500 square yards or it shall be considered as a separate LOT.
- B. Five (5) density tests shall be performed at locations randomly selected by the County within each LOT.
- C. Five (5) thickness measurements shall be performed at locations randomly selected by the County within each LOT. Three-inch minimum diameter test holes are required to determine the thickness.

## 1.4 SHOP DRAWINGS AND SUBMITTALS

- A. Submittals shall be submitted to the County for review and acceptance prior to construction in accordance with the General Conditions and specifications Section 01300 "Submittals."
  - 1. Soil-cement design mix

## PART 2 - PRODUCTS

### 2.1 GENERAL

- A. All material supplied shall be one of the products specified in Appendix D "List of Approved Products" appended to these technical specifications.

### 2.2 MATERIALS

- A. Cement shall be Portland cement, Type I, II, III, or Type 1-P per FDOT Specification Section 921.
- B. Use water that is free from substances deleterious to hardening of the soil-cement mixture.
- C. Curing Material shall be per FDOT Specification Section 916.
- D. Emulsified asphalt shall be Grade SS, RS, or MS as approved by the County. Dilute as recommended by the manufacturer.
- E. Soils for base course construction shall be either limerock material per FDOT Specification Section 911 or soils meeting the following requirements:

**Table 02572-1  
Soil Requirements**

Physical Characteristic	Acceptance Level	Testing Standard
Organic Material	Maximum 5%	AASHTO T-267
Total Clay and Silt Content (Minus No. 200 Sieve)	Maximum 25%	AASHTO T-88
Plastic Index	Maximum 10%	AASHTO T-90
Liquid Limit	Maximum 25%	AASHTO T-89

**Table 02572-2  
Soil Gradation Requirements**

Soil Gradation Requirements (Per AASHTO T-88)	
Passing 2-inch sieve	Minimum 100%
Passing No. 4 sieve	Minimum 55%
Passing No. 10 sieve	Minimum 37%

**2.3 PROPORTIONING OF MIX**

- A. Submit for approval a design mix for the soil proposed for use in soil-cement construction prepared by a testing laboratory approved by the County. The design mix submittal shall include the results of tests run to verify that the soil meets the requirements; results of tests used to establish the cement content; and a final design laboratory sample. Submit the design mix to the County for approval a minimum of 60-calendar days prior to beginning of soil-cement construction for Brush Loss Design Method or 15-calendar days prior to beginning of soil-cement construction for Strength Design Method. Express the cement as a percentage of the dry unit weight of the soil. For mixed-in-place construction, use a ratio of cement based on the maximum density of the soil determined in accordance with AASHTO T-99 and rounded up to the nearest pound per cubic yard.
- B. When proportioning the soil-cement mixture in accordance with strength design, determine the minimum cement content using FM 5-520. The design compressive strength specified shall be achieved in 7-days. Ensure that the cement content is not less than 5% by weight except as noted below.
- C. When proportioning the soil-cement mixture in accordance with Brush Loss Design criteria, determine the minimum cement content in accordance with AASHTO T-135. Ensure that the cement content is not less than 5% by weight except as noted below. Ensure that the soil-cement loss at the completion of 12 cycles of testing conforms to the limits in the following table.

**Table 02572-3  
Soil Limits**

Soil Group	Limits
AASHTO Soils Groups A-1, A-2-4, A-2-5, and A-3	Not over 14%
AASHTO Soils Groups A-2-6, A-2-7, A-4, and A-5	Not over 10%
AASHTO Soils Groups A-6 and A-7	Not over 7%

- D. When proportioning of soil-cement mixture by the Brush Loss Design Criteria Method and processing by Central-Plant-Mixing where the requirements noted below are met, the County will not require strength testing of field specimens. Verify the properties of the parent material during the processing, on a random frequency, to ensure that the final mix has not changed from the original design. Provide the County a printout of each day's production that shows proportioning of the mixture meets the approved Brush Loss Design, including cement.
- E. Do not apply the minimum 5% cement content specified above if obtaining the soil material used in producing a soil-cement mixture from a commercial source (not to exclude recycled materials) where soil properties are consistently uniform, and if processing the mixture in a central mix plant that automatically weighs components and automatically records the weight of each component on a printed ticket, tape, or other digital record.

### **PART 3 - EXECUTION**

#### **3.1 GENERAL**

- A. Use any machine, combination of machines, or equipment that is in good, safe working condition and that will produce results meeting the requirements for cement application, soil pulverization, mixing water application, compaction, finishing, and curing, as required herein. Compaction equipment shall be used that will produce a base at the required density.

#### **3.2 SUBGRADE PREPARATION**

- A. Subgrade shall be completed before beginning base construction operations. Ensure that the subgrade is firm enough to support the equipment used in the soil-cement base operations without appreciable distortion or displacement. Remove any unsuitable material and replace it with suitable material.
- B. When constructing the base with central-plant-mixed soil-cement, grade and shape the subgrade to the lines, grades, and typical cross-section shown in the plans. Ensure that the subgrade is moist but not ponded at the time of placing the mixed base course material.

#### **3.3 BASE SOIL FOR MIXED-IN-PLACE PROCESSING**

- A. Grade and shape the area over which the base is to be constructed to an elevation that will provide a base in conformance with the grades, lines, thickness, and typical cross-sections shown on the plans. Remove all roots, sticks, and other deleterious matter during processing.

### 3.4 PROCESSING OF SOIL-CEMENT MIXTURE

- A. Mix the soil, cement, and water either by mixed-in-place or central-plant-mix methods.
- B. Do not allow the percentage of moisture in the soil at the time of cement application to exceed the quantity that will permit a uniform and intimate mixture of soil and cement during mixing operations.
- C. During seasons of freezing temperature, do not spread any cement or soil-cement mixture unless the ambient temperature is at least 40°F in the shade.
- D. At the completion of moist-mixing, pulverize the soil so that 100% passes a 1-1/2-inch sieve, 95 to 100% passes the 1-inch sieve and a minimum of 80% passes a No. 4 sieve, exclusive of gravel, shell, or stone.
- E. Operations shall be completed within a period of 4-hours starting at the time mixing commences.

### 3.5 MIXED-IN-PLACE METHOD

- A. Where feasible, process the entire width of the base in a single operation. Uniformly spread the design quantity of cement on the soil at the required rate of application, by means of an approved method. Replace spread cement that becomes displaced before starting mixing. Check the uniformity of spread rate by:
  - 1. Weight of cement spread/square yards covered for a short trial section that is between 100 and 300-feet in length; or
  - 2. Use of a square yard cloth/box
- B. After applying the cement, begin mixing within 60-minutes. Initially mix the soil and cement until the cement has sufficiently blended with the soil to prevent formation of cement balls when applying additional water; then add water if necessary, and re-mix the soil-cement mixture. Do not perform windrow mixing.
- C. Process up to the full depth in 1 course, provided the distribution of cement and water and the specified density are satisfactory to the County. If not, construct courses of such thickness to obtain satisfactory results. Make provisions to achieve adequate bonding between courses.
- D. Immediately after mixing of the soil and cement, add any additional water that is necessary. If the moisture content exceeds that specified, manipulate the soil-cement mixture by re-mixing or grading as required to reduce the moisture content to within the specified range. Avoid excessive concentrations of water. Continue mixing during and after applying water until obtaining a uniform mixture of soil, cement, and water.
- E. As an alternative to the above-described procedure, the Contractor may use an approved machine that will blend the cement and the soil. Additional water may be added and mixed as necessary.

### 3.6 CENTRAL-PLANT-MIXED METHOD

- A. Mix the soil, cement, and water in a pugmill of either the batch or continuous-flow type. Equip the plant with feeding and metering devices that will accurately proportion the soil, cement, and water in the quantities specified. Mix soil and cement sufficiently to prevent cement balls from forming when adding additional water. Continue mixing until obtaining a uniform mixture of soil, cement, and water.
- B. Haul the mixture to the roadway in trucks equipped with protective covers. Place the mixture on the moistened subgrade in a uniform layer with suitable equipment. Do not allow more than 60-minutes to elapse between placing of soil-cement in adjacent passes of the spreader at any location, except at construction joints. Ensure that the layer of soil-cement is uniform in thickness and surface contour and in such quantity that the completed base will conform to the required grade and cross-section. Do not perform windrow mixing.

### 3.7 CONSTRUCTION JOINTS

- A. Prior to joining any previously constructed section of base, form a vertical construction joint by cutting back into the completed work to form a true vertical face of acceptable soil-cement to the full depth of the base course. Moisten the vertical face as needed prior to placing new material against it.

### 3.8 SHAPING AND FINISHING

- A. Prior to final compaction, shape the surface of the soil-cement to the required lines, grades, and cross-section. In all cases where adding soil-cement mixture to any portion of the surface, lightly scarify the surface with a spring tooth harrow, spike drag, or other approved device to uniformly loosen the surface prior to adding material and prior to the initial set of the soil-cement mixture. Compact the resulting surface to the specified density. Continue rolling until all rutting ceases and until the base conforms to the density requirements.
- B. Ensure that the surface material is moist but not ponded, and maintained at not less than 2% below its specified optimum moisture content, during finishing operations. Perform surface compaction and finishing in such a manner as to produce a smooth dense surface, free of compaction planes, construction cracks, ridges, and loose material.
- C. If the time limits specified above are exceeded, either remove and replace the base or leave the base undisturbed for a period of 7-days, after which, the County will examine it to determine its suitability. If found unsuitable, remove and replace the base at no additional cost to County.

### 3.9 COMPACTION

- A. Begin compacting the soil-cement mixture immediately after mixing or placing. Do not allow more than 30-minutes to elapse between the last pass of moist-mixing or spreading and the start of compaction of the soil-cement mixture at a particular location.
- B. Determine the optimum moisture content and the maximum density in the field by the methods prescribed in AASHTO T-134 on representative samples of the soil-cement mixture obtained immediately after the initial mixing. Determine the density for each day's run or change of material.
- C. Uniformly compact the loose material to meet the density requirements specified below. During compaction operations, reshape the material to obtain required grade and cross-section.

### 3.10 PROTECTION AGAINST DRYING

- A. While finishing and correcting the surface, keep the surface of the base continuously moist by sprinkling water as necessary until applying the emulsified asphalt curing material. As soon as practicable, protect the base from drying for 7-days by applying the emulsified asphalt at the rate of 0.20 to 0.25-gallons of the diluted mixture per square yard. Provide complete coverage without excessive runoff. While applying the bituminous material, ensure that the soil-cement surface is dense, free of all loose and extraneous material, and contains sufficient moisture to prevent excessive penetration of the bituminous materials.
- B. If it is necessary to allow construction equipment or other traffic to use the completed base before the bituminous material has cured sufficiently to prevent pickup or displacement, sand the bituminous material, using approximately 10-lbs of clean sand per square yard. Do not use cover material containing organic acids or other compounds detrimental to the soil-cement base.
- C. Maintain the curing material during the 7-day protection period.

### 3.11 OPENING TO TRAFFIC

- A. Do not allow traffic on the base subsequent to completion of the finishing operations for a minimum period of 72-hours. As an exception to this requirement, allow equipment necessary for correction of surface irregularities, application of water, and application of curing materials on the base, if the tire contact pressures of such equipment do not exceed 45-psi. Under special conditions (i.e. low speed limit, low traffic volume, urban conditions), the County may waive the 72-hour period.

### 3.12 MAINTENANCE

- A. Maintain the base to a true and satisfactory surface until the wearing surface is constructed. If the County requires any repairing or patching, extend the repair or patch to the full depth of the base, and make them in a manner that will ensure restoration of a uniform base course in accordance with the requirements of these Specifications. Do not repair the base by adding a thin layer of soil-cement or concrete to the completed work. Make full depth repairs to small or minor areas, such as at manholes or inlets, with Class I concrete.
- B. For patching of deficient areas less than 100-square feet and less than 1-inch in depth, correct the areas using Type S-III Asphalt Concrete. For patching of deficient areas less than 100-square feet and greater than 1-inch in depth, remove the areas to full depth and replace them using Asphalt Base Course Type 3, Type S Asphaltic Concrete, or soil-cement.

### 3.13 DENSITY TESTING REQUIREMENTS

- A. As soon as possible after completing compaction, perform field density testing to ensure that the density is 97% of the maximum density as determined by methods prescribed in AASHTO T-134.
- B. If an individual test value within a LOT is less than 94% of the maximum density, determine the extent of this deficiency by performing density tests using a 5-foot grid pattern until a test value of 95% or greater is located in all directions. Remove the delineated area of base, and replace it with base meeting all requirements of this section, at no cost to the County.
- C. As an exception to the foregoing, if 3 or more of the original 5 individual test values within a LOT are less than 94% of the maximum density, the County will reject the entire LOT, and the Contractor shall remove all base within the LOT and replace it with base meeting all requirements of this Section, at no expense to the County.

### 3.14 SURFACE FINISH ACCEPTANCE REQUIREMENTS

- A. After compacting and finishing, and not later than the beginning of the next calendar day after constructing any section of base, measure the surface with a template cut to the required cross-section and a 15-foot straightedge placed parallel to the centerline of the road. Both templates shall be provided by the Contractor. Correct all irregularities greater than 1/4-inch to the satisfaction of the County with a blade adjusted to the lightest cut which will ensure a surface that does not contain depressions greater than 1/4-inch under the template or the straightedge. The County may approve other suitable methods for measurement.

### 3.15 THICKNESS ACCEPTANCE REQUIREMENTS

- A. Construction tolerances for thickness are as follows:

**Table 02572-4  
Thickness Tolerances**

	Allowable Deviation From Plan Thickness
Central-Plant-Mixed Processing	-1-inch
Mixed-in-Place Processing	+/- 1-inch

- B. When any thickness measurement is outside the construction tolerance, the County will take additional thickness measurements at 10-foot intervals parallel to the centerline in each direction from the measurement which is outside the construction tolerance until a measurement in each direction is within the construction tolerance.
- C. The County will evaluate an area of base found to have a thickness outside the construction tolerance and may require the Contractor to remove and replace it with acceptable base of the thickness shown in the plans at no expense to the County.

### 3.16 STRENGTH TESTING OF FIELD SPECIMENS

- A. Check the adequacy of cement content and uniformity of distribution of cement within the base by sampling and testing the completed mix.
- B. Take samples at the project site just prior to final compaction and perform a minimum of 2 Strength Test Values (STV) each day, with at least 1 STV per each 2,500 square yards mixed.
- C. Ensure that each STV is the average strength value of a minimum of 3 individual specimens.
- D. Take representative samples of the mixed soil-cement material for determining an STV just prior to final compaction, recording the sample location, and ensuring that the samples are large enough to mold 3 or more compressive strength test specimens as prescribed in FM 5-520.
- E. Mold test specimens at the field moisture content and cast the individual test specimens as close to identical as possible
- F. Rest the molds during compaction of strength test specimens on a 200-pound concrete block that the Contractor provides.
- G. Gently extrude these test specimens from the compaction mold, and carefully place them in a moist curing environment (not in direct contact with water) such as a tightly closed container under wet cloth or burlap at locations where they will not be disturbed.

- H. Continue the initial field cure for at least 24-hours, and if after 24-hours it is determined that the specimens have not gained sufficient strength to be moved without probable damage, continue field curing until the County determines that each specimen can be safely moved without probable damage occurring. When the County determines that the specimens can be safely moved, transport them to the laboratory where they will be cured, as described in the design procedure (FM 5-520), to 7-days of age. At 7-days of age, test the individual specimen for determination of compressive stress and ensure that the loading procedure and rates are the same, as described in FM 5-520.
- I. If an STV is less than 60% of the Laboratory Design Strength, remove and replace the material represented by the STV, at no expense to the County.
- J. When the LOT average thickness of soil-cement base is deficient by more than 1-inch and the judgment of the County is that the area of such deficiency should not be removed and replaced, payment for the area retained will be at 50%.
- K. When multiple deficiencies occur, the applicable percent payment schedule will be applied to the LOT of base that is identified with each deficiency. The penalty for each deficiency will be applied separately to the unit price.

I. END OF SECTION

## SECTION 02573

### ASPHALT PAVEMENT REMOVAL AND REPLACEMENT

#### PART 1 - GENERAL

##### 1.1 DESCRIPTION

- A. Scope of Work: Mill or remove existing asphalt pavement and base materials and install asphalt paving on a prepared base or as an overlay to existing asphalt pavement sections. Provide Maintenance of Traffic and coordinate and install temporary and permanent replacement of traffic signalization and pavement striping and markings.

##### 1.2 REFERENCES

- A. Florida Department of Transportation (FDOT) Standard Specifications for Road and Bridge Construction, 2000 and 2004 editions.
  - 1. Section 300 – Prime and Tack Coats for Base Courses (2000 and 2004 Editions)
  - 2. Section 320 – Hot Bituminous Mixtures – Plant, Methods, and Equipment (2000 and 2004 Editions)
  - 3. Section 327 – Milling of Existing Asphalt Pavement (2000 and 2004 Editions)
  - 4. Section 330 – Hot Bituminous Mixtures – General Construction Requirements (2000 and 2004 Editions)
  - 5. Section 331 – Type S Asphalt Concrete (2000 Edition)
  - 6. Section 334 – Superpave Asphalt Concrete (2004 Edition)
  - 7. Section 901 – Coarse Aggregate (2000 and 2004 Editions)
  - 8. Section 902 – Fine Aggregate (2000 and 2004 Editions)
  - 9. Section 916 – Bituminous Materials (2000 and 2004 Editions)
  - 10. Section 917 – Mineral Filler (2000 and 2004 Editions)
- B. Florida Department of Transportation (FDOT) Design Standards, 2000 and 2004 editions.

##### 1.3 QUALITY ASSURANCE

- A. Asphalt pavements shall be plant-mixed hot bituminous mixtures. Plant operations shall not begin unless all weather conditions are suitable for laying operations. A prime and tack coat shall be first applied to newly constructed bases. A tack coat shall be applied on existing pavements that are to be overlaid with an asphalt mix and between successive layers of asphalt mix. Apply prime and tack coats when ambient or base surface temperature is above 40°F, and when temperature has been above 35°F for 12-hours immediately prior to application. Construct asphaltic concrete paving when ambient temperature is above 45°F. Do not apply when base is wet, contains excess moisture, or during rain. Establish and maintain required lines and elevations.

- B. Do not spread the mixture when the wind is blowing to such an extent that proper and adequate compaction cannot be maintained or when sand, dust, etc., are being deposited on the surface being paved to the extent that the bond between layers will be diminished.
- C. Field compaction density and thickness testing frequencies of the asphalt shall be tested once every 300-linear feet of paving per 24-foot wide strip, staggered left, center, and right of centerline. Where less than 300-linear feet of asphalt is placed in 1-day, provide minimum of 1 test for each per day's construction at a location designated by the County.
- D. Asphalt extraction gradation shall be tested from grab samples collected once every 1,800-square yards of asphalt delivered to the site, or a minimum of once per day. Obtain the results in a timely manner (no later than the end of the day) so that adjustments can be made if necessary.
- E. On initial use of a Type S mix design at a particular plant, as a minimum, run an additional extraction gradation analysis if more than 500-tons [450-metric tons] of mixture are produced on the first day of production.
- F. Tolerances for Quality Control Tests (Extraction Gradation Analysis) shall be in accordance with FDOT Specification Section 331.

