

3. Optional Mechanical Joints: Use mechanical joint fittings that meet the requirements of Section 330504 with the rubber gasket joint pipe when specified or when rubber gasket fittings are not available.
- J. Temporary Bulkheads: Provide temporary bulkheads at the ends of sections where adjoining pipelines have not been completed, and in connections built into pipelines where adjoining pipelines or structures have not been completed and are not ready to be connected.
1. Remove bulkheads encountered in connecting sewers or structures included in this Contract, or in pipelines or structures previously built, when they are no longer needed or when ordered.
- K. Temporary Blow-Off Assembly: Dead-end water lines shall be temporarily ended with a blow-off as shown in Collier County Standard Details. After full bore flush replace with a fire hydrant meeting the requirements of Section 331619.
- L. Sleeve Type Couplings: For sleeve type couplings, equally tighten diametrically opposite bolts on the connection so that the gaskets will be brought up evenly all around the pipe.
1. Torque Wrenches: Do the final tightening with torque wrenches set for the torque recommended by the coupling manufacturer.
- M. Concrete Encasement: Concrete encasement shall be constructed in accordance with Collier County Standard Details when:
1. A potable water main crosses at a depth that provides less than 18 inches clear distance from sewer lines in which case a Deviation Form request should be completed. Encase the sewer main unless specifically approved by Collier County Utilities. Encasement shall extend a minimum 10 feet on each side of the point of crossing. Pressure test both pipelines to 150 psi after the concrete has properly cured.
 2. A water main running parallel to a sewer line provides less than 10 feet separation from sewer lines, in which case a Deviation Form Request needs to be completed. Encase the sewer main unless specifically approved by Collier County Utilities.
 3. The ENGINEER has ordered the line encased. NO POTABLE WATER MAIN SHALL BE ENCASED IN CONCRETE UNLESS SPECIFICALLY AUTHORIZED BY THE COUNTY MANAGER OR DESIGNEE.

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.

- N. Valve Box Setting: Install valve boxes vertical and concentric with the valve stem.
1. Adjust valve-box to final grade at the time designated by the County Manager or designee.
 2. Build a collar, as shown in the standard details, 18 inches by 18 inches by 6 inches or 24 inch diameter round by 6 inches flush to grade of top of box. Similar collar shall be poured flush with grade and top of unpaved areas.
 3. Satisfactorily reset any valve box that is moved from its original position, preventing the operation of the valve.
 4. Replace any valve box that has been damaged.
- O. Identification:
1. Metallized Warning Tape: For DIP and PVC pipe (other than gravity sewer pipe and laterals) to be installed, 3-inch detectable marking tape, of appropriate color and appropriate warning statement, shall be placed along the entire pipe length. In all cases, marking tape shall be installed two feet (2') below grade or one-half the pipe's bury, whichever is less, during backfill operations (refer to Utilities Standards Manual Section 1 – 1.1 and 2.2.1). All PVC pipe, PVC fittings, and identification tape shall be color-coded per Collier County Standards. HDPE pipe installed by horizontal directional drilling will not be required to be marked with metalized warning tape.
 2. Electronic Markers (see County Approved Product List, Appendix F): Install electronic markers twenty-four inches (24") below final grade, above pipe, at all bends or changes in alignment and every two hundred and fifty feet (250') along the pipe between bends.
- P. Separation From Other Pipe Systems:
1. Parallel Water and Sewer or Non-Potable Lines: Sanitary sewer lines, storm sewers or force mains shall be separated from water mains by a minimum clear vertical distance of 18 inches and a horizontal distance of 10 feet. Non-potable, reclaimed or reuse water mains shall be separated from water mains, gravity sewers or force mains by a minimum clear vertical distance of 18 inches and a horizontal distance of 5 feet center to center or 3 feet outside to outside. When this standard cannot be maintained, the sewer line shall be concrete encased for a distance of 10 feet each way from the water line and any other conduit, with a minimum vertical clearance of 12 inches being provided at all times. See Section 1 - Design Criteria, Subsection 1.2.3.
 2. Crossing Water and Sewer or Non-Potable Lines: Water mains crossing over a sewer or non-potable water line shall be (bottom of water main to top of sewer) separated by at least 18 inches unless local conditions or barriers

prevent an 18 inch vertical separation. All crossings with vertical clearance less than 18 inches shall be made using sewer pipe thickness Class 200 AWWA C900 PVC pipe, and water pipe of Class 51 Ductile iron pipe, for a distance of 10 feet on each side of the crossing. The gravity sewer pipe in these locations shall be backfilled with USCS Class I bedding stone to a height of 6 inches above the crown of the pipe. When water mains cross under a sewer, both mains shall be constructed of C900 Class 200 PVC pipe with joints equivalent to water main standards for a distance of 10 feet on each side of the point of crossing with no intermediate joints. Additionally, a section of water main pipe shall be centered at the point of crossing. See Section 1 – Design Criteria, Subsection 1.3.

Q. Aerial Crossings:

1. Pipes spanning elevated pier crossings shall be flanged ductile iron Pressure Class 350 pipe conforming to AWWA C115, C150 & C151. Pipe spanning on piers spaced further apart than normal pipe length of 18 or 20 ft. shall be multiple length pipe with interior flanged joints with a rubber gasket pipe (see County Approved Product List, Appendix F). The pipe wall thickness and flanged joints shall be designed to safely span the elevated piers under working pressure without exceeding the allowable stresses and conform to AWWA C150. Limit pipe deflection at center of span with pipe full of water to 1/720 of span length. Provide expansion joints for between above ground and below ground wastewater lines.
2. Flanges shall conform to AWWA C150 and C115. All bolts and nuts used in aerial crossings shall be 304 stainless steel. Gaskets shall be full faced or recessed "O-Ring" type to prevent leaks in pipe under stress in the aerial crossing.
3. Outside surface of all pipe, flanges or spool pieces shall be shop coated with zinc primer, High Build Epoxy protective coat and a finish coat of polyurethane high gloss. Color shall be Federal Safety Blue for potable water mains and Pantone Purple 522 C for non-potable irrigation water mains.
4. Install operating valves or other flow regulating devices on each shoreline or at a safe distance from each shoreline to prevent discharge in the event the line is damaged.
5. Install supports for all joints in pipes utilized for aerial crossings and to prevent overturning and settlement. Expansion jointing is specified between above ground and below ground sewers and force mains.