#### 1.4 SHOP DRAWINGS AND SUBMITTALS

- A. Submittals shall be submitted to the County for review and acceptance prior to construction in accordance with the General Conditions and specifications Section 01300 "Submittals."
  - 1. Submit for each proposed design mix the Gradation analysis; Grade of asphalt cement used; and Marshall Stability in pounds flow.
  - 2. Provide a single percentage of asphalt by weight of total mix intended to be incorporated in the completed mixture, shown to the nearest 0.1%. For structural mixes (S-1, S-3) establish the optimum asphalt content at a level corresponding to a minimum of 4.5% air voids. Provide the laboratory density of the asphalt mixture for all mixes except Open-Graded Friction Courses.
  - 3. Identify source and description of the materials to be used.
  - 4. Provide certification that the mix design conforms to specification requirements.
  - 5. Field compaction density and thickness testing.
  - 6. Field asphalt extraction gradation.

## PART 2 - PRODUCTS

### 2.1 GENERAL

- A. All material supplied shall be one of the products specified in Appendix D "List of Approved Products" appended to these technical specifications.

- B. Type S Asphalt Concrete (Type S-1 or S-3) is required. The equivalent fine Type SP (Superpave) Asphalt Concrete mixture (Traffic Level C) meeting the requirements of FDOT Specification Section 334 may be selected as an alternate at no additional cost to the County. The equivalent mixes are as follows:
  1. Type S-1: Type SP-12.5
  2. Type S-3: Type SP-9.5
- C. Asphalt plant and equipment shall meet the requirements in FDOT Specification Section 320.

2.2 AGGREGATE

- A. Coarse Aggregate, Stone, Slag, or Crushed Gravel shall meet the requirements in FDOT Specification Section 901.
- B. Fine Aggregate shall meet the requirements in FDOT Specification Section 902.
- C. Aggregate gradation shall meet the following:

**Table 02573-1  
Bituminous Concrete Mixtures  
(Gradation Design Range)**

Type	Total Aggregate Passing Sieves <sup>1</sup>							
	3/4-inch [19.0 mm]	1/2-inch [12.5 mm]	3/8-inch [9.5 mm]	No. 4 [4.75 mm]	No. 10 [2.0 mm]	No. 40 [425 µm]	No. 80 [180 µm]	No. 200 [75 µm]
S-1 <sup>4</sup>	100	88-98	75-93	47-75	31-53	19-35	7-21	2-6
S-3 <sup>4</sup>		100	88-98	60-90	40-70	20-45	10-30	2-6
ABC-1		100						0-12
ABC-2		100			55-90			0-12
ABC-3 <sup>2</sup>	70-100			30-70	20-60	10-40		2-10
FC-2 <sup>3</sup>		100	85-100	10-40	4-12			
FC-3 <sup>4</sup>		100	88-98	60-90	40-70	20-45	10-30	2-6
1. In inches [mm] or sieves [µm]. 2. 100% passing 1-1/2-inch [37.5 mm] sieve. 3. The County may increase the design range for the No. 10 [200 mm] sieve for lightweight aggregates. 4. The County may retain up to 1% on the maximum sieve size.								

- D. Use clean aggregate containing no deleterious substances. Do not use coarse or fine aggregate which contains more than 0.5% of phosphate.
- E. In laboratory tests, and for the purpose of proportioning the paving mixture, consider all material passing the No. 10 [2.00-mm] sieve and retained on the No. 200 [75 µm] sieve as fine aggregate, and the material passing the No. 200 [75 µm] sieve as mineral filler.

- F. Do not use any screenings in the combination of aggregates containing more than 15% of material passing the No. 200 [75 µm] sieve. When two screenings are blended to produce the screening component of the aggregate, one of such screenings may contain up to 18% of material passing the No. 200 [75 µm] sieve, as long as the combination of the two does not contain over 15% material passing the No. 200 [75 µm] sieve. Screenings may be washed to meet these requirements.

## 2.3 ASPHALT CEMENT

- A. Superpave PG Asphalt Binder or Recycling Agent shall meet the requirements in FDOT Specification Section 916.
- B. Mineral Filler shall meet the requirements in FDOT Specification Section 917.
- C. Marshall design mix shall be in accordance with the following:

**Table 02573-2  
Marshall Design Properties For Bituminous Concrete Mixes**

Mix Type	Minimum Marshall Stability (lbs.)	Flow* (0.01 in)	Minimum VMA (%)	Air Voids (%)	Minimum Effective Asphalt Content (%)	VFA Voids Filled with Asphalt (%)
S-1	1,500	8-13	14.5	4-5	**	65-75
S-3	1,500	8-13	15.5	4-6	**	65-75
ABC-1	500	7-15	15	5-16	6.0	-
ABC-2	750	7-15	15	5-14	5.5	-
ABC-3	1,000	8-13	14	4-7	**	65-78
FC-2	-	-	-	-	-	-
FC-3	1,500	8-13	15.5	4-6	**	65-75

\* The maximum Flow value during production shall not exceed one point more than shown in the Table.

\*\* The ratio of the percentage by weight of total aggregate passing the No. 200 sieve to the effective asphalt content expressed as a percentage by weight of total mix shall be in the range of 0.6 to 1.2.

## 2.4 BITUMINOUS MIXTURE

- A. Use a bituminous mixture composed of a combination of aggregate (coarse, fine or mixtures thereof), mineral filler, if required, and bituminous material. Ensure that no more than 20% by weight of the total aggregate used is silica sand or local materials as defined in FDOT Specification Section 902. Size, grade, and combine the several aggregate fractions in such proportions that the resulting mixture meets the grading and physical properties of the verified mix design.

## **PART 3 - EXECUTION**

### **3.1 GENERAL**

- A. Set up, install and maintain temporary traffic control devices and detours as necessary in accordance with Specification Section 1570 "Maintenance of Traffic."
- B. Asphalt pavements, including all surface courses and base courses, where shown to be open cut and removed on the Drawings or specified in the Project Manual, shall be removed to a line back from each edge of the trench, other excavation, or to the limits indicated on the Drawings. Pavements shall be cut straight, clean and square with a power saw or other tools and equipment suitable for the Work.
- C. Asphalt pavements, where shown to be milled on the Drawings or specified in the Project Manual, shall be milled according to FDOT Specification Section 327.
- D. Asphalt mixtures shall meet the general construction requirements specified in FDOT Specification Section 330.
- E. Spread the mixture only when the surface upon which it is to be laid has been previously prepared, is intact, firm, and properly cured, and is dry. Do not spread mixture that cannot be finished and compacted during daylight hours.
- F. Deliver the asphalt cement from the asphalt plant at a temperature not to exceed 350°F and equip the transport tanks with sampling and temperature sensing devices meeting the requirements of FDOT. Maintain the asphalt cement in storage within a range of 230°F to 350°F in advance of mixing operations. Maintain constant heating within these limits, and do not allow wide fluctuations of temperature during a day's production.
- G. Produce a homogeneous mixture, free from moisture and with no segregated materials, that meets all specification requirements for the mixture, including compliance with the Marshall Properties. Also apply these requirements to all mixes produced by the drum mixer process and all mixes processed through a hot storage or surge bin, both before and after storage.

### **3.2 PREPARATION OF APPLICATION SURFACES**

- A. Prior to the laying of the mixture, clean the surface of the base or pavement to be covered of all loose and deleterious material by the use of power brooms or blowers, supplemented by hand brooming where necessary.
- B. Where an asphalt mix is to be placed on an existing pavement or old base that is irregular, and wherever the plans indicate, bring the existing surface to proper grade and cross-section by the application of patching or leveling courses.
- C. Where an asphalt mix is to be placed over a newly constructed surface treatment, sweep and dispose of all loose material from the paving area.

- D. Paint all structures which will be in actual contact with the asphalt mixture, with the exception of the vertical faces of existing pavements and curbs or curb and gutter, with a uniform coating of asphalt cement to provide a closely bonded, watertight joint.
- E. Apply a prime and tack coat on newly constructed bases and apply a tack coat, as specified in FDOT Specification Section 300, on existing pavement structures that are to be overlaid with an asphalt mix and between successive layers of all asphalt mixes.

### 3.3 PLACING MIXTURE

- A. Lay all asphaltic concrete mixtures, including leveling courses, other than adjacent to curb and gutter or other true edges, by the string line method to obtain an accurate, uniform alignment of the pavement edge.
- B. For each paving machine operated, use a separate crew, each crew operating as a full unit. The Contractor's Certified Paving Technician in charge of the paving operations may be responsible for more than one crew but must be physically accessible to the County at all times when placing mix.
- C. Check the depth of each layer at frequent intervals, and make adjustments when the thickness exceeds the allowable tolerance. When making an adjustment, allow the paving machine to travel a minimum distance of 32-feet to stabilize before the second check is made to determine the effects of the adjustment.
- D. In limited areas where the use of the spreader is impossible or impracticable, the Contractor may spread and finish the mixture by hand.
- E. Straightedge and back-patch after obtaining initial compaction and while the material is still hot.
- F. Upon arrival, dump the mixture in the approved mechanical spreader, and immediately spread and strike-off the mixture to the full width required, and to such loose depth for each course that, when the Work is completed, the required weight of mixture per square yard [square meter], or the specified thickness, is secured. Carry an excess amount of mixture ahead of the screed at all times. Hand-rake behind the machine as required.
- G. Construct each course in layers of the thickness as shown on FDOT Design Standards Index No. 513.
- H. Before starting any rolling, check the surface; correct any irregularities; remove all drippings, fat sandy accumulations from the screed, and fat spots from any source; and replace them with satisfactory material. Do not skin patch. When correcting a depression while the mixture is hot, scarify the surface and add fresh mixture.

### 3.4 APPLICATION OF LEVELING COURSES

- A. Before spreading any leveling course, fill all depressions in the existing surface more than 1-inch deep by spot patching with leveling course mixture, and then compact them thoroughly.
- B. Place all courses of leveling by the use of two (2) motor graders; equip one with a spreader box. Use other types of leveling devices after they have been approved by the County.
- C. When the total asphalt mix provided for leveling exceeds 50-lb/yds<sup>2</sup> [27-kg/m<sup>2</sup>], place the mix in two or more layers, with the average spread of any layer not to exceed 50-lb/yd<sup>2</sup> [27-kg/m<sup>2</sup>]. When using Type S-3 Asphaltic Concrete for leveling, do not allow the average spread of a layer to be less than 50-lb/yd<sup>2</sup> [27-kg/m<sup>2</sup>] or more than 75-lb/yd<sup>2</sup> [40-kg/m<sup>2</sup>]. The Contractor may vary the rate of application throughout the Project as directed by the County. When leveling in connection with base widening, the County may require placing all the leveling mix prior to the widening operation.

### 3.5 COMPACTING MIXTURE

- A. The coverage is the number of times the roller passes over a given area of pavement. Regardless of the rolling procedure used, complete the final rolling before the surface temperature of the pavement drops below 160°F.
- B. Seal Rolling: Provide two (2) coverages with a tandem steel-wheeled roller (either vibratory or static), weighing 5 to 12-tons, following as close behind the spreader as possible without pick-up, undue displacement, or blistering of the material. Use vibratory rollers in the static mode for layers of 1-inch or less in thickness.
- C. Intermediate Rolling: Provide five (5) coverages with a self-propelled pneumatic-tired roller, following as close behind the seal rolling operation as the mix will permit.
- D. Final Rolling: Provide one (1) coverage with a tandem steel-wheeled roller (static mode only), weighing 5 to 12-tons, after completing the seal rolling and intermediate rolling, but before the surface pavement temperature drops below 160°F.
- E. Operate the self-propelled, pneumatic-tired roller at a speed of 6 to 10-mph. For each roller, do not exceed an area of coverage of 4,000 yd<sup>2</sup>/hour; if rolling Type S Asphaltic Concrete, do not exceed an area of coverage of 3,000 yd<sup>2</sup>/hour.
- F. Use a sufficient number of self-propelled pneumatic-tired rollers to ensure that the rolling of the surface for the required number of passes does not delay any other phase of the laying operation and does not result in excessive cooling of the mixture before completing the rolling. In the event that the rolling falls behind, discontinue the laying operation until the rolling operations are sufficiently caught up.

- G. Use hand tamps or other satisfactory means to compact areas which are inaccessible to a roller, such as areas adjacent to curbs, headers, gutters, manholes, etc.
- H. Use self-propelled pneumatic-tired rollers to roll all patching and leveling courses. Where placing the initial leveling course over broken concrete pavement, use a pneumatic-tired roller that weighs at least 15-tons. For Type S-3 Asphaltic Concrete leveling courses, use a steel-wheeled roller to supplement the traffic rollers. On other leveling courses, use a steel-wheeled roller to supplement the traffic rollers on all passes after the first pass.
- I. Do not allow the rollers to deposit gasoline, oil, or grease onto the pavement. Remove and replace any areas damaged by such deposits as directed by the County. While rolling is in progress, test the surface continuously, and correct all discrepancies to comply with the surface requirements. Remove and replace all drippings, fat or lean areas, and defective construction of any description. Remedy depressions that develop before completing the rolling by loosening the mixture and adding new mixture to bring the depressions to a true surface. Should any depression remain after obtaining the final compaction, remove the full depth of the mixture, and replace it with sufficient new mixture to form a true and even surface. Correct all high spots, high joints, and honeycombing as directed by the County. Remove and replace any mixture remaining unbonded after rolling. Correct all defects prior to laying the subsequent course.
- J. Use a self-propelled pneumatic-tired roller on the first structural layer placed on a milled surface. Compact with a minimum of three passes.

### 3.6 JOINTS

- A. Place the mixture as continuously as possible. Do not pass the roller over the unprotected end of the freshly laid mixture except when discontinuing the laying operation long enough to permit the mixture to become chilled. When thus interrupting the laying operation, construct a transverse joint by cutting back on the previous run to expose the full depth of the mat.
- B. For all layers of pavement except the leveling course, place each layer so that longitudinal construction joints are offset 6-inches to 12-inches laterally between successive layers.
- C. When laying fresh mixture against the exposed edges of joints (trimmed or formed as provided above), place it in close contact with the exposed edge to produce an even, well-compacted joint after rolling.

### 3.7 SURFACE REQUIREMENTS

- A. Obtain a smooth surface on all pavement courses placed, and then straightedge all intermediate and final courses with a 15-foot rolling straightedge. Furnish a 15-foot [4.572-m] manual straightedge, and make it available at the job site at all times during the paving operation for checking joints and surface irregularities.

- B. Produce a finished surface of uniform texture and compaction with no pulled, torn, or loosened portions and free of segregation, sand streaks, sand spots, or ripples.

### 3.8 ACCEPTANCE REQUIREMENTS

- A. Upon completion of the final surface or friction course, the County will test the finished surface with a 15-foot rolling straightedge. Correct all deficiencies in excess of 3/16-inch.
- B. If correction is made by removing and replacing the pavement, remove the full depth of the course and extend at least 50-feet on either side of the defective area for the full width of the paving lane.
- C. If correction is made by overlaying, cover the length of the defective area and taper uniformly to a featheredge thickness at a minimum distance of 50-feet on either side of the defective area. Extend the overlay the full width of the roadway. Maintain the specified cross slope. The County may adjust, as necessary, the mix used for the overlay for this purpose.
- D. The maximum deficiency from the specified thickness as follows:
  - 1. For pavement of a specified thickness of 2-1/2-inches or more: 1/2-inch
  - 2. For pavement of a specified thickness less than 2-1/2-inches: 1/4-inch
- E. Where the deficiency in thickness is: (1) in excess of 3/8-inch for pavement of less than 2-1/2-inches in specified thickness, or (2) in excess of 3/4-inch for pavement of specified thickness of 2-1/2-inches or more, correct the deficiency either by replacing the full thickness for a length extending at least 50-feet from each end of the deficient area.
- F. For any case of excess deficiency of the pavement, if approved by the County for each particular location, correct the deficient thickness by adding new surface material, and compact it to the same density as the adjacent surface. The County will determine the area to be corrected and the thickness of new material added.

### 3.9 REPAIR AND RESTORATION

- A. Replace asphalt pavement or roadway surfaces cut or damaged to equal or better condition than the original, including stabilization, base course, surface course, curb and gutter, and other appurtenances.

### 3.10 SIGNALIZATION, PAVEMENT STRIPING AND MARKING

- A. The Contractor shall be responsible for coordinating, repairing or replacing all traffic signalization devices and traffic loops damaged during the pavement milling, removal and replacement process.

- B. The Contractor shall be responsible for coordinating, inventorying, and replacing all temporary and permanent pavement striping and markings damaged during the asphalt pavement milling, removal, and replacement process.
- C. Temporary pavement striping and markings shall be paint or reinforced retro-reflective removal tape. Foil back tape is not acceptable. Permanent pavement striping and markings shall be alkyd thermoplastic tape and raised reflective pavement markers.

END OF SECTION

**SECTION 02578**  
**SOLID SODDING**

**PART 1 - GENERAL**

1.1 DESCRIPTION

- A. Scope of Work: Establishing a stand of grass by furnishing and placing grass sod. Included are fertilizing, watering, and maintenance as required to assure a healthy stand of grass. Solid sodding shall be placed on all slopes greater than 4:1, within 10-feet of all proposed structures, and in all areas where existing grass or sod (regardless of it's condition) is removed or disturbed by Contractor's operation unless otherwise specified or shown on the Drawings.

1.2 SHOP DRAWINGS AND SUBMITTALS

- A. Submittals shall be submitted to the County for review and acceptance prior to construction in accordance with the General Conditions and specifications Section 01300 "Submittals."
  - 1. A certification of sod quality by the producer shall be delivered to the County ten days prior to use.

**PART 2 - PRODUCTS**

2.1 GENERAL

- A. All material supplied shall be one of the products specified in Appendix D "List of Approved Products" appended to these technical specifications.

2.2 GRASS SOD

- A. Grass sod for the road rights-of-way shall be of variety to match the existing adjacent area and shall be well matted with grass roots. The sod shall be taken up in rectangles, preferably 12-inch by 24-inch, shall be a minimum of 2-inches in thickness, and shall be live, fresh, and uninjured at the time of planting.
- B. Grass sod for restoration of new construction sites and/or areas disturbed by construction on existing sites shall be St. Augustine well matted with grass roots. The sod shall be taken up in rectangles, preferably 12-inch by 24-inch, shall be a minimum of 2-inches in thickness, and shall be live, fresh, and uninjured at the time of planting.

- C. It shall be reasonably free of weeds and other grasses and shall have a soil mat of sufficient thickness adhering firmly to the roots to withstand all necessary handling. The sod shall be planted as soon as possible after being dug and shall be shaded and kept moist until it is planted.

## 2.3 FERTILIZER

- A. Commercial fertilizers shall comply with the state fertilizer laws.
- 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 6-6-6. At least 50% of the nitrogen shall be derived from organic sources. At least 50 % of the phosphoric acid shall be from normal super phosphate or an equivalent source, which will provide a minimum of two units of sulfur. The amount of sulfur shall be indicated on the quantitative analysis card attached to each bag or other container.

## 2.4 WATER FOR GRASSING

- A. The water used in the sodding operations shall be by the Contractor as approved by the County.

# **PART 3 - EXECUTION**

## 3.1 PREPARATION OF GROUND

- A. The area over which the sod is to be placed shall be scarified or loosened to a depth and then raked smooth and free from debris. Where the soil is sufficiently loose and clean, the County, at its discretion, may authorize the elimination of ground preparation.

## 3.2 APPLICATION OF FERTILIZER

- A. Before applying fertilizer, the soil pH shall be brought to a range of 6.0 - 7.0.
- B. The fertilizer shall be spread uniformly over the area to be sodded at the rate of 700-pounds per acre, or 16-pounds per 1,000 square feet, by a spreading device capable of uniformly distributing the material at the specified rate. Immediately after spreading, the fertilizer shall be mixed with the soil to a depth of approximately 4-inches.
- C. On steep slopes, where the use of a machine for spreading or mixing is not practicable, the fertilizer shall be spread by hand and raked in and thoroughly mixed with the soil to a depth of approximately 2-inches.

### 3.3 PLACING SOD

- A. The sod shall be placed on the prepared surface, with edges in close contact and shall be firmly and smoothly embedded by light tamping with appropriate tools.
- B. Where sodding is used in drainage ditches, or on slopes of 4:1 or greater, the setting of the pieces shall be staggered to avoid a continuous seam along the line of flow. Along the edges of such staggered areas, the offsets of individual strips shall not exceed 6-inches. In order to prevent erosion caused by vertical edges at the outer limits, the outer pieces of sod shall be tamped so as to produce a featheredge effect.
- C. On slopes greater than 2:1, the Contractor shall, if necessary, prevent the sod from sliding by means of wooden pegs driven through the sod blocks into firm earth at suitable intervals.
- D. Sod which has been cut for more than 72-hours shall not be used unless specifically authorized by the County after the inspection thereof. Sod which is not planted within 24-hours after cutting shall be stacked in an approved manner, maintained, and properly moistened. Any pieces of sod that, after placing, show an appearance of extreme dryness shall be removed and replaced by fresh, uninjured pieces.
- E. Sodding shall not be performed when weather and soil conditions are, in the County's opinion, unsuitable for proper results.

### 3.4 WATERING

- A. The areas on which the sod is to be placed shall contain sufficient moisture, as determined by the County, for optimum results. After being placed, the sod shall be kept in a moist condition to the full depth of the rooting zone for at least 2-weeks. Thereafter, the Contractor shall apply water as needed until the sod roots and starts to grow for a minimum of 60-days (or until final acceptance, whichever is latest).

### 3.5 MAINTENANCE

- A. The Contractor shall maintain, at his expense, the sodded areas in a satisfactory condition until final acceptance of the Project. Such maintenance shall include repairing of any damaged areas and replacing areas in which the establishment of the grass stand does not appear to be developing satisfactorily.
- B. Replanting or repair necessary due to the Contractor's negligence, carelessness, or failure to provide routine maintenance shall be at the Contractor's expense.

END OF SECTION

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**SECTION 02660**  
**POTABLE WATER SYSTEM**

**PART 1 - GENERAL**

1.1 DESCRIPTION

- A. Scope of Work: Provide a complete system for water transmission/distribution pressure piping and appurtenant items.

1.2 QUALITY ASSURANCE

A. Design Requirements

1. Piping shall be laid with a minimum cover of 36-inches below finished grade for mains sized 12-inch and below and a minimum cover of 48-inches for mains sized 16-inch and greater. Pipe located within Local roadways (subdivisions) or within an easement, shall be laid with a minimum cover of 30-inches.
2. Pipelines shall be constructed of the materials indicated in this specification and on the Drawings.

B. Pipe Inspection:

1. The Contractor shall obtain a certificate of inspection from the pipe manufacturer stating that the pipe and fittings supplied for this Contract have been inspected at the plant and that they meet the requirements of these specifications.
2. The entire product of any plant may be rejected when, in the opinion of the County, the methods of manufacture fail to secure uniform results, or where the materials used are such as to produce inferior pipe or fittings.
3. All pipe and fittings shall be subjected to a visual inspection at the time of delivery and before being lowered into the trench. Joints or fittings that do not conform to these specifications will be rejected and must be removed immediately by the Contractor.
4. The County reserves the right to sample and test any pipe or fitting after delivery and to reject all pipe and fittings represented by any sample which fails to comply with the specified requirements.

C. Prevention of electrolysis is required in accordance with AWWA C105 and when crossing, or adjacent to, a power easement, gas easements, any location where induced currents may be present, in areas where aggressive soils exist, and where shown on Drawings. Electrolytic action through the contact of dissimilar metals shall be prevented by either:

1. The separation of one material from the other by means of an insulating or dielectric coupling (polyethylene wrap), or
2. The use of alternative materials, as directed by the County.

### 1.3 SHOP DRAWINGS AND SUBMITTALS

- A. Submittals shall be submitted to the County for review and acceptance prior to construction in accordance with the General Conditions and specifications Section 01300 "Submittals."
  - 1. Mill test certificates or certified test reports on pipe
  - 2. Details of restrained and flexible joints
  - 3. Detailed laying schedule for pipe
  - 4. Valves and valve boxes

### 1.4 JOB CONDITIONS

- A. Water in Excavation
  - 1. Dewatering shall be in accordance with. Section 02140 "Dewatering." Water shall not be allowed in the trenches while the pipes are being laid and/or tested. The Contractor shall not open more trench than the available pumping facilities are able to dewater to the satisfaction of the County. The Contractor shall assume responsibility for disposing of all water so as not to injure or interfere with the normal drainage of the territory in which he is working.
  - 2. In no case shall the pipelines being installed be used as drains. The ends of the pipe shall be kept properly and adequately blocked during construction by the use of approved stoppers and not by improvised equipment.
  - 3. All necessary precautions shall be taken to prevent the entrance of mud, sand, or other obstructing matter into the pipelines. If on completion of the Work any such material has entered the pipelines, it must be cleaned as directed by the County so that the entire system will be left clean and unobstructed.

## **PART 2 - PRODUCTS**

### 2.1 GENERAL

- A. All material supplied shall be one of the products specified in Appendix D "List of Approved Products" appended to these technical specifications.

### 2.2 MATERIALS

- A. Pipe, Fittings, Valves, and Ancillary Equipment shall be installed as shown on the Drawings and as specified in Division 15.
- B. Additional Work: Additional items of construction, necessary for the complete installation of the systems, shall conform to specific details shown on the Drawings and shall be constructed of first-class materials conforming to the applicable portions of these specifications.

## PART 3 - EXECUTION

### 3.1 PREPARATION

#### A. Bedding:

1. Pipe Cradle: Upon satisfactory installation of the pipe bedding material as specified in Section 02220 "Excavating, Backfilling and Compacting", a continuous trough for the pipe barrel and recesses for the pipe bells or couplings shall be excavated by hand digging. When the pipe is laid in the prepared trench, true to line and grade, the pipe barrel shall receive continuous, uniform support and no pressure will be exerted on the pipe joints from the trench bottom.
2. Cleanliness: The interior of the pipes shall be thoroughly cleaned of all foreign matter before being gently lowered into the trench and shall be kept clean during laying operations by means of plugs or other methods approved by the County. During suspension of work for any reason at any time, a suitable stopper shall be placed in the end of the pipe last laid to prevent mud or other foreign material from entering the pipe.

### 3.2 INSTALLATION

#### A. Pipe Identification/Location

1. All PVC water mains shall be solid blue. All lettering shall appear legibly on the pipe and shall run the entire length of the pipe. Lettering shall read as is acceptable for the intended use.
2. All ductile iron water mains shall be color coded blue with tape. The tape (minimum 2-inches) shall be permanently affixed to the top and each side of the pipe (3 locations parallel to the axis of the pipe). For pipes less than 24-inches in diameter, a single tape may be used along the top of the pipe.
3. All HDPE water mains shall be a solid blue or black with 4 co-extruded equally spaced blue stripes of the same material as the pipe. Stripes painted on the pipe outside surface shall not be acceptable.
4. If main is located over 30-feet from the edge of the pavement or in an easement, the Contractor shall install 4-inch diameter schedule 80 PVC utility pipe line markers over the pipe alignment at 1,000-foot intervals, at all valves, and at all locations where fittings deflect the pipe alignment in the horizontal plane. Utility pipeline markers shall include a decal and shall be colored blue for water service.
5. All mains (PVC, HDPE, and DI) shall be installed with a continuous, insulated 10-gauge copper wire installed directly above the pipe for location purposes. Locate wire shall terminate in a test station box and be capable of extending 12-inches above the top of the box. Directionally drilled pipe shall be installed with 2 insulated 10-gauge copper wires.

- B. Pipe: The color stripe and pipe text shall be located on the top of the pipe when installed. When installing PVC pipe, no additional joints will be installed until the preceding pipe joint has been completed and the pipe carefully embedded and secured in place.
1. Gradient: Pipe shall be laid straight and depth of cover shall vary to provide uniform gradient or slope to pipe, whether grading is completed or proposed at time of pipe installation. When a grade or slope is shown on the Drawings, batter boards with string line paralleling design grade, or other previously approved means, shall be used by the Contractor to assure conformance to required grade.
  2. Pipe Joint Deflection
    - a. Ductile Iron Pipe: Whenever it is desirable to deflect pipe, the amount of deflection shall not exceed 75% of the maximum limits as shown in AWWA Standard C600 for ductile iron pipe.
    - b. PVC Pipe: Joint deflection or pipe bending shall not be permitted. The maximum allowable tolerance in the joint due to variances in installation is 0.75° (degrees) (3-inches per joint per 20-foot stick of pipe). No bending tolerance in the pipe barrel shall be acceptable. Alignment change shall be made only with sleeves and fittings.
  3. Rejects: Any pipe found defective shall be immediately removed and replaced with sound pipe at the Contractor's expense.
  4. Joint Compounds: No sulfur base joint compound shall be used.
  5. Thrust restraints shall be accomplished by the use of mechanical restraining devices unless specifically identified otherwise on the Drawings or herein. Restraining devices shall be specified in Sections 15062 "Ductile Iron Pipe and Fittings" and 15064 "Polyvinyl Chlorine (PVC) Pipe and Fittings", respectfully.
- C. Installing Valves and Boxes
1. Valves: Valves shall be carefully inspected, fully opened, and then tightly closed and the various nuts and bolts shall be tested for tightness. Any valve that does not operate correctly shall be removed and replaced.
  2. Valve Boxes: Valve boxes shall be carefully centered over the operating nuts of the valves so as to permit a valve key to be fitted easily to the operating nut. In unpaved areas, valve boxes shall be set to conform to the level of the finished surface and held in position by a concrete collar placed under the support flange as shown on the Drawings. The letter "V" shall be etched in the curb at each valve location. The valve box shall not transmit surface loads to the pipe or valve but be supported by bedding rock as shown on the Drawings. Extensions or risers for valve boxes shall be an integral part of the box. No cut sections of D.I. or PVC pipe shall be used in extending the box to its proper height. Care shall be taken to prevent earth and other material from entering the valve box. Any valve box which is out of alignment or whose top does not conform to the finished ground surface shall be dug out and reset. Before final acceptance of the Work all valve boxes shall be adjusted to finish grade.
  3. Concrete Collar: Each valve installed in an unimproved area (outside of pavement, driveways or sidewalks) shall require a 24-inch by 24-inch by 6-inch concrete pad or collar as shown in the Drawings.

4. Identification Disc: Each 16-inch or larger valve (unless otherwise shown on the Drawings) installed shall be identified by a 3-inch diameter bronze disc anchored in the concrete pad or collar in unimproved areas and/or anchored on a 4-inch by 4-inch by 18-inch long concrete post set flush with the pavement surface in improved areas. The disc shall be stamped with the following information as shown on the Drawings:
  - a. Size of the valve
  - b. Type of valve
  - c. Service
  - d. Direction and number of turns to open

D. Concrete Encasement

1. Concrete encasement shall be constructed in accordance with details shown on the Drawings and shall be constructed of Class C concrete. Encasement shall be constructed where;
  - a. Indicated on the Drawings
  - b. The County orders the pipe encased
2. The points of beginning and ending of pipe encasement shall be not more than 6-inches from a pipe joint to protect the pipe from cracking due to uneven settlement of its foundation or the effects of superimposed live loads.

E. Flush Out Connections: Flush out connections shall be installed at the locations as determined by the County and be full pipe size.

F. Service Connections: Service connections shall be installed at the locations determined by the County and in the manner shown on the Drawings. No service line shall terminate under a driveway.

G. Backfilling: Backfilling shall be in accordance with Section 02220 "Excavating, Backfilling and Compacting" of these specifications.

### 3.3 CLEANING

A. General: At the conclusion of the Work, the Contractor shall thoroughly clean the new pipelines by flushing with water or other means to remove all dirt, stones, or other material which may have entered the line during the construction period. Flushing is permitted for pipes less than or equal to 12-inch diameter.

B. Correction of Non-Conforming Work: All non-conforming work shall be repaired or replaced by the Contractor at no additional expense to the County. Non-conforming work shall be defined as failure to adhere to any specific or implied directive of this Project Manual and/or the Drawings, including but not limited to pipe not laid straight, true to the lines and grades as shown on the Drawings, damaged or unacceptable materials, misalignment or diameter ring deflection in pipe due to bedding or backfilling, visible or detectable leakage, or failure to pass any specified test or inspection.

### 3.4 FIELD QUALITY CONTROL

#### A. Flushing

1. All pipelines less than or equal to 12-inches shall be flushed to remove all sand and other foreign matter. After initial slow-fill, pipe shall sit full for 24-hours to facilitate cleaning and collection of debris from interior of pipe. Flushing shall be accomplished through full pipe size connections at full pipe depth. The velocity of the flushing water shall be at least 2.5-feet per second. Flushing shall be terminated at the direction of the County. The Contractor shall dispose of the flushing water without causing a nuisance or property damage. The Contractor shall arrange with the County and pay for the source of flushing water.
2. In lieu of flushing, new water mains may be hydraulically or pneumatically cleaned with a polypropylene swabbing device in accordance with "Orange County Utilities Standards and Construction Specifications Manual."
  - a. The Contractor is responsible to provide temporary access and egress points.
  - b. Passage of the cleaning swabs through the system shall be constantly monitored, controlled, and all poly swabs entered into the system shall be individually marked and identified.
  - c. Cleaning of the system shall be done in conjunction with the initial filling of the system for its hydrostatic test.
  - d. The Contractor is responsible for collection of debris, water, and the swab. Considerations shall be made for protecting surrounding property and personnel.
  - e. Swabbing speed shall range between 2 and 5-feet per second.

#### B. Pressure and Leakage Tests of Pressure Piping

1. General: The Contractor shall perform hydrostatic pressure and leakage tests on all pressure piping. Tests shall be made between valves and shall not exceed 2,000-feet. Each side of all valves shall be pressure tested. Multiple sections of main may be tested simultaneously providing there are non-pressurized sections in between each pressure-tested section.
2. Standard: AWWA C600, Section 4, with the exceptions required herein and the exception that the Contractor shall furnish all gauges, meters, pressure pumps, and other equipment needed to test the lines.
3. Hydrostatic Pressure Test
  - a. Test Pressure: Pressure test at 50% above the normal working pressure, but not less than 150-psi, unless otherwise noted on the Drawings.
  - b. Test Duration: Duration is 2-hours. If during the test, the integrity of the tested line is in question, the County may require a 6-hour pressure test.
  - c. Air Release: Corporation cocks at least 3/4-inch in diameter, pipe riser, and angle globe valves shall be provided at each dead-end to bleed air from the line.
4. Hydrostatic Leakage Test
  - a. General: Following the pressure test, the Contractor shall perform the leakage test. The line shall be filled with water and all air removed for the test. The Contractor shall provide a pump to maintain the test pressure for the entire test period.
  - b. Test Pressure: Maximum operating pressure as determined by the County but not less than 150-psi unless otherwise noted.
  - c. Test duration: 2-hours.

d. Allowable leakage: 
$$L = \frac{SD(P)0.5}{148,000}$$

L = Allowable leakage (gallons per hour)

S = Length of pipe tested (feet)

D = Nominal diameter of pipe (inches)

P = Average test pressure maintained (psig)

- e. Visible Leakage: All leaks evident at the surface shall be repaired and leakage eliminated regardless of the measured total leakage.
- f. Leakage Measurement: The amount of water required to maintain the test pressure is the leakage.

C. Wire Continuity Check: The Contractor shall perform a continuity check of the 10-gauge locating wire for the entire length of the main by performing a continuity test at each valve test station box.

### 3.5 DISINFECTING POTABLE WATER PIPELINES

A. General: Before being placed in service, all potable water pipelines shall be disinfected by chlorination. Taps for chlorination and sampling shall be uncovered and backfilled by the Contractor as required. The disinfection procedure shall be approved by the County.

B. Standard: AWWA 651, "Standard Procedures for Disinfecting Water Mains."

C. Procedure

1. Flush all dirty or discolored water from the line and introduce chlorine in approved dosages through a tap at one end while water is being withdrawn at the other end of the line.
2. The chlorine solution shall remain in the pipeline for 24-hours.
3. Following the chlorination period, all treated water shall be flushed from the line and replaced with water from the distribution system.
4. Bacteriological sampling and analysis shall be made in full accordance with AWWA Manual C651 and the appropriate FDEP permit. If necessary, the Contractor will be required to re-chlorinate.
5. Sampling and analysis shall be done by the County.

D. Approval: The line shall not be placed in service until the requirements of the State and County Public Health Department are met and the bacteriological test results are approved by the Department of Environmental Protection.

### 3.6 CONNECTION TO EXISTING SYSTEM

A. All connections to existing mains shall be made after complete disinfection of the proposed system and shall be made under the direction of the County. Valves separating the mains being installed from existing mains shall be operated by or under the direction of the County. The cost of the Work in making the connections shall be paid for by the Contractor.

- B. In the event the proposed main is to be connected to a main which has one or more active services between the point of connection and the first existing line valve, a temporary plug or cap shall be installed on the new main until the pressure tests and disinfecting are completed. Upon satisfactory completion, the cap or plug shall be removed from both mains and the connection made with pipe which has been swabbed out with a solution of chlorine and water. The connection shall be made as swiftly as possible and any water in the ditch shall be kept below the level of the pipe. The pipeline shall then be placed in service by the County's personnel.
- C. In the event any existing users will be without water while a connection is being made, the Contractor shall notify the County 72-hours prior to disconnection. The County shall notify the affected user(s) when the water will be turned off and when the service is estimated to be resumed. In some instances, these connections may have to be made at night. No user shall be without water service for more than 3-hours.