3.3 FIELD QUALITY CONTROL

- A. Testing: Test pipelines in accordance with Section 022501.

1. Test valves in place, as far as practicable, and correct any defects in valves or connections.
 2. Gravity Sewer Lines: Test in accordance with Section 022501
- B. Inspection: Clean, inspect, and examine each piece of pipe and each fitting and special for defects before it is installed.
1. Cut away any lumps or projections on the face of the spigot end or the shoulder.
 2. Do not use any cracked, broken, or defective pieces in the work.
 3. If any defective piece should be discovered after having been installed, remove and replace this piece with a sound piece in a satisfactory manner at no increase in Contract Amount.

3.4 CLEANING

- A. General: Thoroughly clean all pipe before it is laid and keep it clean until it is accepted in the completed work.
- B. Removal of Materials: Exercise special care to avoid leaving bits of wood, dirt, and other foreign particles in the pipe. If any particles are discovered before the final acceptance of the work, remove and clean the pipe.

3.5 DISINFECTION

- A. General: Disinfect all pipelines that are to carry potable water in accordance with Section 025400.

END OF SECTION

NO TEXT FOR THIS PAGE

SECTION 330520

PIPE REMOVAL AND ABANDONMENT

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Removal and abandonment of piping and appurtenances, wholly or in part, as required to complete Work as shown on the Drawings and specified in this Section.
- B. Related Work Specified in other Sections Includes:
 - 1. Section 020500 – Connection to Existing Systems
 - 2. Section 033100 – Concrete, Masonry Mortar and Grout
 - 3. Section 312316 – Excavation – Earth and Rock
 - 4. Section 312323 – Backfilling

1.2 SUBMITTALS

- A. General: Provide all submittals, including the following, as specified in Division 1.
- B. Submit the following:
 - 1. Proposed methods for pipe removal and abandonment;
 - 2. Equipment proposed to be used to do pipe removal and abandonment work;
 - 3. Resume of pipe grouting subcontractor;
 - 4. Pipe removal and abandonment schedule/sequence.
- C. If a detour is required, submit a traffic control plan for approval to County Manager or designee and/or the Florida Department of Transportation as described in Section 015526.

1.3 SITE CONDITIONS

- A. General
 - 1. Prior to any work, a proper and approved maintenance of traffic plan (MOT) shall be submitted to the engineer and the County.
 - 2. Execute pipe removal and abandonment so that there is no injury to persons or damage to adjacent buildings, structures, equipment, materials, piping, wiring, pavement, fences, trees, guardrails, and other adjacent improvements. Execute demolition and abandonment so that access to facilities that are in operation and to residences and businesses is free and safe.
 - 3. Execute pipe removal and abandonment so that interference to vehicular traffic and personnel traffic does not exceed scheduled interference. Do not place rubble,

excavation, piping, or other materials removed on roadways, drives, or sidewalks that are to remain in service.

PART 2 - PRODUCTS

2.1 TEMPORARY MATERIALS

- A. Provide temporary fencing, barricades, barriers, piping, valves, pumps, power and controls, and water necessary to meet the requirements of this Section.
- B. Temporary fencing, barricades, barriers, and enclosures shall be suitable to the purpose intended.

2.2 REPAIR AND REPLACEMENT MATERIALS

For repair or replacement of existing facilities or improvements to remain, use materials identical to, or equal to, materials used in existing work when new.

PART 3 – EXECUTION

3.1 GENERAL

- A. Conduct pipe removal and abandonment as shown and specified in the Contract Documents.
- B. Conduct pipe removal and abandonment so that existing equipment, piping, wiring, structures, and other improvements to remain are not damaged. Repair or replace equipment, piping, wiring, structures, and other improvements damaged at no additional cost to the County.
- C. Do not remove equipment, piping, wiring, structures, or other improvements not shown or specified to be removed. If equipment, piping, wiring, structures, or other improvements not shown or specified to be removed is removed, replace equipment, piping, wiring, structures, or other improvements at no additional cost to the County.

3.2 DISCONNECTIONS

- A. Prior to starting pipe removal or abandonment, check underground and exposed existing utilities, piping, and equipment within the limits of pipe removal or abandonment. Prior to starting, check underground and exposed existing utilities, piping connected to and associated with existing pipe to be removed or abandoned. Verify the following:
 - 1. Piping is inactive (abandoned);
 - 2. Other utilities which may be in conflict have been permanently or temporarily disconnected, if required:
- B. Do not proceed with salvage or demolition if piping is active or utilities have not been disconnected.