### 3.7 SUPPLIER'S FIELD SERVICE:

- A. The Contractor shall, at no additional cost to the County, arrange for a pipe supplier's field representative to be on-site to provide instruction to each crew working on the installation for a minimum of 4 push-on joints (PVC, DIP). The supplier's field representative shall certify that the installations observed were satisfactorily completed and all pipe installation crews were familiar with the proper methods and procedures for the pipeline installations.

### 3.8 WATER FOR USE IN FLUSHING, TESTING, AND DISINFECTION:

- A. The Contractor shall arrange with the County for water required for pressure testing, flushing, and disinfection required by the Contractor. The Contractor shall provide meter and backflow preventer.

END OF SECTION

**SECTION 13440**  
**UNI-DIRECTIONAL FLUSHING**

**PART 1 GENERAL**

Work on this Contract consists of reviewing existing UDF plans, confirmation of existing plans or recommendations for revision to such plans with County, establishing a schedule, and phasing for completion of the UDF; including field services and data collection, and conducting the flushing program in accordance with these Specifications and Requirements.

The Contractor shall furnish all labor, materials, equipment, personal protective equipment, tools, supervision, transportation and other incidentals as required to provide services on this contract.

County intends to assign approximately 300 miles of distribution network piping to the UDF program annually. The system consists of three major service areas with approximately 1,800 total miles of pipe.

1.1 QUALIFICATIONS

- A. Refer to Section 01101 for requirements

1.2 SCOPE OF WORK

- A. Contractor shall provide all labor, equipment, and materials to implement the uni-directional flushing program and collect and document data in accordance with these specifications and the approved OCU Uni-Directional Flushing Plans.
- B. Contractor shall review existing UDF plans and recommend modifications, if needed.
- C. Contractor shall provide all labor, equipment, and materials to perform the flushing.
- D. The work shall include valve, hydrant and blow-off valve location, survey, exercising, inspection, and evaluation as specified in Section 13441
- E. The UDF program will be performed within distribution system areas, divided into sequences. The following table provides a summary of the general UDF work per year. Actual work per year may vary.

Year	Area	Miles of Pipe	No. of Sequences
Basic Year	West 1	50.9	48
Basic Year	West 2	65.2	61
Basic Year	West 3	48.4	40
Basic Year	West 4	53.4	42
Basic Year	West 5	33.4	25
Basic Year	West 6	31.0	29
Basic Year	West 7	46.3	33
Basic Year	Added pipe	5.0	4
<b>Basic Year</b>	<b>Total</b>	<b>335.5</b>	<b>282</b>
Option Year 1	West 8	60.2	35
Option Year 1	West 9	60.8	36
Option Year 1	West 10	132.0	122
Option Year 1	South 1	70.1	46
Option Year 1	South 2	52.1	43
Option Year 1	Added pipe	10.0	8
<b>Option Year 1</b>	<b>Total</b>	<b>385.1</b>	<b>290</b>
Option Year 2	South 3	68.6	48
Option Year 2	South 4	31.0	27
Option Year 2	South 5	67.1	53
Option Year 2	East 1	44.1	30
Option Year 2	East 2	57.4	37
Option Year 2	East 3	53.0	40
Option Year 2	Added pipe	5.0	4
<b>Option Year 2</b>	<b>Total</b>	<b>326.2</b>	<b>239</b>
Option Year 3	East 4	39.3	40
Option Year 3	East 5	40.3	35
Option Year 3	East 6	56.9	48
Option Year 3	East 7	29.7	24
Option Year 3	East 8	63.2	54
Option Year 3	East 9	48.0	48
Option Year 3	East 10	52.2	46
Option Year 3	Added pipe	5.0	4
<b>Option Year 3</b>	<b>Total</b>	<b>334.5</b>	<b>299</b>
Option Year 4	East 11	81.7	67
Option Year 4	East 12	121.4	97
Option Year 4	East 13	29.1	29
Option Year 4	East 14	46.1	37
Option Year 4	East 15	35.2	23
Option Year 4	Added pipe	5.0	4
<b>Option Year 4</b>	<b>Total</b>	<b>318.5</b>	<b>257</b>
	<b>Grand Total</b>	<b>1697.8</b>	<b>1367</b>

- F. Current Orange County Utilities Uni-Directional Flushing Plans are available for review at OCU

### 1.3 SUBMITTALS

- A. Uni-Directional Area Flushing Plans
- B. Flushing Sequence Plans
- C. Flushing observation forms
- D. Project signage
- E. Final report hard copy and electronic

## **PART 2 PRODUCTS (NOT USED) PART 3 EXECUTION**

### 3.1 SEQUENCE

- A. Contractor shall conduct water valve, hydrant and blow-off valve assessment/exercising/preventative maintenance prior to execution of the UDF. Refer to Specification Section 13441.
- B. Contractor shall review, update and propose modifications to County Unidirectional Flushing Plans and flushing sequencing plan for each designated area of the water system. The current County UDF plan is available for review upon request.
- C. Contractor shall develop and submit a plan (Daytime/nighttime work, start time, flushing hours per day etc.), schedule (Flushing sequences) and phasing (Breakdown areas in the service area so customers can be informed prior to flushing) for completion of the UDF at least 2 weeks in advance of starting the work for each flushing sequence. Flushing operations shall be ceased by 5:00 pm during normal work hours and by 6:00 am during night work hours.
- D. Execute the uni-directional flushing program and flushing sequencing plan of the water system.
- E. Reports will be sent to County on a weekly basis. Contractor shall provide a final report documenting on all findings (i.e., visual observations, chlorine residual, etc.) including a map and list of all valves and fire hydrants that need to be repaired or replaced.
- F. Prepare and submit UDF report

### 3.2 UDF PLAN REVIEW

- A. The Contractor will provide qualified personnel to review, plan and develop the UDF flushing models and plans.
- B. The Contractor shall meet with the County, as necessary to update the models and plans.
- C. The Contractor shall review existing plans, maps, records and perform field visits as necessary to develop the updated models and plans.
- D. The UDF flushing models and plans shall be submitted to the County via electronic format acceptable to the County and hardcopy format for review and approval prior to commencing any work on this contract.

### 3.3 FLUSHING

- A. Contractor shall dechlorinate all water discharged during flushing and hydrant fire flow tests.
- B. All contract work shall be performed in accordance with the following County flushing requirements and under County supervision and direction. Flushing requirements are:
  - 1. Sufficient flow for minimum of 3 feet per second
  - 2. Water turnover 3 times
  - 3. Minimum flushing residual pressure at each target hydrant: 20 psi
- C. Contractor shall provide all labor, equipment and materials to implement the flushing. Contractor shall conduct and document a “white bucket test” before closing the hydrant and note characteristics of the water (i.e. color and particles – intensity and time required to disappear). Contractor shall collect and document, at a minimum, the data included in the Job Plans in Appendix J. The flushing data includes, but is not limited to, the following:
  - 1. Observations
    - a. Contractor shall document any abnormal color conditions (i.e. brown, orange, yellow, cloudy/milky colored water) and the length of time it takes to for the water to appear clear.
    - b. Contractor shall document any abnormal odor conditions (i.e. rotten eggs [H<sub>2</sub>S], chlorine, musty, or chemical) and time it takes for odor to clear, if applicable.
  - 2. Flushing times
  - 3. Water volume
  - 4. Water quality

- a. Turbidity at start and end of flush
- D. Contractor shall document the results of the flushing implementation in Unidirectional Flushing Sequence Data Sheet or equivalent as approved by County.
- E. UDF Reports are to be sent to the County on a weekly basis
- F. Contractor shall provide a Final Report for each UDF Area documenting all findings including, but not limited to:
  - 1. Descriptive summary of work performed
  - 2. Completed Sequence Sheets
  - 3. Summary table of condition assessment for each asset group: Hydrants, Valves and Blow-off Valves
  - 4. Water discharged table
    - a. Condition assessments
    - b. Flushing
    - c. Hydrant Flow Tests
  - 5. Hydrant Fire Flow Test Forms
  - 6. Hydrant Fire Flow Test Data conforming to Job Plan (see Appendix J)
    - a. Test Hydrant
    - b. Flow Hydrant
    - c. Static Pressure
    - d. Residual Pressure
    - e. Pitot Reading
    - f. Test Flow
    - g. Flow at 20 psi
  - 7. Table of Turbidity start and end readings at each flush point
  - 8. Table of aesthetic condition of water at each flush point and time to clear
  - 9. Table of pipe flushed by size, length and capacity

### 3.4 HYDRANT FIRE FLOW TESTS

- A. Contractor shall perform fire flow tests as designated by OCU.
- B. Hydrant flow tests shall be performed in accordance with OCU Standard Operating Procedures included in Appendix I.

### 3.5 FLUSHING PRECAUTIONS

- A. Contractor shall protect property from damage during flushing and prevent hazardous conditions. Damage control measures include, but are not limited to, the following:
  - 1. Avoid washing out driveways and sodded areas
  - 2. Direct water streams away from traffic and public
  - 3. Open and close hydrants slowly to avoid water hammer

4. Control pedestrian and automobile traffic during flushing
5. Tighten all unused hydrant caps
6. Avoid standing in front of closed caps
7. Avoid leaning over the top of hydrants while in operation
8. Avoid flowing hydrants where adequate drainage is not provided
9. Review routing of discharged water avoid damage of downstream facilities or property

3.6 DATA DELIVERABLES

- A. All valve information, including location, exercise, inspection, and assessment data shall be delivered in a format that can be directly imported into the County Maximo Computerized Maintenance Management System. Refer to Section 13441 for details on valve program.
- B. UDF reports shall be submitted in hard copy and electronic format. Electronic files shall be compiled PDF along with the native files (e.g. Excel, Word, etc.).

3.7 NOTIFICATIONS AND COORDINATION

- A. The Contractor shall coordinate all schedules with the County to ensure proper customer notification and SCADA notification prior to flushing.
- B. County and the Contractor will be responsible for notifying OCU SCADA and customers of the flushing times and locations and coordinating the flushing with County staff.
- C. Signage notifying public of UDF to be provided by the Contractor. Signs shall be minimum 48 inch x 48 inch. Contractor shall submit proposed signage to the County for approval.

3.8 MAINTENANCE OF SERVICE

- A. The Contractor shall maintain water service throughout all testing.

3.9 PERIOD OF PERFORMANCE/DELIVERY

- A. Work included in this contract shall be completed within the contract year.

END OF SECTION

## SECTION 13441

### VALVE OPERATION AND EVALUATION PROGRAM

#### PART 1 GENERAL

The water valve operation and evaluation program will serve the following purposes:

- To evaluate and improve the usability of large and critical valves in the water distribution system through hands-on field activities.
- To perform preventative maintenance.
- Prioritize the repair and replacement of large critical valves

#### 1.1 SUMMARY

- A. The Contractor shall develop, plan and execute a valve operation, evaluation, improvement/repairs and information management program that uses the County's Maximo Computerized Maintenance Management System as the data repository. This program will include the following activities:
1. Locate valves
  2. Identify and mark valves
  3. Clean out valve boxes
  4. Inspect valves
  5. Exercise valves
  6. Assess valves
  7. Perform minor repairs as directed
  8. Document valve attributes
- B. The Contractor shall support the County to further develop the County's valve inventory in Maximo in close coordination with the County Field Services Division to prioritize all inspections, work with the County Hydraulic Modeling Group to establish valve criticality for each valve in the system and analyze the results of the large valves in the County water and reclaimed water distribution and wastewater collection systems.
- C. Contractor shall provide all labor, equipment, and materials to implement the valve program as described herein. The following scope of services details specific functions to be provided by the Contractor.
- D. Under the direction of the County, the Contractor may be required to prioritize the evaluation program based on the size of the valves and their locations.

- E. Valve operation and evaluation activities as described herein are to be performed on all water valves as part of the Uni-Directional Flushing Program (refer to Section 13440) and other valves as identified by the County .

## **PART 2 PRODUCTS (NOT USED)**

## **PART 3 EXECUTION**

### **3.1 VALVE LOCATES**

- A. The County will provide electronic copy of the County’s Geographical Information System (GIS) containing the most current water, wastewater and reclaimed water distribution maps, and access to the Plan File application for accessing construction drawings.
- B. For valves that have GPS coordinates in the GIS, the Contractor is not required to capture coordinates.
- C. For valves that do not have coordinates in the GIS, the Contractor shall capture coordinates in accordance with the requirements herein.
- D. The County shall provide the Contractor with a geodatabase containing all valve assets included in this contract.
- E. The Contractor shall locate all valves in Uni-directional flushing areas and other valves 14” and larger as identified by the County using the following guidelines:
  - 1. The Contractor will search for all valves visually using the County GIS maps, as-built drawings, and the GPS coordinates (for valves previously located).
  - 2. If the valve cannot be located, the Contractor will perform a GIS search for the valve to get approximate coordinates. The Contractor shall search for valves shown, but not found by visual inspection, using a magnetic locator, probing rods and other tools.
  - 3. If, after searching for a minimum of 15 minutes, the valve still is not found, the Contractor shall mark the valve as “Not Found” and create a work order request for the County to locate.
- F. All the assets located that do not have GPS coordinates in the County GIS are to be GPS mapped within sub-foot accuracy. Contractor shall provide all equipment necessary to collect location data to meet the County accuracy requirements.
- G. Contractor shall utilize a locator pole/tripod with bubble level when collecting GPS coordinates.

- H. Attribute data will be delivered weekly, or more frequently, in a geodatabase feature class compatible with the existing County data schema. The schema is included in Appendix H.
- I. Coordinate data shall be field collected with autonomous GPS readings and real-time corrections via the Florida Permanent Reference Network (FPRN).

### 3.2 VALVE IDENTIFICATION

- A. Each valve will be identified by its corresponding County asset identification number derived from the GIS.
- B. In cases where Asset ID's are not available, the Contractor shall contact the County and the County will provide the appropriate asset number.
- C. Contractor shall verify the presence of the ID tag for each valve and note any missing, illegible or damaged tags.
- D. Contractor shall repaint pavement/curb markings near valves and paint valve box covers according to the Valve Exercise Operation SOP located in Appendix I.

### 3.3 ACCESS VALVES

- A. Some valves are located in an easement or right-of-way and accessibility of valves will require additional clearing and four wheel drive vehicle or all-terrain vehicles for access.
- B. The valve and/or manhole cover shall be removed by the Contractor in order to access the valve.
- C. If, after attempting to remove the valve cover it is clear that the cover is "stuck" the cover shall be broken by the Contractor in such a manner so as not to cause the lid to fall into the valve vault and damage the valve and/or its operating mechanisms. The Contractor shall install a new cover provided by County.
- D. For valves located within roadways, Contractor shall replace any non-heavy duty valve box covers with heavy duty covers. Heavy duty covers will be provided by the County.

### 3.4 CLEAN OUT VALVE BOX/VAULT

- A. The Contractor shall pump out the water in the vault in accordance with County guidelines and discharge policies, and ventilate the confined space prior to entering the vault.
- B. The Contractor shall have an established program conforming to all OSHA requirements regarding confined space entry and permits.

- C. The Contractor shall vacuum out debris or pump out water from the box/vault in order to allow access to the valve operating nut and exposing both external gearing and bonnet bolts for inspection prior to operation. In every case the operating nut must be exposed and clearly visible (not under water or debris) when the valve is exercised.
- D. The Contractor must provide an industrial vacuum and water pump with every work crew.
- E. Valve bodies will be cleaned utilizing primary conventional methods with hand tools (wire brush, rags, etc.). However in some cases it may also become necessary for the Contractor to provide a pressure washer in order to remove hardened sediment from the valves so that inscriptions and manufacturer identification markings may be uncovered. As such, the Contractor shall make a gasoline powered pressure washer available on each crew truck.
- F. The project as a whole will require, from time to time, industrial vacuums with pressure washer system with excavation capabilities capable of removing large debris from vaults. The County will provide a location for discarding materials vacuumed out of the valve structures.

### 3.5 INSPECTION AND PREVENTIVE MAINTENANCE

- A. The Contractor shall conduct a detailed inspection and perform preventative maintenance of all valves and hydrants following the County valve inspection guidelines included in Appendix I and document all data in accordance with the Maximo Required Data included in Appendix J.
- B. The Contractor will execute a visual inspection of each asset. This inspection will be conducted from street level and is intended to discover discrepancies that are readily visible from above ground. Inspection Items include, but are not limited to:
  1. Pavement or sidewalk marking
  2. Lid and valve box relation to ground/pavement surface (raised, sunken, buried, etc.)
  3. Lid and valve box paint and condition (refer to marking section)
  4. Depth to operating nut
  5. Operating nut and extension condition
  6. Presence and condition of locating wire
  7. Presence of identification tags on valve collar in unpaved areas, or attached to valve box locating wire
  8. Valve position at arrival
- C. Valve Inspection and Preventative Maintenance
  1. Contractor shall perform inspection and preventative maintenance of all valves located within UDF sequences.
  2. Contractor shall perform valve inspection and preventative maintenance in

accordance with the Valve S.O.P. Checklist/Job included in Appendix I.

D. Hydrant Inspection and Preventive Maintenance

1. Contractor shall perform inspection and preventative maintenance of all hydrants located within UDF sequences.
2. Contractor shall perform hydrant inspection and preventative maintenance in accordance with the Hydrant S.O.P Checklist/Job Plan included in Appendix I.

E. Blow-off Valve Inspection and Preventive Maintenance

1. Contractor shall perform inspection and preventative maintenance of all blow-off valves located within UDF sequences.
2. Contractor shall perform blow-off valve inspection and preventative maintenance in accordance with the Blow-off Valve S.O.P. Checklist/Job Plan included in Appendix I.

### 3.6 VALVE OPERATION AND TESTING

- A. If a red tag or red paint is found under the valve box cover lid, DO NOT continue with valve operation without contacting the Field Service Center at (407)836-6818.
- B. The Contractor shall operate each valve based on an approved plan for each valve size and type encountered in this program. The plan requirements are included in the Valve S.O.P. Checklist/Job Plan and Manual Valve Exercise Operation SOP included in Appendix I. Appendix J includes the required data to be documented and reported to the County.
- C. The Contractor will be required to test and operate all assigned valves and make numerous observations about the condition, operability and functionality of each asset. Observations are to be meticulously documented electronically while linking them directly to earth coordinates via GPS.
- D. All valves shall be initially operated using the exercise mode of the valve operating machine.
- E. The Contractor shall not exceed torque values shown in chart below nor exceed 300 ft- lbs without notification and approval in writing from the County.
- F. Contractor shall perform leak sounding on all valves and hydrants. Suspected leaks shall be reported to the County for follow-up pinpointing activity. Sound shall be categorized as "strong", "possible", or "none".
- G. Prior to the operation of any valve in the County system, a bi-weekly schedule shall be submitted to the Utility Services Team for coordination and approval.
- H. Specific valve operating guidelines are to be provided by the Contractor making note of different sizes and types. The guidelines shall be approved by the County. At a minimum the Contractor should include:
  1. Specific operating procedures and torque limits for all butterfly, gate and plug valves.

2. Detailed, written valve exercising processes that will be used by its operating crews that will include torque limits for every valve type and size anticipated in the scope of this program
  3. Notification procedures for any valves found closed or any unsafe conditions that are observed.
  4. Specific procedures if a bypass valve is in place.
- I. The Contractor shall utilize a microprocessor controlled valve operating machine that records torque data during each rotation for valves 12 inches and larger. The Contractor may use a microprocessor controlled valve operating machine for valves less than 12 inches if chosen. Starting torque and ending torque shall be documented and reported for any valve operated using a controlled valve operating machine, regardless of size.
- J. Contractor shall exercise all located valves. The following information, at a minimum, shall be collected on all valves exercised and inspected.
1. Physical data
  2. Asset ID number, map number, valve size, type of valve, use of valve, valve structure, depth of valve, if clean out was necessary, valve discrepancies (categories and details), box/vault discrepancies (categories and details) and additional physical information as necessary
  3. Location data
  4. GPS position and coordinate data items as noted above
  5. Operational data
  6. Turns to fully close (all valve sizes), torque (all valves 12 inches and larger and those turned using valve machine), close direction (all valve sizes), torque chart including starting and ending torque (valves 12 inches and larger and those turned using valve machine), specific operational discrepancies (categories and details), additional operational comments as necessary
  7. Discrepancies and operational issues
  8. Detail on discrepancies and operational issues so that a work order (as described below) can be concisely created
  9. Leak sounding results
- K. The Contractor will exercise each valve a minimum of two cycles and operations and exercising will continue until operating torque stabilizes without measurable decreases and valve turn count stabilized without measurable increases. (Exercise is defined as a full cycle). It is expected that many valves in this program will be partially operated (not fully closed) due to hydraulic conditions.
- L. All valves will be exercised at the lowest operational torque. More explicitly, torque will be reduced immediately following initial movement of the valve to the lowest foot-pound required to continue moving the valve.

- M. Torque charts will be submitted to the County in .JPG format named by the Asset ID and Date; this name will appear in both the ESRI GIS feature class for valves and in the corresponding asset table record fields where directed by the County.
- N. The following torque limit specifications have been gathered (from the AWWA and valve manufacturers). Valves not operating at these torque limits will be considered frozen and a work order will be created. If requested by the County the Contractor will apply additional methods and/or torque in an attempt to free up the frozen valve.

<b>Maximum Industry Standard Torque Limit Guidelines (in ft#'s)</b>				
<b>Valve Size</b>	<b>Non-Geared</b>	<b>Bevel Geared</b>	<b>Spur Geared</b>	<b>Butterfly</b>
2 inch	225			
4 inch	225			
6 inch	225			
8 inch	225			
10 inch	225			
12 inch	225	132	123	
14 inch	225	75	118	
16 inch	225	162	118	
18 inch	225	162	144	
20 inch	300	177	157	300
24 inch	325	127	120	300
30 inch	450	177	167	300
36 inch	550	162	156	300
42 inch	700	206	199	300
48 inch	800	235	227	300
54 inch	850	240	227	300
60 inch	900	250		300
72 inch				300
96 inch				300

- O. The Contractor and the County will agree to a standard operating protocol to be executed when out of position valves are encountered for both open and closed valves prior to startup of field operations.
- P. Due to the potential condition or deterioration of assets the Contractor will not be held liable for any assets that fail or break or the consequences of such failures or breaks, provided the Contractor is diligent and performs the operations in accordance with these specifications and as agreed in the project plan.
- Q. Contractor shall maintain records of valve exercising torque. If assets fail or break during operation, the Contractor shall **immediately** notify the County Project Manager

or designee and create a work order request and the valve will be repaired or replaced by County.

### 3.7 VALVE MARKING

- A. Valve lid covers will be marked with marking paint as the inspection and exercising process is completed. The mark is intended to provide field evidence of work completed at an individual valve and will also assist any future crews in locating the valve in a timely manner. Marking is as follows:
  - 1. Blue – water valve
  - 2. Red – water life support valve
  - 3. Green – wastewater valve. In addition to green paint a white dot shall indicate quarter turn valves.
  - 4. Purple – reclaimed water valve
- B. Marking paint will be provided by the County
- C. As directed by County (valve markers may be installed and/or replaced in non-paved areas.

### 3.8 VALVE REPAIRS

- A. The Contractor shall provide minor repairs as they are encountered throughout this program as requested and authorized by the County.
  - 1. Minor repairs are defined as repairs that can return a valve to full operability and do not require backhoe excavation or breaking the pressure barrier of the water system
  - 2. Minor repairs include the following:
    - a. Raising valve boxes in asphalt including locate the paved over valve, cut asphalt (small cut), jackhammer down to the cover, apply risers to raise to existing street level, backfill with compacted material and patch with cold patch material. Materials (risers and cold patch) are to be provided by the County.
    - b. Raising valve boxes in outside of paved areas including locate the buried valve, dig down to the cover, apply risers to raise to existing ground level, backfill with compacted soil. Materials (risers) are to be provided by the County.
    - c. Re-alignment of the valve boxes (in paved and unpaved areas). Misaligned valve boxes will be excavated using high-pressure water and vacuum system and re-aligned to allow proper operation.
    - d. Replacement of rounded or missing operating nuts (buried valves). The Contractor shall gain access to the lower section of roadway boxes by utilizing vacuum excavation if necessary or other means within the water main

easement including but not limited to traffic control, removal and installation of roadway boxes, temporary restoration of pavement, grubbing and seeding. The Contractor shall remove any existing operation nut pieces from the valve stem and lower section of the roadway box, removing existing operating nut screws, re-tap the stem when necessary and securely install an operating nut. Valve box sections, lids, asphaltic cement, stone backfill will be provided by the County.

e. Install hydrant chains

3. For all repairs requiring surface restoration, the Contractor shall provide sketch of necessary restoration, photos and submit a request for a follow up work order in Maximo (to be performed by others).

### 3.9 EQUIPMENT AND SOFTWARE

- A. The Contractor agrees to furnish to the County all necessary materials, equipment, and labor to complete the Valve Operation and Evaluation Program in accordance with the provisions, instructions and specifications.
- B. The Contractor must use a microprocessor controlled hydraulic valve turning machine with the capability to assure that all large valves 16” and greater in size can be safely operated. Contractor shall submit for approval the make, model, year and operating system version for the proposed hydraulic valve turning equipment. Identify the software system used for creating torque charts – including version.
- C. The Contractor shall use an industrial vacuum with at least a 500 gallon holding capacity and water pump with a minimum pumping capacity of 300 GPM. The Contractor shall provide a large industrial vacuum with water jetting capability which may be used for vacuum excavation. The Contractor shall submit for approval the make, model, year of the industrial vacuum with at least a 500 gallon holding capacity and a pump with a minimum pumping capacity of 300 GPM.
- D. The Contractor will plainly identify the sub-foot GPS survey instruments and methodology proposed for collecting coordinate and observational data for this program. The Contractor will identify software systems for data collection, post processing, filtering and editing positional data - including version, upon request. The Contractor may use equipment, as approved by the County, to capture coordinate data but must prepare the data to be compatible with the required check-in procedures..

### 3.10 ADDITIONAL REQUIREMENTS

- A. Before field operations commence, a meeting to be attended by the Contractor and County project personnel will be held to reach alignment on specific data schemas to be employed. It is at this juncture that the Contractor and the County will agree on which specific attributes will be collected, validated and delivered, the format this data will conform to, and the final repository for all collected and calculated information

within County data infrastructure so that it can be appropriately mapped and accessed by County staff.

B. Quality Assurance (QA) and/or Quality Control (QC)

1. Contractor shall submit a detailed QA and/or QC plan identifying quality checkpoints throughout the program lifecycle. The plan shall address GPS locate QA/QC as well as asset data collection QA/QC.
2. The GPS locate plan shall describe methods for developing sub-foot horizontal accuracy and accurate attribute data collection and management.
3. Asset data submitted shall conform to OCU data requirements, including, but not limited to valid entries for various data fields. The County will provide a library of valid entries.
4. All submitted data will be checked and validated by OCU prior to loading into the County Computerized Maintenance Management System. Payment will only be made after submitted data is accepted by the County.

C. The Contractor shall provide web based access to field activity data, work assignments and work orders

D. Work Orders

1. The Contractor will notify the County of any valves not located or requiring repairs to bring the valve or hydrant to 100% operability.
2. Notification to the County shall be via email to [UD-FSC@ocfl.net](mailto:UD-FSC@ocfl.net). The email shall contain, at a minimum, the following information:
  - a. Asset ID
  - b. Map number
  - c. Specific valve or hydrant discrepancy (category and details)
  - d. Specific repair activity initially required to return the valve to full operability

### 3.11 SCHEDULE

- A. The Contractor shall develop an overall schedule of work to be approved by the County prior to the commencement of work.
- B. The County shall approve the work schedule in bi-weekly increments so as to provide proper coordination with other large main and/or large valve activities in which other County teams are involved.
- C. The Contractor shall not commence any valve exercising/operation activities prior to approval by the County

### 3.12 SAFETY

- A. The Contractor shall abide by all OSHA (Federal and State of Florida) safety regulations in the fulfillment of this scope of services.
- B. The Contractor shall provide all traffic control services necessary to insure a safe working environment for the fulfillment of the contract.
- C. As a requirement to perform this scope of work safely, each crew will have a minimum of two workers.
- D. All work vehicles will be equipped with amber warning lights, strobe lights, directional arrow board lights, communications equipment and will clearly identify the Contractor.
- E. If necessary, the Contractor shall switch to night time operations if traffic control and safety become a factor in the completion of services.
- F. Contractor shall comply with the requirements of Orange County Utilities Safety Handbook

### 3.13 PROFESSIONALISM

- A. The Contractor shall insure that all activities are conducted in a professional manner.
- B. At a minimum the Contractor shall ensure all personnel are in an approved uniform; all field equipment is maintained clean and neat; all trucks are clearly identified with the Contractor's name and contact phone number and written procedures for field operations and information management processes are contained within the vehicle in an operations manual.

### 3.14 DOCUMENTATION

- A. The Contractor will provide applicable asset data in a spatially accurate format compliant with the County data structure.
- B. Metadata, including a detailed citation describing field data collection practices, equipment settings, post processing procedures, base stations used for differential correction and expected accuracy, are to be submitted with final and interim data deliveries. The database shall contain the information agreed with the County.
- C. All map documents shall be supplied in .PDF format and saved as ESRI map document files delivered individually.
- D. The Contractor will supply the following maps and reports to the County:
  - 1. Valve Operability – a detailed summary of operability before and after asset inspection and exercising was performed. Accompanying this report will be a map record of inoperable and valves in the wrong position.

2. Frozen Valve – a detailed summary accompanied by a map depicting frozen valves.
3. Opened Work Orders – a detailed summary of work orders created on the County valve assets This report will be accompanied by a map document showing location detail
4. Monthly Leak Sounding Report – A report identifying the location and intensity of all leak sounds.
5. All valve information, including location, exercise, inspection, and assessment data shall be delivered in a spreadsheet or database with data fields consistent with County CMMS field names. Refer to Appendix J for Maximo Required Data.

### 3.15 DELIVERABLE PRESENTATION

- A. The Contractor shall evaluate and analyze the results of the program and develop a deliverable presentation for the County.
- B. The presentation will include an analysis of the results of the program, findings, suggestions and recommendations for the County.

### 3.16 REFERENCES

- A. Orange County Utilities Uni-Directional Flushing Plans (available for review at the County)

### 3.17 SUBMITTALS

- A. Valve assessment forms

- B. Populated spreadsheet or database with valve data and condition assessment (refer to Appendix J)
- C. Valve operation documentation
- D. Equipment specifications
- E. Personnel qualifications/certifications
- F. Quality Control/Quality Assurance Plan
- G. Project signage
- H. Final report hard copy and electronic

### 3.18 NOTIFICATIONS AND COORDINATION

- A. The County and the Contractor will be responsible for notifying customers of the flushing times and locations and coordinating the flushing with County staff.
- B. Signage notifying public of UDF will be provided by the County and installed by Contractor.

END OF SECTION

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# **APPENDIX G**

## **ORANGE COUNTY UTILITIES**

### **DEWATERING DISCHARGE OFF-SITE**

- **Orange County Environmental Protection Division Work Instruction**
- **Generic Permit for the Discharge of Produced Ground Water From any Non-Contaminated Site Activity**
- **FDEP Notice of New Method for Mercury Testing**
- **Memo – EPA - Analytical Methods for Mercury in NPDES Permits**

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**STATE OF FLORIDA**

**DEPARTMENT OF ENVIRONMENTAL PROTECTION**

**GENERIC PERMIT**

**FOR THE**

**DISCHARGE OF PRODUCED GROUND WATER**

**FROM ANY NON-CONTAMINATED SITE ACTIVITY**

**Generic Permit for the Discharge of Produced Ground Water from any Non-Contaminated Site Activity**

(1) The facility is authorized to discharge produced ground water from any non-contaminated site activity which discharges by a point source to surface waters of the State, as defined in Chapter 62-620, F.A.C., only if the reported values for the parameters listed in Table 1 do not exceed any of the listed screening values. Before discharge of produced ground water can occur from such sites, analytical tests on samples of the proposed untreated discharge water shall be performed to determine if contamination exists.

(2) Minimum reporting requirements for all produced ground water dischargers. The effluent shall be sampled before the commencement of discharge, again within thirty (30) days after commencement of discharge, and then once every six (6) months for the life of the project to maintain continued coverage under this generic permit. Samples taken in compliance with the provisions of this permit shall be taken prior to actual discharge or mixing with the receiving waters. The effluent shall be sampled for the parameters listed in Table 1.

Table 1

Parameter	Screening Values for Discharges into:	
	Fresh Waters	Coastal Waters
Total Organic Carbon (TOC)	10.0 mg/l	10.0 mg/l
pH, standard units	6.0-8.5	6.5-8.5
Total Recoverable Mercury	0.012 µg/l	0.025 µg/l
Total Recoverable Cadmium	9.3 µg/l	9.3 µg/l
Total Recoverable Copper	2.9 µg/l	2.9 µg/l
Total Recoverable Lead	0.03 mg/l	5.6 µg/l
Total Recoverable Zinc	86.0 µg/l	86.0 µg/l
Total Recoverable Chromium (Hex.)	11.0 µg/l	50.0 µg/l
Benzene	1.0 µg/l	1.0 µg/l
Naphthalene	100.0 µg/l	100.0 µg/l

(3) If any of the analytical test results exceed the screening values listed in Table 1, except TOC, the discharge is not authorized by this permit.

(a) For initial TOC values that exceed the screening values listed in Table 1, which may be caused by naturally-occurring, high molecular weight organic compounds, the permittee may request to be exempted from the TOC requirement. To request this exemption, the permittee shall submit additional information with a Notice of Intent (NOI),

described below, which describes the method used to determine that these compounds are naturally occurring. The Department shall grant the exemption if the permittee affirmatively demonstrates that the TOC values are caused by naturally-occurring, high molecular weight organic compounds.

(b) The NOI shall be submitted to the appropriate Department district office thirty (30) days prior to discharge, and contain the following information:

1. the name and address of the person that the permit coverage will be issued to;
2. the name and address of the facility, including county location;
3. any applicable individual wastewater permit number(s);
4. a map showing the facility and discharge location (including latitude and longitude);
5. the name of the receiving water; and
6. the additional information required by paragraph (3)(a) of this permit.

(c) Discharge shall not commence until notification of coverage is received from the Department.

(4) For fresh waters and coastal waters, the pH of the effluent shall not be lowered to less than 6.0 units for fresh waters, or less than 6.5 units for coastal waters, or raised above 8.5 units, unless the permittee submits natural background data confirming a natural background pH outside of this range. If natural background of the receiving water is determined to be less than 6.0 units for fresh waters, or less than 6.5 units in coastal waters, the pH shall not vary below natural background or vary more than one (1) unit above natural background for fresh and coastal waters. If natural background of the receiving water is determined to be higher than 8.5 units, the pH shall not vary above natural background or vary more than one (1) unit below natural background of fresh and coastal waters. The permittee shall include the natural background pH of the receiving waters with the results of the analyses required under paragraph (2) of this permit. For purposes of this section only, fresh waters are those having a chloride concentration of less than 1500 mg/l, and coastal waters are those having a chloride concentration equal to or greater than 1500 mg/l.

(5) In accordance with Rule 62-302.500(1)(a-c), F.A.C., the discharge shall at all times be free from floating solids, visible foam, turbidity, or visible oil in such amounts as to form nuisances on surface waters.

(6) If contamination exists, as indicated by the results of the analytical tests required by paragraph (2), the discharge cannot be covered by this generic permit. The facility shall apply for an individual wastewater permit at least ninety (90) days prior to the date discharge to surface waters of the State is expected, or, if applicable, the facility may seek coverage under any other applicable Department generic permit. No discharge is permissible without an effective permit.

(7) If the analytical tests required by paragraph (2) reveal that no contamination exists from any source, the facility can begin discharge immediately and is covered by this permit without having to submit an NOI request for coverage to the Department. A short summary of the proposed activity and copy of the analytical tests shall be sent to the applicable Department district office within one (1) week after discharge begins. These analytical tests shall be kept on site during discharge and made available to the Department if requested. Additionally, no Discharge Monitoring Report forms are required to be submitted to the Department.

(8) All of the general conditions listed in Rule 62-621.250, F.A.C., are applicable to this generic permit.

(9) There are no annual fees associated with the use of this generic permit.



# Department of Environmental Protection

## Notice of New Method for Mercury Testing

### New Method for Mercury Testing Has Been Approved

In accordance with Rule 62-620.610, Florida Administrative Code (F.A.C.), all sampling and monitoring data, required to be reported to the Department, shall be collected and analyzed in accordance with Rule 62-4.246, Chapters 62-160 and 62-601, F.A.C., and 40 CFR 136, as appropriate. Effective August 25, 2003, Chapter 62-620, F.A.C., was revised to adopt, and incorporate by reference, various sections of Title 40 of the Code of Federal Regulations revised as of July 1, 2003, including the revised 40 CFR 136. The revised 40 CFR 136 includes a new method for low-level mercury analysis, EPA Method 1631(Revision E), Mercury in Water by Oxidation, Purge and Trap, and Cold Vapor Atomic Fluorescence Spectrometry (Method 1631E).

### Who is Required to Use Method 1631E?

Applicants for a wastewater facility permit and wastewater facility permittees are now required to use the low-level mercury Method 1631E when reporting results associated with water quality standards (WQSs) below 0.2 micrograms per liter (ug/L). The following facilities are now required to use Method 1631E for all **effluent samples**:

- Facilities discharging to Class I and Class II surface waters, including wetlands.
- Facilities discharging to Class III Marine or Fresh surface waters, including wetlands.
- Facilities with Water Quality Based Effluent Limits (WQBELs), or any other limit for mercury specified in a permit, below 0.2 ug/L.