3.3 ABANDONMENT

- A. The Contractor shall, as described on the Drawings and as may be directed by the County, abandon in place the following existing utility improvements:
1. All water mains, reuse water mains and raw water mains that are designated to be abandoned shall be filled with grout. Refer to Section 033100 – Concrete, Masonry Mortar and Grout.
 2. All sewer lines, force mains, laterals and services that are designated to be abandoned shall be flushed clean and filled with grout. Prior to grout fill, sewer lines, force mains, laterals and services to be abandoned shall be flushed clean to remove wastewater and solids. Contractor is responsible for securing and providing flushing water, collection of flush water/wastewater, and disposal. The cleaning of these piping systems shall comply with all local and DEP requirements.
 3. Sewer manholes designated to be abandoned shall have the top two feet removed. The remainder of each manhole shall be abandoned and filled with grout or flowable fill. The excavation or pit shall be backfilled with select fill and compacted in accordance with Section 312323 – Backfilling and the trenching details on the Drawings.
- B. Appurtenances: All water hydrants, ARV valves and other appurtenances on abandoned lines shall be removed to the main and the fitting at the main shall be capped or plugged. All valves shall have the valve box, pad and operator removed, with the valve left in the open position unless specifically noted otherwise.
- C. Preparation:
1. The County shall be notified at least 72 hours in advance of grouting operations.
 2. Bulkheads shall be spaced at intervals of not more than 1,000 feet. If the line to be abandoned is longer, bulkheads shall be inserted in the pipe to maintain the required maximum spacing between bulkheads.
 3. Temporary vents shall be installed in the line to be filled at a maximum spacing of 150 ft. The vents shall be capable of being capped to allow further grouting operations.
- D. Equipment:
1. The materials shall be mixed or delivered in equipment of sufficient size and capacity to provide the desired amount of grout material for each stage in a single operation. The equipment shall be capable of mixing the grout at densities required for the approved procedure and shall also be capable of changing density as dictated by field conditions any time during the grouting operation.
 2. Mixers and Pumps - The grout shall be delivered to the injection point at a steady pressure with a non-pulsating centrifugal or triplex pump. Means shall be provided to increase or decrease the water-cement ratio. The system shall mix the grout to a homogeneous consistency. Means of accurately measuring grout component quantities, pumping pressures, and volumes pumped shall be provided.

3. Pressure Gauges - CONTRACTOR shall provide one pressure gauge at the point of injection and one pressure gauge at the grout pump. Grouting shall not proceed without appropriate calibrated gauges in place and in working order. Pressure gauges shall be equipped with diaphragm seals, have a working range between 1.5 to 2.0 times the design grout pressure, and have an accuracy within 0.5 percent of full range. Pressure gauges shall be instrument oil filled and attached to a saddle-type diaphragm seal to prevent clogging with grout.

E. Grouting:

Once grouting operations begin, grouting shall proceed uninterrupted from bulkhead to bulkhead. Grout placement shall not be terminated until both of the following conditions have been met, unless otherwise approved by the County: a) The estimated volume of grout to fill the line has been injected; and, b) grout has been expelled from the furthest vent or bulkhead. Bulkheads and temporary vents shall not be removed until the grout has set.

F. Testing and Sampling:

1. Take four test specimens for each 50 cubic yards of grout or for each four hours of placing.
2. Test in accordance with ASTM C109 except:
 - a. The specimens shall be 3 inch by 6 inch cylinders covered after casting to prevent damage and loss of moisture. Moist cure specimens for a period up to 7 days prior to a 28-day compressive strength test.
 - b. Do not oven dry specimens that are load tested. Specimens may be tested at any age to monitor compressive strength. The material may require special handling and testing techniques.

G. The CONTRACTOR may remove the pipe in accordance with the Paragraph 3.04 in lieu of abandonment if acceptable to the County. Such removal, however, will be paid at the same price for pipe abandonment.

H. All work under this Section shall comply with City, County, State and Federal regulations.

3.4 REMOVAL AND DISPOSAL

A. The Contractor shall, as described on the Drawings and as may be directed by the County, remove the following existing utility improvements:

1. All water mains, reuse water mains and raw water mains that are designated to be removed.
2. All sewer lines, sewer manholes, force mains, laterals and services that are designated to be removed shall be flushed clean with water prior to removal. Contractor is responsible for securing and providing flushing water, collection of flush water/wastewater, and disposal. The cleaning of these piping systems shall comply with all local and DEP requirements.

B. The pipe removal and disposal shall include all valves, fittings and appurtenances.

3.5 SALVAGE OF EQUIPMENT, PIPING, AND MATERIALS

- A. Remove items identified on the drawings or specified to remain the property of the County. Do not damage equipment, piping, and materials to be salvaged.
- B. Following removal of equipment, piping, and materials to be salvaged, place equipment, piping, and materials in a location within the County limits as designated by the County.

3.6 REPAIRS

Repair structural elements, equipment, piping, conduit, and other improvements to remain that are damaged during demolition. Use workers specifically qualified in trade, or trades, involved to repair damaged work.

3.7 DISPOSAL

- A. Remove and dispose of all equipment, piping, and materials from the jobsite not specifically designated to be retained by the County.
- B. Contractor shall not accumulate or store debris from demolition on the project site.
- C. The disposal of the piping, manholes and appurtenances shall be in accordance with County, State and Federal laws.

3.8 BACKFILLING

- A. Backfill excavations, trenches, and pits resulting from abandonment and removal according to Section 312323 – Backfilling.
- B. Backfill of the pipe trenches shall be according to the County details for pipe trench backfill. Pipe trenches for removed pipes that were within 3 horizontal feet of the edge of pavement shall be backfilled according to the detail for the type of roadway.

3.9 CLEANUP AND CLOSURE

- A. Following pipe abandonment or removal, clean-up areas where other work is to be done as specified in this Section, or Sections applicable to work to be done.
- B. Following pipe abandonment or removal, clean-up areas where no other work is to be done under this Contract. Remove debris and rubbish, temporary facilities, and equipment. Level surface irregularities to eliminate depressions. Leave work in a neat and presentable condition.
- C. In locations where a pipe to be abandoned or removed connects to a pipe that remains in service, the Contractor shall install a suitable cap or plug on the end of the active pipe.