This includes effluent samples collected for any of the following requirements:

- Monitoring specified in Section I, *Reclaimed Water and Effluent Limitations and Monitoring*, section of permits.
- Monitoring performed under Section 3.A. of *Wastewater Permit Application Form 2A For Domestic Wastewater Facilities*; Part VII.C. of *Application to Discharge Process Wastewater from New or Existing Industrial Wastewater Facilities to Surface Water - Form 2CS*; or Part V.C. of *Application to Discharge Process Wastewater from New or Existing Industrial Wastewater Facilities to Ground Water - Form 2CG*.
- Priority pollutant scans performed in accordance with pretreatment program annual report requirements.
- Monitoring performed for the development or re-evaluation of local discharge limitations.
- Monitoring required in Table 4 of the Generic Permit for Discharges from Petroleum Contaminated Sites and Table 1 of the Generic Permit for the Discharge of Produced Ground Water from any Non-Contaminated Site Activity.

The low-level mercury method provides, for the first time, the ability to assess compliance with mercury water quality standards (WQSs) below 0.2 ug/L. Your permit requires that surface water discharges shall be analyzed using a sufficiently sensitive method in accordance with 40 CFR 136. *Wastewater Permit Application Forms 2A, 2CS, and 2CG* require effluent testing be conducted using methods that are able to detect pollutants at levels adequate to meet WQSs and to provide reasonable assurance that the WQSs will not be violated in the future.

Additionally, in order to develop technically and legally defensible local discharge limitations for domestic wastewater facilities that have pretreatment programs, Method 1631E must be used to provide data that clearly establishes the basis for any calculated mercury limitations. Note, regarding local discharge limitations, the requirement to use Method 1631E may be expanded to other locations in the collection and treatment system on a case-by-case basis depending on the initial results from effluent analysis using Method 1631E.

### Mercury Laboratory Analysis

Method 1631E has a minimum level of quantitation of 0.0005 ug/L, or 0.5 nanograms per liter (ng/L), which is 400-times more sensitive than Method 245.1 ("Manual Cold Vapor Technique"). Due to the sensitivity of Method 1631E, the results are typically measured in parts per trillion (ng/L) rather than in parts per billion (µg/L). The Department is currently evaluating Method 1631E to determine target method detection limits (MDLs) and target practical quantification limits (PQLs). Until target MDLs and PQLs are incorporated into Rule 62-4.246(4), the laboratory analysis is expected to achieve MDLs close to, or below, 1 ng/L. All laboratory analysis must be done by a NELAP accredited laboratory with current certification by Florida Department of Health for Method 1631E.

### Mercury Clean Sampling Techniques

Clean sample handling techniques should be used when collecting samples for low-level mercury analysis to preclude false positives arising from sample collection, handling, or analysis. Sample collection methods should be consistent with *DEP-SOP-001/01: FS 8200 Clean Sampling For Ultratrace Metals in Surface Waters* and *EPA Method 1669: Sampling Ambient Water for Trace Metals at EPA Water Quality Criteria Levels* (EPA-821-R-96-011). Because FS 8200 and Method 1669 are performance-based procedures, sample collection personnel may modify these procedures or eliminate steps if the modification does not lead to unacceptable contamination of samples or blanks. Any modifications should be thoroughly evaluated and demonstrated to be effective before field samples are collected. This may be accomplished through documentation of uncontaminated samples, equipment blanks and/or other quality control samples.

Note, discrete and composite samplers have been found to contaminate samples with mercury at the ng/L level. Therefore, grab samples are permissible when using Method 1631E. However, grab samples must be representative of the wastewater discharge and a field blank should be collected along with the sample.

In order for a permittee to justify a claim that any reported mercury is due to outside contamination, a blank must have been collected. For this reason, permittees should consider collecting at least one blank at each site for each day a sample is collected. If more than one sample is collected in a day, at least one blank for each 10 samples collected on that day should also be collected. The blank may either be an equipment blank or a field blank. Once a permittee demonstrates the ability to collect samples from a given site using an established procedure that prevents contamination, the permittee may choose to decrease the number of blanks being taken. Specific definitions and procedures for collecting blanks are found in DEP SOP FQ 1000.

Field blanks should be collected only if no equipment other than the sample container is used to collect samples. If the sampling procedure involves the use of additional equipment, such as a peristaltic pump and pump tubing, equipment blanks should be collected. All blanks are subject to the same preservation, digestion, and analysis protocols as regular samples and should have a concentration at least five times lower than the sample concentration. The permittee may not subtract field blank concentrations when reporting sample results.

Sample-collection, preservation, and shipping requirements should be discussed with contract laboratories to ensure the requirements of Method 1631E are met.

### Additional Assistance and Information

For additional information on Method 1631:  
[www.epa.gov/waterscience/methods/1631.html](http://www.epa.gov/waterscience/methods/1631.html)

Please refer questions concerning sample collection to:  
Silky Labic: 850-245-8066  
[Silky.Labic@dep.state.fl.us](mailto:Silky.Labic@dep.state.fl.us)

Additional information concerning NELAP certified laboratories can be obtained from:  
Department of Health Bureau of Laboratories  
P.O. Box 210 Jacksonville, FL 32231  
(904) 791-1599 (voice)(904) 791-1591 (fax)  
[ftp.dep.state.fl.us/pub/labs/assessment/doh/accredited.pdf](ftp://ftp.dep.state.fl.us/pub/labs/assessment/doh/accredited.pdf)



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

OFFICE OF  
WATER

signed: August 23, 2007

**MEMORANDUM**

**SUBJECT:** Analytical Methods for Mercury in National Pollutant Discharge Elimination System (NPDES) Permits

**FROM:** James A. Hanlon, Director  
Office of Wastewater Management

**TO:** Water Division Directors, Regions 1 - 10

The purpose of this memorandum is to inform you of EPA's March 12, 2007, approval of Method 245.7 for measurement of mercury and modified versions of approved analytical methods for mercury as well as the impact of their approval on the NPDES permitting process. While several different methods are currently approved under 40 CFR Part 136 for the analysis of mercury, some of these methods have much greater sensitivities and lower quantitation levels than others. This memorandum clarifies and explains that, in light of existing regulatory requirements for NPDES permitting,<sup>1</sup> only the most sensitive methods such as Methods 1631E and 245.7 are appropriate in most instances for use in deciding whether to set a permit limitation for mercury and for sampling and analysis of mercury pursuant to the monitoring requirements within a permit.

**BACKGROUND**

Section 301 of the Clean Water Act (CWA) requires NPDES permits to include effluent limitations that are as stringent as necessary to meet water quality standards. Thus, under the Act and EPA regulations, each permit must include, as necessary, requirements in addition to or more stringent than technology-based effluent limitations established under section 301 of the CWA in order to achieve water quality standards. 40 C.F.R. § 122.44(d)(1). The regulations require limitations to control all pollutants that the NPDES program director determines are or may be discharged at a level that "will cause, have the reasonable potential to cause, or contribute to an excursion above any state water quality standard," including both narrative and

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<sup>1</sup> This memorandum is based on existing legal requirements and authorities. It does not impose any new, legally binding requirements on EPA, states, or the regulated community.

numeric criteria, 40 C.F.R. § 122.44(d)(1)(i). If the program director determines that a discharge has the reasonable potential to cause or contribute to such an excursion, the permit must contain water quality-based effluent limitations for the pollutant, 40 C.F.R. § 122.44(d)(1)(iii). Thus, a prospective permittee may need to measure various pollutants in its effluent at two stages: first, at the permit application stage so that the program director can determine whether “reasonable potential” exists and establish appropriate permit limits; and second, where a permit limit has been established, to meet the monitoring requirements within the permit. The following discussion explains which analytical methods permit applicants and permittees should use to make these measurements when mercury is the pollutant at issue.

### Approved Analytical Methods

Measurements included on NPDES permit applications and on reports required to be submitted under the permit must generally be made using analytical methods approved by EPA under 40 CFR Part 136. See 40 CFR 136.1, 136.4, 136.5, 122.21(g)(7), and 122.41(j). For mercury, there are three methods commonly used in the NPDES program that EPA has approved under Part 136: Method 245.1, Method 245.2, and Method 1631E. Methods 245.1 and 245.2 were approved by EPA in 1974 and can achieve measurement of mercury down to 200 parts per trillion (ppt). Additionally, EPA approved Method 1631 Revision E in 2002. Method 1631E has a quantitation level of 0.5 ppt, making it 400 times more sensitive than Methods 245.1 and 245.2. In fact, the sensitivity of Methods 245.1 and 245.2 are well above the water quality criteria now adopted in most states (as well as the criteria included by EPA in the Final Water Quality Guidance for the Great Lakes System) for the protection of aquatic life and human health, which generally fall in the range of 1 to 50 ppt.<sup>2</sup> In contrast, Method 1631E, with a quantitation level of 0.5 ppt, does support the measurement of mercury at these low levels.

In addition to Methods 245.1, 245.2, and 1631E listed above, EPA approved Method 245.7 as well as modified versions of other EPA-approved methods on March 12, 2007. See 72 FR 11200. Method 245.7 has a quantitation level of 5.0 ppt, making it 40 times more sensitive than Methods 245.1 and 245.2. Additionally, modified versions of EPA-approved methods may also be used for the measurement of mercury. Methods approved under Part 136, such as 245.1 and 245.2, may be modified to achieve lower quantitation levels than can be achieved by the method as written.<sup>3</sup> Modifications to an EPA-approved method for mercury that meet the method

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<sup>2</sup> Many states have adopted mercury water quality criteria of 12 ppt for protection of aquatic life and 50 ppt for the protection of human health, and for discharges to the Great Lakes Basin, the applicable water quality criteria for mercury are 1.3 ppt for the protection of wildlife and 1.8 ppt for the protection of human health. In 2001, EPA issued new recommended water quality criteria guidance for the protection of human health. This new guidance recommends adoption of a methylmercury water quality criterion of 0.3 milligrams of methylmercury per kilogram (mg/kg) in fish tissue. EPA is currently developing implementation guidance to assist states in implementing the criterion, and *Draft Guidance for Implementing the January 2001 Methylmercury Water Quality Criterion* (EPA-823-B-04-001) was released for public comment in August 2006.

<sup>3</sup> Examples of such modification may include changes in the sample preparation digestion procedures such as the use of reagents similar in properties to ones used in the approved method, changes in the equipment operating parameters such as the use of an alternate more sensitive wavelength, adjusting the sample volume to optimize method performance, and changes in the calibration ranges (provided that the modified range covers any relevant regulatory limit).

performance requirements of Part 136.6 are considered to be approved methods and require no further EPA approval. See 72 FR 11239-40 (March 12, 2007). For analytical method modifications that do not fall within the flexibility of Part 136.6, the modified methods may be approved under the alternate test procedure program as defined by Parts 136.4 and 136.5.

## **ACTIONS RESULTING FROM THE MARCH 12, 2007, RULEMAKING**

To implement the March 12, 2007, rule, the Office of Wastewater Management (OWM) provides the following guidance:

### Monitoring Data Submitted as Part of NPDES Permit Applications

As noted, most states have adopted water quality criteria for the protection of aquatic life and human health that fall in the range of 1 to 50 ppt, and Methods 245.1 and 245.2, as written, do not detect or quantify mercury in this range. A "did not detect" result using Method 245.1 or Method 245.2 would show only that mercury levels are below 200 ppt but would not establish that they are at or below the applicable water quality criterion. Therefore, when a permit writer receives a permit application reporting mercury data analyzed with Method 245.1 or Method 245.2 as "did not detect" results, the permit writer in reality may lack the information needed to make a "reasonable potential" determination. In contrast, Method 1631E is able to detect and quantify mercury concentrations at these low levels.

EPA therefore expects, in general, that all facilities with the potential to discharge mercury will provide with their NPDES permit applications monitoring data for mercury using Method 1631E or another sufficiently sensitive EPA-approved method. For purposes of permit applications, a method for mercury is "sufficiently sensitive" when (1) its method quantitation level is at or below the level of the applicable water quality criterion for mercury or (2) its method quantitation level is above the applicable water quality criterion, but the amount of mercury in a facility's discharge is high enough that the method detects and quantifies the level of mercury in the discharge.<sup>4</sup> Accordingly, EPA strongly recommends that the permitting authority determine that a permit application that lacks effluent data analyzed with a sufficiently sensitive EPA-approved method such as Method 1631E is incomplete unless and until the facility supplements the original application with data analyzed with such a method. See 40 CFR 122.21(e) (a permit application is determined to be complete at the discretion of the permitting authority) and 40 CFR 122.21(g)(13) (the applicant shall provide to the Director, upon request, such other information as the Director may reasonably require to assess the discharge). Such data would allow the permitting authority to characterize the effluent to determine whether the discharge causes, has the reasonable potential to cause, or contributes to an excursion of state water quality standards for mercury and would consequently allow the permitting authority to determine whether a water quality-based effluent limit for mercury is necessary in the permit.

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<sup>4</sup> To illustrate the latter, if the water quality criterion for mercury in a particular state is 2.0 ppt, Method 245.7 (with a quantitation level of 5.0 ppt) would be sufficiently sensitive where it reveals that the level of mercury in a facility's discharge is 5.0 ppt or greater. In contrast, Method 245.7 would not be sufficiently sensitive if it resulted in a level of non-detect for that discharge because it could not be known whether mercury existed in the discharge at a level between 2.0 and 5.0 (less than the quantitation level but exceeding the water quality criterion).

### Monitoring Requirements in Permits

Where a permit authority establishes a permit limit for mercury, it also needs to consider specifying an analytical method that the permittee must use to monitor for mercury during the term of the permit. Methods 245.1 and 245.2, as written, are not likely to be sensitive enough to detect or quantify the concentration of mercury in the discharge at a level that matches the limitation for mercury in the permit. EPA therefore expects the permitting authority to require the use of a sufficiently sensitive EPA-approved method for monitoring under the permit in order to ensure that the sampling and measurements required are "representative of the monitored activity" (as required by 40 CFR 122.41(j)(1)). For purposes of monitoring under a permit, a method for mercury is "sufficiently sensitive" when (1) its method quantitation level is at or below the level of the mercury limit established in the permit or (2) its method quantitation level is above the mercury limit in the permit, but the amount of mercury in a facility's discharge is high enough that the method detects and quantifies the level of mercury in the discharge.<sup>5</sup>

### EPA Permit Review and Objection to State Issued Permits

For NPDES-authorized states, EPA regions are expected to review state permits and should strongly consider objecting to permits that are issued based on analytical data collected and analyzed using an EPA-approved method that is not sufficiently sensitive or that do not require use of a sufficiently sensitive EPA-approved method for monitoring when the permit includes a limit for mercury. OWM is expecting to undertake a permit quality review of a small representative number of permits with respect to mercury limitations and other conditions.

If you have questions concerning the content of this memorandum, please contact Linda Boornazian, Director of the Water Permits Division, at 202-564-0221 or have your staff contact Marcus Zobrist of the State and Regional Branch at 202-564-8311 or zobrist.marcus@epa.gov.

cc: NPDES Branch Chiefs Regions 1 - 10

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<sup>5</sup> See footnote 4.

**ORANGE COUNTY ENVIRONMENTAL PROTECTION DIVISION  
WORK INSTRUCTION**

**Title: Dewatering Permitting and Approvals Work Instruction**  
**Number: EPD-WI-2000-04**

Effective Date: 10/04/2011 Revision: 1  
Renewal Date: 10/04/2014 Revision Date: 10/04/2011  
Approved By: Elizabeth R. Johnson, Environmental Programs Administrator

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**Purpose:** The purpose of this work instruction is to provide guidance regarding the approvals required to initiate construction related dewatering in unincorporated Orange County

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**I. Procedure**

**County Offices:**

**Orange County Public Works**

For proposed dewatering discharges to the Orange County Municipal Separate Storm Sewer System (MS4), contact Orange County Development Engineering prior to commencement of dewatering. OC Public Works Contact: Miguel Tamayo, 407-836-7914.

**Orange County Utilities (OCU)**

If the groundwater discharge testing indicates groundwater quality parameter exceedences, the discharge may be allowed to enter into the Orange County sanitary system. Coordinate with OCU. If OCU can accept the discharge, a County Industrial Wastewater Discharge Permit (IWD) will be required. Per Florida Department of Environmental Protection (FDEP), no FDEP dewatering permitting is required if an IWD is received.

Contact: Susanna Littell, OCU/Water Reclamation, 407-254-7710 (Industrial Wastewater Discharge Permits)

Contact: Laura Woodbury, P.E., OCU/Development Engineering, 407-254-9928.

Rules/Permits:

- Chapter 37 Article XX. Addresses industrial waste pretreatment and permitting.
- Industrial Wastewater Discharge (IWD) Permit. Required prior to discharge to the wastewater system.
- OCU Development Engineering Connection Requirements. OCU Development Engineering reviews and approves plans for groundwater dewatering and remediation projects when discharge will be to the OCU sanitary sewer system.

EPD-WI-2000-04	Effective Date: 10/04/2011
<b>The only official copy of this document is on the EPD intranet.</b>	Page 1 of 3

**ORANGE COUNTY ENVIRONMENTAL PROTECTION DIVISION  
WORK INSTRUCTION**

**State Agencies:**

**Florida Department of Environmental Protection (FDEP)**

For dewatering that is discharged offsite, sampling/analytical work is required prior to dewatering to determine if the proposed activity can be permitted under one of the generic dewatering permits.

FDEP Contacts: Ali Kazi, 407-897-4149; Randall Cunningham, 407-897-4152.

Rules/Permits:

- Generic Permit for Discharges from Petroleum Contaminated Sites (62-621.300(1)).
- Generic Permit for the Discharge of Produced Groundwater from any Non-Contaminated Site Activity (62-621.300(2)).
- Permit for all Other Contaminated Sites (62-04; 62-302; 62-620 & 62-660).

**Water Management Districts:**

**St. Johns River Water Management District**

Contact: Richard Kimmel, 407-659-4849.

Rules/Permits:

- No permit ("No Notice").
- Noticed General Permit for Short-term Construction Dewatering.
- Individual and Standard General Consumptive Use Permit.

**South Florida Water Management District**

Contact: Mario Cabana, 407-858-6100, ext. 3816.

Rules/Permits:

- "No-Notice" Short-Term Dewatering Permits.
- Dewatering General Water Use Permits.
- Long-term Dewatering Individual Permits.

For dewatering activities located in the City of Orlando contact Lisa Lotti at 407-246-2037.

**II. Scope**

This procedure applies to construction sites within unincorporated Orange County.

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**Definitions:**

**Off-site:** For the purposes of this Work Instruction, off-site means property not under control of the owner/applicant or (discharging to) the municipal separate storm sewer system or waters of the County.