END OF SECTION

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SECTION 330523.13

HORIZONTAL DIRECTIONAL DRILLING

PART 1 GENERAL

1.1 DESCRIPTION OF REQUIREMENTS

- A. The requirements of this section are applicable to all horizontal directional drills where the carrier pipe is 3" in nominal diameter and larger.
- B. Provide all necessary tools, materials, labor, supervision and equipment to successfully complete the installation of directionally drilled piping as specified herein and shown on the drawings. The CONTRACTOR shall be responsible for the final constructed product, and for furnishing the qualified labor and superintendence necessary for this method of construction.
- C. Furnish all items necessary to perform the horizontal directional drilling operation and construct the pipe to the lines and grade shown on the drawings. Project work tasks include completion of the drilling, pulling operations, horizontal directional drilling installation pressure testing, and final connection of piping installed as part of the horizontal directional drilling to open-cut piping. Horizontal directional drilling shall include the following work elements:
 - 1. Drilling of the pilot hole and the reaming of the hole sufficient to install the HDPE pipe.
 - 2. Provide, assemble, and install HDPE pipe including:
 - a. Thermal fusion welding the HDPE pipe sections for temporary staging.
 - b. Pulling the HDPE fused pipe stringout, in a continuous pullback operation with one fuse pipe cartridge.
 - 3. Following HDPE pipe pullback, cut the HDPE pipe stubouts and install a temporary thermal fusion welded HDPE cap on both ends of the HDPE pipe stubouts, and perform pressure testing with water to verify pipeline integrity in accordance with the requirements of Section 022501 for HDPE product pipe material.
- D. Use techniques of creating or directing a borehole along a predetermined path to a specified target location. Use mechanical and hydraulic deviation equipment to change the boring course and use instrumentation to monitor the location and orientation of the boring head assembly along a predetermined course.

1. Develop, provide, and operate a Drill Fluid Loss Monitoring Program as follows:
 - a. Drill Fluid Loss Monitoring Program shall insure the following:
 - 1) Site specific storm water control measures meet the requirements of the FDEP Best Management Practices guidelines. Storm water control measures shall include, as a minimum, onsite silt fence and sandbags or other mechanical means located between the construction operations and any adjacent water body. Storm water control measures shall provide positive containment of uncontrolled fluids on the site resulting from spills or overtopping of drill pits from heavy rainfall and prevent the fluids from reaching adjacent water body, or bodies.
 - 2) Positive containment of uncontrolled fluids on the site resulting from spills or overtopping of drill pits from heavy rainfall.
 - 3) Fluids are prevented from reaching the adjacent water bodies, per FDEP ERP permit requirements.
 - b. Drill Fluid Loss Monitoring Program shall include the following:
 - 1) Observations along the drill path during drilling and reaming operations;
 - 2) Equipment for spill control remediation including, but not necessarily limited to, vac trucks, sand bags, and pumps; emergency spill and leakage control materials and equipment including diapers, absorbent material and other fuel and oil spill containment and cleanup materials;
 - 3) Drill fluid loss monitoring and containment including downhole verification of annular drill fluid pressure with continual and immediate reading capability of the pressure monitor;
 - 4) Drill rig instrumentation, including remote-monitoring electronic data recording features, to monitor drill fluid pressures and rates at pits, tanks, pumps, and drill rig operations;
 - 5) Drill fluid properties measuring equipment; and
 - 6) Trained field personnel to monitor and maintain the instrumentation.
 - c. Provide drill fluid Loss Circulation Materials (LCM's) on site ready for use if needed.
2. Equipment shall be in functional order during all drilling operations.

3. Data shall be provided to the OWNER's representative daily or on request and a complete package of the recorded data will be provided to the OWNER following completion of the drill.

E. Accomplish drilling with fluid-assist mechanical cutting. Use a mixture of bentonite and water or polymers and additives. Use bentonite sealants and water to lubricate and seal the mini-tunnel. Use minimum pressures and flow rates during drilling operation as not to fracture the sub-grade material around and or above the bore.

F. Utilize small diameter fluid jets to fracture and mechanical cutters to cut and excavate the soil as the head advances forward.

G. Install an offset section of drill stem that causes the cutter head to turn eccentrically about its centerline when it is rotating for steering. When steering adjustments are required, rotate the cutter head offset section toward the desired direction of travel and advance the drill stem forward without rotation. Control of tunnel line and grade shall meet the requirements of this section.

H. The mobile drilling system shall be capable of being launched from the surface at an inclined angle and drilling a pilot hole with a diameter appropriate to the size, length, and configuration of the directional drill. The pilot hole shall then be enlarged with reamers as required. Pilot holes are not required on drills 4" and smaller.

I. Develop and provide certified as-built plans, signed and sealed by a Professional Land Surveyor licensed in the State of Florida, in accordance with this Section

1.2 REFERENCE STANDARDS

A. See Section 330502 for casing and carrier pipe diameter requirements.

B. American Association of State Highway and Transportation Officials (AASHTO).

C. Occupational Safety and Health Administration (OSHA).

D. ASTM Standards:

1. ASTM D 3261 Standard Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing

2. ASTM F 1962 Standard Guide for Use of Maxi-Horizontal Directional Drilling for Placement of Polyethylene Pipe or Conduit Under Obstacles, Including River Crossings

1.3 DEFINITIONS

- A. CONTRACTOR's Construction Drawings shall be defined as drawings by which the CONTRACTOR proposes to construct, operate, build, etc., the referenced item. Submit Construction Drawings for the sole purpose of providing the sufficient details to verify that the CONTRACTOR's work in progress is in accordance with the intent of the design.

1.4 SUBMITTALS

- A. The ENGINEER will base the review of submitted details and data on the requirements of the completed work, safety of the work in regards to the public, potential for damage to public or private utilities and other existing structures and facilities, and the potential for unnecessary delay in the execution of the Work. Such review shall not be construed to relieve the CONTRACTOR in any way of his responsibilities under the contract. Do not commence work on any items requiring CONTRACTOR's Construction Drawings or other submittals until the drawings and submittals are reviewed and accepted by the ENGINEER.

- B. The CONTRACTOR shall:

1. Submit for review complete construction drawings in plan and profile view identifying details of the proposed method of construction and the sequence of operations to be performed during construction only if deviations from the contract plans are proposed. The drawings shall be sufficiently detailed to demonstrate to the ENGINEER whether the proposed materials and procedures will meet the requirements of the Contract Documents.
2. Submit manufacturer's data for the HDPE pipeline, as outlined in Section 330502 for HDPE product pipe material.
3. Submit the directional boring locating equipment proposed for use, method of locating to be used, and the proposed sequence and method of construction, for approval by the ENGINEER in accordance with the plans and specifications. Include information on how the bore is to be steered, the information recorded, and the pipe location verified for record drawings. Include proposed pilot bore tunnel size, proposed drilling fluid composition and Material Safety Data Sheets (MSDS), proposed viscosities, proposed pre-ream procedures, and final tunnel size. Submit proposed Temporary Traffic Control (MOT) plans for FDOT right-of-way work and for Collier County DOT right-of-way work.
4. Submit a work sequence and schedule. Provide a list of key personnel for the project including superintendent, driller, and tracking specialists.
5. Prior to approval for directional boring, the CONTRACTOR shall submit the names of supervisory field personnel and historical information of directional boring experience.

6. Drill Method Submittal: Submit a minimum of 20 days before starting drilling for review and approval. This submittal shall include the following information:
 - a. Drawings. Submit scaled plan showing the following: the work zone equipment configuration at each end of the drill; staging and storage areas; and the location of drill fluid, HDPE pipe, water supply for drilling, cuttings, pit spoil handling areas; and storm water containment measures, devices and locations.
 - b. Drilling Procedure. It is recognized and accepted that the CONTRACTOR may need to adjust drilling procedures and equipment as new information is developed during the drill. The intent of this requirement is to provide the CONTRACTOR's initial approach to the project specific subsurface and permit conditions.
 - c. Maximum Pipe Pull-back Forces: Submit anticipated maximum pipe pull-back forces based on proposed drill path plan and profile.
 - d. Drill Fluid Loss Monitoring/Frac-Out Plan. Submit materials list including bentonite and bentonite additives for the project along with respective MSDS for all materials used on the site.
7. Tracking Coordination Submittal: Provide this submittal a minimum of 20 days prior to drilling. The intent of this submittal is to coordinate the contractor activities with the tracking specialist. Include manufacturer's data sheets and calibration on the tracking equipment and sample data recording log sheets.
8. The CONTRACTOR shall bring to the attention of the ENGINEER any known design issues based on CONTRACTOR's proposed drilling methods and/or procedures. This shall be stated in writing to the ENGINEER no later than the preconstruction meeting.
9. CONTRACTOR's construction drawings shall be submitted on the following items only if deviations from the Contract plans are proposed.
 - a. Proposed contingency plans for critical phases and areas of directional drilling.
 - b. Any proposed deviations from the Contract construction plans.
 - c. Any proposed deviations from the Contract construction specifications.
10. Quality Control Methods. CONTRACTOR shall submit a description of his quality control methods he proposes to use in his operations to the ENGINEER. The submittal shall describe:

- a. Procedures for controlling and checking line and grade.
- b. Equipment specifications for checking line and grade.
- c. Field forms for establishing and checking line and grade.
- d. Actual product pipe pullback forces.

1.5 QUALITY CONTROL

- A. Low Pressure Air Test. Before the OWNER accepts the installation of each HDD, the CONTRACTOR shall perform a low-pressure air test of each of the HDPE fused pipe string-out cartridges prior to pipe pullback. Low pressure testing of the above ground pipes to be 10 psig for 60 minutes duration, soap all joints to test for leaks, and test pressure to remain within 2 PSI of original applied pressure for acceptance.
- B. Annular Pressure Monitoring. Annular pressure shall be monitored and recorded using equipment constructed for that purpose, and shall include a fully-instrumented remote-monitoring data recording package, such as PASON or equal. Annular pressures shall be monitored and recorded in the Annular Pressure Report. Annular pressure shall be recorded during active drilling of the pilot hole and during the first ream pass. The minimum and maximum annular pressure experienced during the joint shall also be recorded; the minimum and maximum pressures are not necessarily the pressures recorded at the start, middle and end of each joint, but shall be maximum values as measured throughout the whole joint. The time of each recorded measurement shall be recorded. The annular pressure measurements shall be indexed to the rod being drilled. The trends of the circulating pressure information will be assessed and corrective action shall be taken when appropriate. Drilling shall be stopped when required to prevent excess annular pressure. Drilling may resume once the cause of the excess down-hole pressure has been identified and corrected.
- C. Pipe Pull-back Forces. Force applied to pipe during pull-back shall not exceed the values shown on the Drawings.
- D. ENGINEER Authority for Directional Drilling. Directional drilling shall be performed in accordance with approved submittals. ENGINEER will have the authority to interpret and make decisions with respect to drilling activities should specification interpretation be required or unanticipated conditions occur.

1.6 JOB CONDITIONS

- A. Safety Requirements
 - 1. Perform work in a manner to maximize safety and reduce exposure of men and equipment to hazardous and potentially hazardous conditions, in accordance with applicable safety standards.

2. Whenever there is an emergency or stoppage of work which is likely to endanger the excavation or adjacent structures, operate a full work force for 24 hours a day, including weekends and holidays, without intermission until the emergency or hazardous conditions no longer jeopardize the stability and safety of the work.

B. Air Quality.

1. Conduct directional drilling operations by methods and with equipment, which will positively control dust, fumes, vapors, gases or other atmospheric impurities in accordance with applicable safety requirements.

C. Geotechnical Investigation

1. Make any geotechnical investigations deemed necessary to determine actual site conditions.

D. Unanticipated Conditions

1. Notify ENGINEER of unexpected subsurface conditions and discontinue work in affected area until notified by ENGINEER to resume work.
2. Take emergency measures as required to protect persons and improvements.

1.7 UTILITY PROTECTION

- A. Utility lines and structures indicated on the drawings, which are to remain in service, shall be protected by the CONTRACTOR from any damage as a result of their operations. Where utility lines or structures not shown on the drawings are encountered, the CONTRACTOR shall report them to the ENGINEER before proceeding with the work. The CONTRACTOR shall bear the cost of repair or replacement of any utility lines or structures, which are broken or damaged by their operations.