EPD-WI-2000-04	Effective Date: 10/04/2011
<b>The only official copy of this document is on the EPD intranet.</b>	Page 2 of 3

**ORANGE COUNTY ENVIRONMENTAL PROTECTION DIVISION  
WORK INSTRUCTION**

**Related Documents:**

Florida Department of Environmental Protection's Construction Generic Permit

**History of Revisions:**

Revision No.	Revision Date	Summary of Revisions
0	06/06/2011	Original
1	10/04/2011	Update contact information

# **APPENDIX H**

## **ORANGE COUNTY UTILITIES**

# **ORANGE COUNTY VALVE ATTRIBUTE DATA SCHEMA**

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## Appendix H: Orange County Valve Attribute Data Schema

### GPS UNIT GPS LAYER FIELD NAMES

FID
SHAPE
ID
X
Y
Z
PDOP
NUM_SATS
GPS_TIME
GPS_DATE
QUALITY
DGPS_ID
DIFF_AGE
HDOP
EPE
HPE
FEATCLASS - FETLIST.DBF DROPDOWN
ASSETTYPE - WSUBTYPE.DBF DROPDOWN
LASER
COLNAME
COLAGENCY
SCHEMA
CONDITION - COND.DBF DROPDOWN
DISTANCE
BEARING
PP
WO
OFFSET
ASSETID

# **APPENDIX I**

## **ORANGE COUNTY UTILITIES**

### **S.O.P. CHECKLIST/JOB PLANS**

**Valve Preventive Maintenance S.O.P. Checklist/Job Plan**

**Hydrant Preventive Maintenance S.O.P. Checklist/Job Plan**

**Hydrant Flow Test S.O.P Checklist/Job Plan**

**Blow-off Valve Preventive Maintenance S.O.P. Checklist/Job Plan**

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## Appendix I: Valve Preventive Maintenance S.O.P. Checklist/Job Plan

1. Using the asset ID number, obtain the location of the asset with the Geographic Information System (GIS) software on your laptop.	<input type="checkbox"/>
2. Locate the valve.	<input type="checkbox"/>
3. If the valve cannot be located, put the Maximo work order on hold and ask for record drawings.	<input type="checkbox"/>
4. Once the valve is located, remove any material from around the valve cover.	<input type="checkbox"/>
<b>5. Take the cover off of the valve box, If red paint or a red tag is found , contact “3410” to verify this is a life support valve:</b>	<input type="checkbox"/>
a. If it is a life support valve, continue with the PM but omit steps 10-14.	<input type="checkbox"/>
b. If it is no longer a life support valve continue with the PM and paint the underside of the lid black.	<input type="checkbox"/>
<b>6. Bring the valve box collar to grade as needed.</b>	<input type="checkbox"/>
a. If the valve is located under or in concrete and needs to be brought to grade contract your UMC and ask for assistance.	<input type="checkbox"/>
b. If assistance is not available, put the valve PM work order on hold and a second work order will be created at a later time.	<input type="checkbox"/>
7. If a locating wire exists, move it so that is out of the way.	<input type="checkbox"/>
8. Insert the valve key into the valve box and make sure the valve is in the fully open position.	<input type="checkbox"/>
9. If the valve found in closed position, notify your utility supervisor before proceeding. Your supervisor will provide instructions on how to proceed.	<input type="checkbox"/>
<b>10. Use the valve key to fully close the valve.</b>	<input type="checkbox"/>
a. Note the valve arrival location from the fully open position and record on the work order.	<input type="checkbox"/>
b. Count the number of turns to fully close the valve and record on the work order.	<input type="checkbox"/>
c. Note the valve departure location from the fully closed position and record on the work order.	<input type="checkbox"/>
d. Once the valve is fully closed, re-open it a few turns so that high-velocity water flowing under the gates can clean the debris and sediment that often builds up on the gates, stem, and slides.	<input type="checkbox"/>
<b>11. Valves that are hard to operate must be closed by exercising the valve.</b>	<input type="checkbox"/>
a. Use standard valve exercising until valve is closed, count the number of turns to fully close the valve and record on the work order.	<input type="checkbox"/>
b. Once the valve is fully closed, re-open it a few turns so that high-velocity water flowing under the gates can clean the debris and sediment that often builds up on the gates, stem, and slides.	<input type="checkbox"/>
<b>12. If the number of turns to fully close a gate valve does not match the water main size, verify valve size by exposing the water main:</b>	<input type="checkbox"/>
a. If the valve is a different size than what is shown, update the specifications and create a field note in GIS.	<input type="checkbox"/>
b. If the valve is the correct size but does not fully close, make a note on the work order.	<input type="checkbox"/>
13. Open the valve fully and back off a ¼ to ½ a turn to prevent the valve from freezing up.	<input type="checkbox"/>
14. Replace the lid and paint blue.	<input type="checkbox"/>
15. Paint the “V” in the curb blue. If not found etch a 3-4 inch “V” in the curb, using a grinder, and paint it blue.	<input type="checkbox"/>
16. If a sketch does not exist of the valve location, take measurements from two fixed reference points and create a sketch of the valve location on the valve survey form.	<input type="checkbox"/>
<b>17. Enter all collected data in to the Maximo work order:</b>	<input type="checkbox"/>
a. In the job plan tab of the work order, input all data.	<input type="checkbox"/>
b. In the locations specifications tab of the work order, input all the data.	<input type="checkbox"/>
c. In the equipment specifications tab of the work order, input all the data.	<input type="checkbox"/>
18. Create a redline to update GIS if the valve is located in the wrong area on GIS.	<input type="checkbox"/>
19. Complete a restoration form if excavation was needed to verify the size of the valve.	<input type="checkbox"/>

## Appendix I: Hydrant Preventive Maintenance S.O.P. Checklist/Job Plan

1. Determine the approximate location of the Hydrant using Utility Mobile Desktop "GIS" and information found on the work order.	<input type="checkbox"/>
2. Confirm the data is correct for the hydrant and record any changes on the Hydrant PM Data Sheet:	<input type="checkbox"/>
3. Clear obstructions that are within a 36" radius around the hydrant.	<input type="checkbox"/>
4. Locate the hydrant isolation valve.	<input type="checkbox"/>
5. Clean the valve box and bring the valve box collar to grade as needed. If valve box needs to be brought to grade a second work order will need to be created.	<input type="checkbox"/>
6. Check to see if the isolation valve is open.	<input type="checkbox"/>
7. Exercise the hydrant's isolation valve and count the number of turns to fully close the valve from the fully opened position and record.	<input type="checkbox"/>
8. Check and inspect all bolts at the bottom of the hydrants traffic flange or bonnet making sure there are none missing or need to be replaced. Replace as needed.	<input type="checkbox"/>
9. Using a hydrant wrench remove one of the 2 1/2" port cap. If found under pressure, loosen the cap slowly until depressurized.	<input type="checkbox"/>
10. In place of the 2 1/2" port cap attach a 2 1/2" tapped cap with pressure gauge	<input type="checkbox"/>
11. Close stopcock and open petcock.	<input type="checkbox"/>
12. Place a hydrant wrench on the operating nut and crack open the hydrant main valve. Bleed air through the petcock on the pressure gauge.	<input type="checkbox"/>
13. Once the air has been removed open the stopcock and close the petcock.	<input type="checkbox"/>
14. Open the hydrant fully, and count the number of turns until fully open and record.	<input type="checkbox"/>
15. If the hydrant does not operate smoothly the hydrant may need to be lubricated with either grease or oil, depending on model and manufacturer.	<input type="checkbox"/>
a. Oil - hydrants:	<input type="checkbox"/>
i. Mueller Centurion	<input type="checkbox"/>
ii. Super Centurion-Standard and Improved	<input type="checkbox"/>
b. Grease - hydrants:	<input type="checkbox"/>
i. All American Darlings	<input type="checkbox"/>
ii. Clow F2500	<input type="checkbox"/>
iii. Kennedy K81A, K10A	<input type="checkbox"/>
iv. M&H and Dressers - all styles	<input type="checkbox"/>
v. US Pipe	<input type="checkbox"/>
vi. Mueller 4¼	<input type="checkbox"/>
vii. Waterous	<input type="checkbox"/>
viii. Clow Medallion	<input type="checkbox"/>
16. If hydrant is hard to operate, break down the hydrant bonnet, clean and re-grease the operating nut.	<input type="checkbox"/>
17. Check the hydrant bonnet, hose nozzle, traffic flange, for leaks.	<input type="checkbox"/>
18. Read and record the static pressure on the Hydrant PM Data Collection Sheet.	<input type="checkbox"/>
19. Close the hydrant. Relieve pressure through the petcock on the pressure gauge.	<input type="checkbox"/>
20. Remove the 2 1/2" tapped cap with pressure gauge.	<input type="checkbox"/>
21. Attach an appropriate diffuser to the hydrant such as the "Hose Monster" diffuser or swivel diffuser.	<input type="checkbox"/>

22. Identify the size of the opening to be flowed and the coefficient of the orifice.	<input type="checkbox"/>
23. Open the hydrant a few turns and let the water flow until it is clear. Take your first chlorine sample using a chlorine residual tester and record the chlorine residual.	<input type="checkbox"/>
24. Open the hydrant fully.	<input type="checkbox"/>
25. With the hydrant fully open take the pitot pressure reading from the pressure gauge attached to the diffuser and record. This pressure is to be used in conjunction with the size of the opening and coefficient of the orifice in step 22 for determining the flow rate.	<input type="checkbox"/>
26. Record the total time the hydrant was flowed to calculate the total water loss and record.	<input type="checkbox"/>
27. Close the hydrant's isolation valve.	<input type="checkbox"/>
28. Place the Aqua Phone on the valve key and listen for any leakage. If a leak is detected on the isolation valve, put the work order on hold. If the leak appears to come from the main, create a work order to investigate a possible leak.	<input type="checkbox"/>
29. Fully open the isolation valve, and partially close the hydrant.	<input type="checkbox"/>
30. Take the second chlorine residual reading and record.	<input type="checkbox"/>
31. Close the hydrant. Do not attempt to close the hydrant beyond its limits of travel with excess torque as this can damage the hydrant.	<input type="checkbox"/>
32. Remove the diffuser from the hydrant.	<input type="checkbox"/>
33. Pump the water from the lower barrel using a hydrant pump.	<input type="checkbox"/>
34. Recheck the isolation valve to ensure that it is fully open.	<input type="checkbox"/>
35. Remove the valve key. Measure and record the depth of the isolation valve and replace the lid.	<input type="checkbox"/>
36. Make sure chains are connected to the hydrant. Replace chains as needed.	<input type="checkbox"/>
37. Clean all the threads on the hose nozzles with a wire brush.	<input type="checkbox"/>
38. Apply a small amount of grease to the threads and replace the port caps. Tighten caps just enough to avoid loosening by hand.	<input type="checkbox"/>
39. Make sure the hydrant wrench has enough clearance to rotate fully when removing port caps. If wrench cannot fully rotate, make note on work order that the hydrant is too low and put on hold.	<input type="checkbox"/>
40. With a wire brush, knockoff any loose paint or rust.	<input type="checkbox"/>
41. Paint the bonnet and all caps green, and paint the body of the hydrant silver.	<input type="checkbox"/>
42. The isolation valve box lid is to be painted silver.	<input type="checkbox"/>
43. Check for the pavement marker and replace as needed in the center of the lane closest to the hydrant.	<input type="checkbox"/>
44. Enter and update all collected data in to the Maximo work order:	<input type="checkbox"/>
45. Create redlines to update GIS if needed.	<input type="checkbox"/>
46. Complete a restoration form if restoration was required.	<input type="checkbox"/>

## Appendix I: Hydrant Flow Test S.O.P. Checklist/Job Plan

1. <b>The Utility Supervisor/Senior UMC will select the test hydrant (residual hydrant) and the flow hydrant(s) according to the information that is needed.</b>	<input type="checkbox"/>
a. The test hydrant will be located at or near the building or area to be tested.	<input type="checkbox"/>
b. The flow hydrant will be located downstream of the test hydrant if on a one-way feed system or around the test hydrant if located on a grid system.	<input type="checkbox"/>
c. Multiple flow hydrants may need to be used to meet the minimum requirement of a 10 psi pressure drop at the test hydrant.	<input type="checkbox"/>
2. Make sure there is an open line of communication between the operators during the flow test to assure that that the pressure readings are simultaneous. The communication can be through two-way radio or cell phone.	<input type="checkbox"/>
3. Determine the approximate location of the hydrants using GIS Utility Mobile Desktop.	<input type="checkbox"/>
<b>4. At the residual/test hydrant:</b>	<input type="checkbox"/>
a. Verify the hydrant ID and location.	<input type="checkbox"/>
b. Locate the hydrant's isolation valve and insert a valve key into valve box. Make sure the valve is fully open. Leave the valve key in the valve box in case an emergency shutdown of the hydrant is needed.	<input type="checkbox"/>
c. Remove one 2 1/2" port cap. If found under pressure, loosen the cap slowly until depressurized.	<input type="checkbox"/>
d. With the port cap off place a hydrant wrench on the operating nut and crack open the hydrant main valve and slowly flush the hydrant until the water is clear.	<input type="checkbox"/>
e. Close the hydrant.	<input type="checkbox"/>
f. In place of the 2 1/2" port cap attach a 2 1/2" tapped cap with pressure gauge.	<input type="checkbox"/>
g. Close stopcock and open petcock.	<input type="checkbox"/>
h. Crack open the hydrant main valve. Bleed air through the petcock on the pressure gauge.	<input type="checkbox"/>
i. Once the air has been removed close the petcock and open the stopcock.	<input type="checkbox"/>
j. Open the hydrant fully. Do not attempt to open the hydrant beyond its limits of travel with excess torque as this can damage the hydrant.	<input type="checkbox"/>
<b>k. Check the hydrant bonnet, hose nozzle, traffic flange, for leaks.</b>	<input type="checkbox"/>
i. If the hydrant is found to have a leak, contact your Utility Supervisor for further instruction.	<input type="checkbox"/>
ii. If no leaks are found proceed with the flow test.	<input type="checkbox"/>
l. Read the gauge. This is the static pressure reading.	<input type="checkbox"/>
m. A field specialist must remain at this hydrant to record the residual pressure while the flow hydrant(s) are being operated.	<input type="checkbox"/>
<b>5. At the flow hydrant:</b>	<input type="checkbox"/>
a. Verify the hydrant ID and location is correct. If the hydrant ID is not correct, it should be corrected.	<input type="checkbox"/>
b. Make provisions for adequate drainage to prevent damage caused by the water flow.	<input type="checkbox"/>
c. Locate the hydrants isolation valve and insert a valve key into valve box. Make sure the valve is fully open. Leave the valve key in the valve box in case an emergency shutdown of the hydrant is needed.	<input type="checkbox"/>
<b>d. Open hydrant and check the bonnet, hose nozzle, traffic flange, for leaks.</b>	<input type="checkbox"/>
i. If the hydrant is found to have a leak, contact you Utility Supervisor for further instruction.	<input type="checkbox"/>
ii. If no leaks are found proceed with the flow test.	<input type="checkbox"/>
e. Loosen one 2 1/2" port cap slowly until depressurized. Once depressurized remove port cap completely.	<input type="checkbox"/>
<b>f. Attach an appropriate diffuser to the hydrant such as the "Hose Monster" diffuser.</b>	<input type="checkbox"/>
i. Identify the size of the opening to be flowed and the coefficient of the orifice.	<input type="checkbox"/>
g. Open the hydrant a few turns and let the water flow until it is clear.	<input type="checkbox"/>
h. Take your first chlorine sample using a chlorine tester.	<input type="checkbox"/>
i. Record the chlorine residual in the Maximo work order.	<input type="checkbox"/>
j. Open the hydrant fully.	<input type="checkbox"/>
<b>6. With both hydrants fully open take the flow pressure reading from the pressure gauge attached to the</b>	<input type="checkbox"/>

<b>diffuser at flow hydrant and take the residual pressure at test hydrant.</b>	<input type="checkbox"/>
<b>a. The pressure drop at the test hydrant should drop at least 10 psi.</b>	<input type="checkbox"/>
i. If the pressure drop is not at least 10 psi, another hydrant should be flowed and an additional operator(s) will be required. If on a one-way system the hydrants should be located downstream of the test hydrant, if on a grid system the hydrants should be located around the test hydrant. This should be repeated until the pressure drop is 10 psi or more.	<input type="checkbox"/>
b. Take the second chlorine sample, at the flow hydrant, using a chlorine tester and record the chlorine residual.	<input type="checkbox"/>
c. Record the total time the flow hydrant(s) was flowed to calculate the total water used during the flow test.	<input type="checkbox"/>
<b>7. Close the flow hydrant slowly.</b>	<input type="checkbox"/>
a. The operator at the flow hydrant should contact the operator at the test hydrant to inform him that the flow hydrant is closed	<input type="checkbox"/>
b. Remove the diffuser from the flow hydrant	<input type="checkbox"/>
c. Use the hand pump to remove the water out of the lower barrel.	<input type="checkbox"/>
d. Replace the port cap on the hydrant.	<input type="checkbox"/>
<b>8. The operator at the test hydrant can now close the test hydrant.</b>	<input type="checkbox"/>
a. Relieve pressure through the petcock on the pressure gauge.	<input type="checkbox"/>
b. Remove the tapped cap from the test hydrant:	<input type="checkbox"/>
c. Use the hand pump to remove the water out of the lower barrel.	<input type="checkbox"/>
d. Replace the port cap on the hydrant.	<input type="checkbox"/>
<b>9. Record the results of the flow test on the Hydrant Flow Test Report (electronic form) and/or the Water Flow Test Summary Sheet (hard copy).</b>	<input type="checkbox"/>
<b>a. Record the following information on the Hydrant Flow Test Report:</b>	<input type="checkbox"/>
i. Date	<input type="checkbox"/>
ii. Time	<input type="checkbox"/>
iii. Operator	<input type="checkbox"/>
iv. Weather	<input type="checkbox"/>
<b>v. Test hydrant information:</b>	<input type="checkbox"/>
(a) Address	<input type="checkbox"/>
(b) Test hydrant number	<input type="checkbox"/>
(c) Static pressure	<input type="checkbox"/>
(d) Residual pressure	<input type="checkbox"/>
(e) Pipe Material	<input type="checkbox"/>
(f) Pipe Diameter	<input type="checkbox"/>
<b>vi. Flow hydrant information:</b>	<input type="checkbox"/>
(a) Hydrant number	<input type="checkbox"/>
(b) Outlet diameter	<input type="checkbox"/>
(c) Coefficient	<input type="checkbox"/>
(d) Pitot gauge pressure reading	<input type="checkbox"/>
<b>vii. Comments</b>	<input type="checkbox"/>
(a) Address of the hydrant that was flowed.	<input type="checkbox"/>
b. Save the form locally onto the laptop in the following manner.	<input type="checkbox"/>
<b>c. Record the following information on the Water Flow Test Summary Sheet:</b>	<input type="checkbox"/>
i. Flow Hydrant Address	<input type="checkbox"/>
ii. Flow Hydrant ID Number	<input type="checkbox"/>
iii. Test Hydrant ID Number	<input type="checkbox"/>
iv. Chlorine before flow test	<input type="checkbox"/>

v. Chlorine after flow test	<input type="checkbox"/>
vi. Pitot pressure for the flow hydrant(s)	<input type="checkbox"/>
vii. Discharge for the flow hydrant(s)	<input type="checkbox"/>
viii. Location of the test	<input type="checkbox"/>
ix. Date of the test	<input type="checkbox"/>
x. Static pressure	<input type="checkbox"/>
xi. Residual pressure	<input type="checkbox"/>
xii. Total discharge during test	<input type="checkbox"/>
<b>xiii. Draw the graph</b>	<input type="checkbox"/>
(a) Plot the first point using the static pressure value and 0 water flow.	<input type="checkbox"/>
(b) Plot the second point use the residual pressure value and the discharge value obtained from the flow hydrant.	<input type="checkbox"/>
(c) Draw a line connecting the two points and extend the line until it intersects the water flow axis.	<input type="checkbox"/>
<b>xiv. Determine the flow available at 20 psi:</b>	<input type="checkbox"/>
(a) Determine the intersection point between the 20 psi line and the line that was drawn.	<input type="checkbox"/>
(b) Once that point has been found, determine the water flow associated with it from the water flow axis.	<input type="checkbox"/>
xv. Determine the flow available at 0 psi by finding where the line that was drawn intersects the water flow axis.	<input type="checkbox"/>
<b>10. Complete the Maximo work order:</b>	<input type="checkbox"/>
<b>a. Click on "Measurement" button:</b>	<input type="checkbox"/>
<b>i. Double click on the following and enter the value for each:</b>	<input type="checkbox"/>
(a) "Collect Static Pressure" from the test hydrant	<input type="checkbox"/>
(b) "Collect Residual Pressure" from the test hydrant	<input type="checkbox"/>
(c) Provide Pitot Reading" from the flow hydrant	<input type="checkbox"/>
(d) Available Flow at 20 psi., which can be obtained from the hydrant Flow Test Form or the Water Flow Test Summery sheet	<input type="checkbox"/>
(e) Gallons Per Minute	<input type="checkbox"/>
(f) Before Flush Chlorine	<input type="checkbox"/>
(g) After Flush Chlorine	<input type="checkbox"/>
(h) Total Water Loss	<input type="checkbox"/>
<b>b. In the "Completion Info Screen" add any additional information from the flow test in the notes section.</b>	<input type="checkbox"/>