- B. All utilities that may be impacted by the HDD shall be exposed through a "pot-hole" or other opening, in accordance with state utility locate laws and regulations, to ensure, through visual inspection, that the drill, reamer, or product pipe will not cause damage to the utility.

1.8 PERMITS

- A. Obtain any and all other permits required for prosecution of the work.

PART 2 PRODUCTS

2.1 GENERAL

- A. Refer to Section 330502 for HDPE pipe material.
- B. Use a high quality bentonite drilling fluid or equivalent to ensure hole stabilization, cuttings transport, bit and electronics cooling, and hole lubrication to reduce drag on the drill pipe and the product pipe. Oil based drilling fluids or fluids containing additives that can contaminate the soil or groundwater will not be considered acceptable substitutes. Composition of the fluid shall comply with all federal and local environmental regulations.
 - 1. Disposal of drilling fluids shall be the responsibility of the CONTRACTOR and shall be conducted in compliance with all relative environmental regulations, right-of-way and workspace agreements and permit requirements.
 - 2. Drilling fluid returns can be collected in the entrance pit, exit pit, or spoils recovery pit. The CONTRACTOR shall immediately clean up any drilling fluid spills or overflows from these pits.

PART 3 EXECUTION

3.1 GENERAL

- A. The CONTRACTOR shall be responsible for his means and methods of directional drilling construction and shall ensure the safety of the work, the CONTRACTOR's employees, the public, and adjacent property, whether public or private.
- B. Obtain locations of all existing utilities within the horizontal directional drilling project area, whether shown on the plans or not, in coordination with the owners of such utilities. Be responsible for protection of such utilities from damage, and repair of any utilities damaged during or as a result of construction.
- C. Anticipate that portions of the drilled excavation will be below the groundwater table.
- D. Comply with all local, state and federal laws, rules and regulations at all times to prevent pollution of the air, ground and water.
- E. A pilot hole shall be drilled such that the required vertical clearances from ditch, river, or wetland bottoms and utilities and horizontal clearances from jurisdictional or buffer lines and utilities are maintained. If the pilot hole exits in jurisdictional or buffer areas they shall be responsible to grout hole to satisfaction of the environmental regulators and the ENGINEER.

- F. The boring hole shall then be reamed to be 120% to 150% oversized than the HDPE product pipe OD. Drilling mud, usually fluidized bentonite clay, shall be used to stabilize the hole and remove soil cuttings. The CONTRACTOR shall monitor and record the reamed hole location and depth at the same intervals as the bore hole.
- G. The pull-back operations shall include pulling the entire pipe stringout, in one segment back through the reamed hole and drilling mud. The pull-back operations shall include filling the product pipe with water to reduce the buoyancy and to reduce the pull-back forces required to pull-back the product pipe in the borehole. Proper pipe handling, cradling, bending minimization, surface inspection, and fusion welding procedures (for HDPE) shall be followed in accordance with this specification and Section 330502. Note that anticipated pullback speed is typically 1 to 2 feet per minute. Pull-back operation shall be continuous with no stoppage. If conditions exist where the pull-back cannot be continuous, the Contractor shall submit an alternative plan to the Engineer for review and approval prior to commencing the drill.
- H. Any soil borings required for the CONTRACTOR's detailed designs shall be included in the bid. The CONTRACTOR is fully responsible to obtain this information.
- I. CONTRACTOR shall be responsible for design and construction of the drill entrance and exit pits. Supports may be required to maintain safe working conditions, ensure stability of the pit, minimize loosening, and minimize soil deterioration and disturbance of the surrounding ground.
- J. CONTRACTOR shall be required to locate all utilities prior to start of excavation or drilling. All utilities crossed or approached within 48 inches in a lateral direction shall be exposed to verify location. In addition, visual verification shall be required that the drill, reamer, or product pipe has missed the utility as it passes. Damage to utilities shall be the responsibility of the CONTRACTOR.
- K. Immediately upon completion of work, all rubbish and debris shall be removed from the job site. All construction equipment and implements of service shall be removed and the entire area involved shall be left in a neat, clean, and acceptable condition.
- L. "Frac-outs" or "Blow holes" of drilling fluid to the surface shall be immediately reported to the ENGINEER and the OWNER's representative, and shall be cleaned up immediately and the surface area washed and returned to original condition. All drilling fluids, spoils, and separated material shall be disposed of in compliance with federal and local environmental regulations.

- M. If, during boring, an obstruction is encountered which prevents completion of the bore in accordance with the design location and specification, and the product pipe is abandoned in place and taken out of service, the failed bore shall be filled with cement grout. The record drawings shall show the failed bore path along with the final bore path on the as-built plans. Should the HDD crossing be lost or damaged while the CONTRACTOR is engaged in the performance of the work, all such lost or damage to the hole shall be borne by the CONTRACTOR. Failure to complete the crossing or partially completed crossing by directional drilling or as approved by ENGINEER and OWNER will result in forfeiture of all payment.

3.2 EQUIPMENT

- A. Diesel, electrical, or air-powered equipment will be acceptable, subject to applicable federal and state regulations.
- B. Any method or equipment that the CONTRACTOR can demonstrate will produce the specified results will be considered.
- C. Employ equipment that will be capable of handling the various anticipated ground conditions. In addition, the equipment shall:
1. Be capable of minimizing loss of ground ahead of and around the machine and providing satisfactory support of the excavated face at all times.
 2. Provide a system to indicate whether the amount of earth material removed is equivalent to that displaced by the advance of the machine such that the advance rate may be controlled accordingly.
- D. Provide adequate secondary containment for any and all portable storage tanks.
- E. Provide down-hole annular pressure monitoring equipment, including remote monitored electronic data recording package, such as PASON, or equal.

3.3 DIRECTIONAL DRILLING DATA

- A. Submit daily logs of construction location, progress and events, including observations on the following:
1. Drill thrust pressure.
 2. Drill pullback pressure.
 3. Annular pressure.