## Appendix I: Blow-off Valve Preventive Maintenance S.O.P. Checklist/Job Plan

1. Locate the BOV.	<input type="checkbox"/>
2. If the valve cannot be located put the Maximo work order on hold and ask for record drawings.	<input type="checkbox"/>
<b>3. Once the BOV is located:</b>	<input type="checkbox"/>
a. If needed replace or bring the valve box to grade.	<input type="checkbox"/>
b. Remove or open the BOV valve box.	<input type="checkbox"/>
c. Clean out and remove any debris out of the BOV valve box so that the BOV is easily accessible.	<input type="checkbox"/>
d. If the valve is found to be leaking, create a second work order and proceed to repair or replace the valve. If the valve cannot be repaired or replaced under pressure or water service to customers will be interrupted, notify the SUMC and place the work order on hold.	<input type="checkbox"/>
e. Make sure the valve is completely closed.	<input type="checkbox"/>
f. Remove the plug or cap from the BOV.	<input type="checkbox"/>
g. Screw the stand pipe or "Hose Monster" diffuser onto the end of the BOV.	<input type="checkbox"/>
h. Open the BOV valve.	<input type="checkbox"/>
i. Once the water has cleared, take your first chlorine sample using a chlorine residual tester and record the chlorine residual reading on the Maximo work order.	<input type="checkbox"/>
j. Take the pitot pressure reading by either using the gauge on the "Hose Monster" or by using a pitot pressure blade.	<input type="checkbox"/>
k. Identify the size of the opening to be flowed and the coefficient of the orifice.	<input type="checkbox"/>
l. Flow the BOV for approximately 5 minutes.	<input type="checkbox"/>
m. Take the second residual and record.	<input type="checkbox"/>
n. If water is clear and residual is within range, close the valve.	<input type="checkbox"/>
o. Remove the stand pipe or hose monster diffuser from the BOV.	<input type="checkbox"/>
p. Pump the excess water out of the valve box with the hand pump if applicable. <i>(See Figure 16)</i>	<input type="checkbox"/>
q. Reinstall the plug or cap back onto the BOV.	<input type="checkbox"/>
r. Add gravel to the valve box so that it is level with the spring line of the pipe, if applicable.	<input type="checkbox"/>
s. Reinstall or close the valve box lid.	<input type="checkbox"/>
t. If a sketch does not exist of the valve location, take measurements and create a sketch of the valve location on the valve survey form.	<input type="checkbox"/>
u. Using the pitot pressure reading and the flushing time, calculate the gallons flushed.	<input type="checkbox"/>
4. Update all the attributes in the Maximo work order under the location and equipment specifications tab.	<input type="checkbox"/>
5. Complete the Maximo work order.	<input type="checkbox"/>
6. If any additional changes or information needs to be included in the GIS, insert a field note or redline.	<input type="checkbox"/>
7. Complete a restoration form if restoration is needed.	<input type="checkbox"/>

# APPENDIX J

## ORANGE COUNTY UTILITIES

### MAXIMO REQUIRED DATA

- Maximo Job Plan 1582 Required Data – Valve Preventive Maintenance (Water 12 inch and less)**
- Maximo Job Plan 3311 Required Data – Valve Preventive Maintenance (Water Greater than 12 inch)**
- Maximo Job Plan 1531 Required Data – Preventive Maintenance Blow Off Valve (Dead End Flush)**
- Maximo Job Plan HYD PM Required Data – Preventive Maintenance Hydrant**
- Maximo Job Plan 3309 Required Data – Preventive Maintenance Reclaimed Water Valve (Greater than 12 inch)**
- Maximo Job Plan VCVPM Required Data – Preventive Maintenance Wastewater Valve**
- Maximo Job Plan 2036 Required Data – Valve Operation Uni-Directional Flush**
- Maximo Job Plan 2037 Required Data – Blow off Valve Flush**
- Maximo Job Plan 2035 Required Data – Hydrant Flush**
- Maximo Job Plan 2051 Required Data – Hydrant Flow Test**
- Maximo Location Required Data – Hydrant**
- Maximo Asset Required Data – Hydrant**
- Maximo Location Required Data – Valve**
- Maximo Asset Required Data – Valve**

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## Appendix J: Maximo Required Data

### Maximo Job Plan Key

Maximo Job Plan	Title
1582	Preventive Maintenance - Water Valve (< 12 inch)
3311	Preventive Maintenance - Water Valve (Greater Than 12 inch)
1531	Preventive Maintenance - Blow off Valve (Dead End Flush)
HYD PM	Preventive Maintenance - Hydrant
3309	Preventive Maintenance - Reclaim Water (Greater Than 12 inch)
VLVPM	Preventive Maintenance - Sewer Valve
2036	Uni-Directional Flushing Valve Operation
2037	Blow off Valve System Flushing
2035	Hydrant System Flushing
2051	Hydrant Flow Test
Hydrant Location	Hydrant Location Data
Hydrant Asset	Hydrant Asset Data
Valve Location	Valve Location Data
Valve Asset	Valve Asset Data

### Maximo Job Plan 1582 - Valve Preventive Maintenance (Water 12 inch and less)

Sequence	Task	Description	Meter
1	10	COUNT NUMBER OF TURNS	OPERATING
	20	VALVE ARRIVING POSITION	VARRIVING
	30	VALVE DEPARTING POSITION	VDEPARTING

### Maximo Job Plan 3311 Required Data - Valve Preventive Maintenance (Water greater than 12 inch)

Sequence	Task	Description	Meter
	10	COUNT NUMBER OF TURNS	OPERATING
	20	VALVE ARRIVING POSITION	VARRIVING
	30	VALVE DEPARTING POSITION	VDEPARTING

Maximo Job Plan 1531 Required Data - Preventive Maintenance Blow Off Valve (Dead End Flush)

Sequence	Task	Description	Meter
	10	COLLECT BEFORE FLUSH CL2	BCL2
	20	GALLONS FLUSHED	GPM
	30	COLLECT CL2 AFTER FLUSH	ACL2

Maximo Job Plan HYD PM Required Data - Preventive Maintenance Hydrant

Sequence	Task	Description	Meter
1	10	BEFORE FLUSH CL2	BCL2
2	40	PRESSURE TEST HYDRANT AND RECORD STATIC READING	STATIC
3	45	RECORD TURNS ON HYDRANT	HYDTURNS
4	50	INSTALL DIFUSER, RECORD FLOW	PITOT
5	52	FLOW: _____ GPM	GPM
6	60	AFTER FLUSH CL2	ACL2
	70	TOTAL WATER LOSS	WATERLOSS

Maximo Job Plan 3309 Required Data - Preventive Maintenance Reclaimed Water Valve (Greater than 12 inch)

Sequence	Task	Description	Meter
	10	COUNT NUMBER OF TRUNS	OPERATING
	20	VALVE ARRIVING POSITION	VARRIVING
	30	VALVE DEPARTING	VDEPARTING

Maximo Job Plan VLVPM Required Data - Preventive Maintenance Wastewater Valve

Sequence	Task	Description	Meter
	10	COUNT NUMBER OF TURNS	OPERATING
	20	VALVE ARRIVING POSITION	VARRIVING
	30	VALVE DEPARTING POSITION	VDEPARTING

Maximo Job Plan 2036 - Valve Operation Uni-Directional Flush

Sequence	Task	Description	Meter
1	5	CLOSE VALVE COUNT TURNS	OPERATING
2	10	OPEN VALVE COUNT TURNS	OPERATING

Maximo Job Plan 2037 Required Data - Blow off Valve Flush

Sequence	Task	Description	Meter
1	5	CAPTURE BEFORE FLUSH CL2	BCL2
2	10	GALLONS PER MINUTE	GPM
3	15	CAPTURE AFTER FLUSH CL2	ACL2
4	20	TOTAL WATER LOSS	WATERLOSS
	30	COLOR START OF FLUSH	
	31	COLOR END OF FLUSH	
	32	ODOR START OF FLUSH	
	33	ODOR END OF FLUSH	
	34	FLUSHING TIME	
	35	WATER VOLUME	
	36	TURBIDITY START OF FLUSH	
	37	TURBIDITY END OF FLUSH	
	38	pH START OF FLUSH	
	39	pH END OF FLUSH	
	40	TEMPERATURE START OF FLUSH	
	41	TEMPERATURE END OF FLUSH	

Maximo Job Plan 2035 Required Data - Hydrant Flush

Sequence	Task	Description	Meter
1	1	OBTAIN STATIC PRESSURE	STATIC
2	5	PITOT PRESSURE	PITOT
3	10	GPMS	GPM
4	30	CHLORINE RESIDUAL BEFORE	BCL2
5	35	CHLORINE RESIDUAL AFTER	ACL2
6	40	TOTAL WATER LOSS	WATERLOSS
	50	COLOR START OF FLUSH	
	51	COLOR END OF FLUSH	
	52	ODOR START OF FLUSH	
	53	ODOR END OF FLUSH	
	54	FLUSHING TIME	
	55	WATER VOLUME	
	56	TURBIDITY START OF FLUSH	
	57	TURBIDITY END OF FLUSH	
	58	pH START OF FLUSH	
	59	pH END OF FLUSH	
	60	TEMPERATURE START OF FLUSH	
	61	TEMPERATURE END OF FLUSH	

Maximo Job Plan 2051 Required Data - Hydrant Flow Test

Sequence	Task	Description	Meter
	10	COLLECT STATIC PRESSURE	STATIC
	15	COLLECT RESIDUAL PRESSURE	RESIDUAL
	20	PROVIDE PITOT READING	PITOT
	25	AVAILABLE FLOW @ 20 PSI	AVL20PSI
	30	GALLONS PER MINUTE	GPM
	40	BEFORE FLUSH CL2	BCL2
	50	AFTER FLUSH CL2	ACL2
	60	TOTAL WATER LOSS	WATERLOSS

Maximo Location Required Data – Hydrant

Attribute	Description	Data Type
STNUMBER	STREET NUMBER	ALN
STNAME	STREET NAME	ALN
HBURYDEP	HYDRANT BURY DEPTH	ALN
CRSST1	CROSS STREET1	ALN
CRSST2	CROSS STREET2	ALN
CORNDIR	CORNER DIRECTIONS	ALN
ROWSURF	RIGHT OF WAY SURFACE	ALN
SPRESSUR	STATIC PRESSURE	ALN
ISVLVMFR	ISOLATION VALVE MANUFACTURER	ALN
NUMTURNS	NUMBER OF TURNS ON VALVE	ALN
VBURYDEP	VALVE BURY DEPTH	ALN
ISVLSIZE	ISOLATION VALVE SIZE	ALN
STTYPE	STREET TYPE	ALN
STDIR	STREET DIRECTION	ALN
X_CORD	X GPS COORDINATE	ALN
Y_CORD	Y GPS COORDINATE	ALN

Maximo Asset Required Data – Hydrant

Attribute	Description	Match
HBURYDEP	HYDRANT BURY DEPTH	GLOBAL
HLUBE	HYDRANT LUBRICATION	GLOBAL
HMFGR	HYDRANT MANUFACTURER	GLOBAL
HMODEL	HYDRANT MODEL	GLOBAL
HOPERDIR	HYDRANT OPERATING DIRECTION	GLOBAL
HSESZCFG	HOSE SIZE THREAD CONFIGURATION	GLOBAL
HSIZE	HYDRANT SIZE	GLOBAL
HUSE	HYDRANT USE	GLOBAL
HYDRPREQ	HYDRANT REPAIRS REQUIRED	GLOBAL
HYDRRISR	HYDRANT RISER LENGTH	GLOBAL
OPNTSZSH	OPERATING NUT SIZE AND SHAPE	GLOBAL
PMPSZCFG	PUMPER SZ THREAD CONFIGURATION	GLOBAL
YEAR	YEAR OF MANUFACTURE	GLOBAL

Maximo Location Required Data – Valve

Attribute	Description	Data Type
STNUMBER	STREET NUMBER	ALN
STNAME	STREET NAME	ALN
SIZE	SIZE	ALN
CRSST1	CROSS STREET1	ALN
CRSST2	CROSS STREET2	ALN
VBURYDEP	VALVE BURY DEPTH	ALN
ROWSURF	RIGHT OF WAY SURFACE	ALN
CORNDIR	CORNER DIRECTIONS	ALN
ARVTYP	ARV TYPE	ALN
VTYPE	VALVE TYPE	ALN
LIFESUPP	LIFE SUPPORT CUSTOMER	ALN
NORMLPOS	NORMAL VALVE POSITION	ALN
VLVDRAW	VALVE DRAWING	ALN
WTRMNSZ	WATER MAIN SIZE	ALN
VUSE	VALVE USE	ALN

Maximo Asset Required Data – Valve

Attribute	Description	Match
ARVMATYP	ARV MATERIL TYPE	GLOBAL
ARVTYP	ARV TYPE	GLOBAL
CONCTYP	CONNECTION TYPE	GLOBAL
ENCMFGR	ENCLOSURE MANUFACTORER	GLOBAL
ENCTYP	ENCLOSURE TYPE	GLOBAL
ISOVLCON	ISOLATION VALVE CONNECTION TYP	GLOBAL
ISOVLMFG	ISOLATION VALVE MANUFACTORER	GLOBAL
ISOVLMOD	ISOLATION VALVE MODEL NUMBER	GLOBAL
ISOVLSZ	ISOLATION VALVE SIZE	GLOBAL
ISOVLTYTYP	ISOLATION VALVE TYPE	GLOBAL
LAY LGTH	LAY LENGTH	GLOBAL
MFGR	MANUFACTURER	GLOBAL
MODEL	MODEL	GLOBAL
OFFSET	OFFSET	GLOBAL
OPENDIR	VALVE OPERATING DIRECTION	GLOBAL
SIZE	SIZE	GLOBAL
VACT	VALVE ACTUATOR	GLOBAL
VNUM	VALVE NUMBER	GLOBAL
VTURNS	NUMBER OF TURNS	GLOBAL
VTYPE	VALVE TYPE	GLOBAL



# **APPENDIX K**

## **ORANGE COUNTY UTILITIES**

# **ENTERPRISE SECURITY STANDARDS, POLICIES, AND GUIDELINES**

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**EXTERNAL DATA HOSTING STANDARD**

**1.0 Purpose**

The purpose of this policy is to establish a standard in order to execute the proper retrieval, storage, transmission, processing, and handling of electronic data.

**2.0 Scope**

This document applies to all vendors, networks, systems, and applications that will transmit, process, store, or handle electronic data provided by Orange County Government Board of County Commissioners (OCGBCC).

**3.0 Audience**

This document is intended for distribution to those that are involved in the retrieval, storage, transmission, processing, and handling of electronic data.

**4.0 Policies**

**4.1 Data Input and Processing**

- 4.1.1 Any use of Social Security Number information shall adhere to and abide by Florida Statutes, specifically F.S. 119.071.
- 4.1.2 The hosted application shall not have access to social security information.
- 4.1.3 The hosted application shall not have access to data containing bank information.
- 4.1.4 The hosted application shall not be granted direct or indirect access to OCGCC Active Directory usernames.
- 4.1.5 The hosted application shall not have access to the OCGCC internal or DMZ networks.

**4.2 Data Storage and Handling**

- 4.2.1 Any data accessible from the hosted application meeting the following criteria shall be encrypted at a field-level and in transit: usernames, passwords, names, addresses, phone numbers, email addresses, birthdates, federal/state/local document numbers, account numbers, race or religious information, usernames, passwords, employee identification numbers and all HIPAA and PCI information.
- 4.2.2 Any data accessible from the hosted application or directly accessible from it should be encrypted at a field level.

**4.3 Transmission of Data**

- 4.3.1 Any data referenced above shall be transmitted within an encrypted tunnel.

**4.4 Disposal of Data**

Once data is no longer needed or must be removed from the system it shall be sanitized and disposed using one of the methods below:

- 4.4.1 Sanitization - Overwriting of data previously stored on a disk or drive with a random pattern of meaningless information.
- 4.4.2 Destruction - Physically damaging a medium so that it is not usable by any device that may normally be used to read information on the media such as a computer, tape reader, audio or video player.
- 4.4.3 Purging data - Using strong magnetic devices; such as a degausser, it is possible to render data unrecoverable.

**4.5 External Audit**

- 4.5.1 The vendor must ensure that the web hosting environment and the application is secured using information security best practices.
- 4.5.2 The external service, system, and application must pass a yearly penetration test performed by Orange County ISS personnel. Alternatively the vendor can provide the results of an external audit conducted by a reputable 3<sup>rd</sup> party security company.

**5.0 Definitions**

<b>Term</b>	<b>Definition</b>
<b>Bank Information</b>	Checking account numbers, credit card numbers, or any unique number from a bank institution.
<b>Electronic Media</b>	Physical objects on which data can be stored, such as hard drives, zip drives, CD-ROMs, DVDs, USB drives, and tapes.
<b>Sanitization</b>	To expunge data from storage media so that data recovery is impossible.
<b>Physical Destruction</b>	A sanitization method for optical media, such as CDs.
<b>Florida Statue 119.071</b>	Detailed guidelines on usage of Social Security information

## 6.0 Revision History

October 2017	Specified “field-level encryption” for sensitive data at rest in 4.2.1 Added usernames and passwords to the list in 4.2.1 Added an option for a 3rd party vendor in 4.5.2 Added definition for field-level encryption
August 2012	Added “Bank Information” to list of definitions in 5.0