3.4 CONTROL OF THE TUNNEL LINE AND GRADE

A. Construction Control.

1. Establish and be fully responsible for the accuracy of control for the construction of the pipeline to be installed, including structures, tunnel line and grade.
2. Establish control points sufficiently far from the tunnel operation so as not to be affected by construction operations.
3. Maintain daily records of alignment and grade and submit three copies of these records to the ENGINEER. However, the CONTRACTOR remains fully responsible for the accuracy of his work and the correction of it, as required.
4. Check, monitor, and record control for the bore alignment against an above ground undisturbed reference at least once each hour and at least once for each drill rod length interval. CONTRACTOR shall immediately report bore alignment location to ENGINEER after each control check. The location shall be reported based on the approved bore alignment, i.e. horizontal distance and direction from approved bore alignment and vertical distance and direction from approved bore alignment length from the entry or exit point along the bore path, and horizontal distance from the entry or exit point.
5. The pilot hole shall be drilled on bore path with no deviations greater than 10 percent of depth of the bore path as shown on the Drawings or approved CONTRACTOR submittal drawings. In the event that pilot hole deviates from bore path more than 10 percent of depth, CONTRACTOR shall notify ENGINEER and ENGINEER may require CONTRACTOR to pull-back and re-drill from the location along bore path before the deviation. The depth of the bore path is the vertical distance from the drill head to the surface of the earth, i.e. ground, pavement, water surface. Any deviations greater than 10 percent shall be reviewed by the ENGINEER. Excessive deviation may be grounds for rejection of the bore. All minimum vertical separations and clearances must be maintained regardless of the allowable drill path deviations.
6. Pilot hole shall be drilled on bore path with no deviations greater than 10 feet horizontally along the path of the drill. Excessive deviation may be grounds for rejection of the bore. Regardless of the tolerance achieved, right-of-way and easement restrictions shall take precedence over the listed tolerances. Listing of tolerances does not relieve CONTRACTOR from responsibility for safe operations or damage to adjacent utilities and structures.

7. Record survey of the pilot hole shall be submitted in State Plane Coordinate system using NAVD 1988 datum.

3.5 INSTALLATION OF TRACKING/LOCATING WIRE

- A. Install all facilities such that their location can be readily determined by electronic designation after installation. For non-conductive installations, attach a minimum of two (2) separate and continuous conductive tracking (tone wire) materials, either externally, internally or integral with the product. The ends of the tone wire shall be stubbed up through a one-inch (1") diameter SCH 80 PVC pipe which shall be installed in the concrete valve pad adjacent to the valve box on both sides of the directional drill. Use either a continuous green-sheathed solid conductor copper wire line (minimum #12 AWG for external placement or minimum #14 AWG for internal placement in the conduit/casing) or a coated conductive tape. Conductors must be located on opposite sides when installed externally. Connect any break in the conductor line before construction with an electrical clamp, or solder, and coat the connection with a rubber or plastic insulator to maintain the integrity of the connection from corrosion. Clamp connections must be made of brass or copper and of the butt end type with wires secured by compression. Soldered connections must be made by tight spiral winding of each wire around the other with a finished length minimum of three (3) inches overlap. Test conductors for continuity. Each conductor that passes must be identified as such by removing the last six (6) inches of the sheath. No deductions are allowed for failed tracking conductors. Conductor ends must be stubbed out through the PVC conduit at the isolation valve box at the terminus of the drill.

3.6 DEWATERING

- A. Where such effort is necessary, cost for groundwater control during the course of the directional drilling work shall be included in the unit contract price for the work.
- B. Dewatering required during the course of the project to lower water table, to remove standing water, surface drainage seepage, or to protect ongoing work against rising waters or floods shall be considered incidental to the work being performed.

3.7 DISPOSAL OF EXCESS MATERIAL

- A. Dispose of excess material, including, but not necessarily limited to, drill fluid, casing water, cuttings and pit spoil, off of the project site.
- B. Non-hazardous waste meeting the requirements of a Class III Waste shall be disposed of in a FDEP permitted Class III Landfill.

- C. Non-hazardous waste meeting the requirements of a Class I or II waste shall be disposed of in a FDEP permitted Class I or Class II landfill.

3.8 DOCUMENTATION REQUIREMENTS OF RECORD DRAWINGS

- A. Provide the ENGINEER a complete set of As-Built Plans showing all bores (successful and failed) within 30 calendar days of completing the work. Ensure that the plans are dimensionally correct copies of the Contract plans and include utility and/or topography plan and profile, cross-section, boring location and subsurface conditions as directed by the ENGINEER. As-Built Plans shall show appropriate elevations and be referenced to two permanent benchmarks as shown on the drawings, and in a State Plane grid system and NAVD 88 datum, as designated on the Contract plans. As-Built Plans shall be same scale in black ink on white paper, of the same size and weight as the Contract Drawings. Submittal of electronic plans data in addition to hard copy plans is required and shall be compatible with the industry standard CAD software. As-Built Plans shall be signed and sealed by a Professional Land Surveyor licensed in the State of Florida. Specific plans content requirements include but may not be limited to the following:

1. The Contract plan view showing the center line location of each facility installed, or installed and placed out of service, to an accuracy of 0.1 feet at the ends and other points physically observed in accordance with the bore path report.
2. As directed by the ENGINEER, provide a plan and profile for each bore path. Show the ground or pavement surface and center line elevation of each facility installed, or installed and placed out of service, to an accuracy of within 0.1 feet at the ends and other exposed locations. Each bore path shall be depicted on the Contract plans using the same datum as the Contract plans.
3. Show the top elevation, diameter and material type of all utilities encountered and physically observed during the subsoil investigation. For all other obstructions encountered during a subsoil investigation or the installation, show the type of material, horizontal and vertical location, top and lowest elevation observed, and note if the obstruction continues below the lowest point observed.
4. Include bore notes on each plan stating the final bore path diameter, product pipe diameter and type, drill entry and exit angles, and installed bore path radius for each pipeline installed by HDD.

3.9 CLEANING

- A. General. Directional drilling operation site cleaning shall meet the requirements of Section 017423 Cleaning.

- B. Spillage. Clean spillage, on adjacent streets, from construction operations on a daily basis, if spillage occurs.

END OF SECTION

SECTION 330523.16

JACKING, AUGERING AND MINING

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Pipeline installation in casing pipe beneath highways, railroads and other structures may be installed by jacking and augering or by jacking and mining.
- B. Related Work Specified in Other Sections Includes:
 - 1. Section 033100 – Concrete, Masonry, Mortar and Grout
 - 2. Section 312316 – Excavation - Earth and Rock
 - 3. Section 314000 – Shoring, Sheeting and Bracing

1.2 REFERENCES

- A. Codes and standards referred to in this Section are:
 - 1. ASTM C 76 - Specification for Reinforced Concrete Culvert, Storm Drain, and Sewer Pipe
 - 2. ASTM A 139 - Specification for Electric-Fusion (Arc) -Welded Steel Pipe (NPS in 4 in. and Over)
 - 3. OSHA PL-91-596 - Occupational Safety Health Act of 1970 Public Law 91-596

1.3 SUBMITTALS

- A. Provide all submittals, including the following, as specified in Division 1.
 - 1. Working drawings of the jacking pipe, jacking frame, jacking head, reaction blocks, sheeting, including design calculations and the complete jacking installation.
 - 2. Necessary permit applications and approvals by the appropriate authority.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle all products and materials as specified in Division 1.

PART 2 PRODUCTS

2.1 MATERIALS

- A. General: Use the following for casing piping.
 - 1. Spiral Weld or smooth wall steel pipe, meeting the requirements of ASTM A 139, Grade B. The minimum casing pipe size shall be determined by maintaining a minimum of a four inch (4") difference between the carrier pipe's largest outside diameter (including restraints) and the casing pipe's inside diameter. The wall thickness shall be a minimum of .25 inches for up to twenty inch casings, .312 inches for twenty-four to thirty-six inch casings, and .50 inches for forty-two inch and larger casings. For special design considerations, obtain approval from Collier County Utilities.
- B. Fill Material: Use fill material consisting of 1-1/4 pounds of Bentonite per gallon of water during jacking to fill any voids between pipe and the earth.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Casing Pipe:
 - 1. Install all casing pipe in accordance with the manufacturer's recommendations and approved shop drawings and as specified in Division 1.
 - 2. The provisions of this section shall represent the minimum standards for the installation of casing pipe for sewer force main or water main pipeline.
 - 3. Install all sewer force mains and water mains in a casing to be placed under all present and future Collier County Department of Transportation & Engineering roadways. Conform steel casing procedures to the requirements of Collier County DOT. All work and materials shall be subject to inspection by DOT. Restore the Department's property and surface conditions to the original condition in keeping with the Department's specifications and standards.
 - 4. In general, install all underground sewer force mains and water mains crossing all existing Collier County roadways, Florida State Highways and railroads within steel casing pipe extending at least five (5) feet beyond pavement edge. Obtain specific crossing requirements in advance from the authority having jurisdiction.
 - 5. Submit the necessary permit documents and data to the appropriate authority and receive approval thereof. Maintain traffic on the roadway and

keep all workmen and equipment clear of the travelway during the work. Comply with all Federal, State and County safety regulations and any permit(s).

6. Locate casing pipes crossing under State and County roadways at suitable approved alignments in order to eliminate possible conflict with existing or future utilities and structures with a minimum 36 inches depth of cover between the top of the casing pipe and the surface of the roadway. Conduct boring operations in such a manner as not to create hazardous conditions or impede traffic flow.
7. For casing pipe crossing under roadways, railroads, or other installations not within the jurisdiction of Collier County, comply with the regulations of said authority in regard to design, specifications and construction. State Highway casing installations shall be as specified in the FDOT, "Utility Accommodation Guide", and for railroads, the American Railway Engineering Association, Part 5, Section 5.2, "Specifications for Pipelines Conveying Nonflammable Substances", shall be applicable. However, in no case shall the minimum casing pipe diameter and wall thickness, for a specific carrier pipe size, be less than that specified above.
8. Use a simultaneous and continuous installation of any dry boring and jacking operation until the casing pipe is in final position. Maintain correct line and grade. Use full-ring welded add-on sections of casing pipe, developing water-tight total pipe strength joints. Use pipe lengths of at least 18 feet. Casing welders shall be certified welders. A copy of the certification shall be obtained by the Engineer of Record and given to the County Manager or designee prior to the welding procedure. Produce no upheaval, settlement, voids, cracking, movement or distortion of the existing roadbed or other facilities during the casing installation. Fill any voids with 1:3 portland cement grout at sufficient pressure for roadway protection. Following placement of the carrier pipe within the steel casing, install masonry plugs at each open end. Plugs shall be suitable for restraining the external earth load, while allowing internal drainage.
9. Mechanically bore casing pipe holes through the soil by a cutting head on a continuous auger mounted inside the pipe. Extend the auger a maximum of 2 inches beyond the end of the casing pipe to preclude formation of voids outside the pipe shell. Auger should not be of a greater diameter than the outside diameter of the encasement.
10. Adequately protect the casing pipe to prevent crushing or other damage under jacking pressures. Provide backstops for adequately distributing the jack thrust without causing deformation of the soil or other damage. Replace damaged casing pipe if not installed; however, if installed, abandon encasement pipe in place, suitably plug, and install an alternate installation, as directed by the County Manager or designee.

11. In the event of obstruction, withdraw auger, cut and cap excess pipe and fill void with 1:3 portland cement grout under sufficient pressure
12. Excavate and maintain required boring or jacking pits or shafts to the minimum dimension. Adequately barricade, sheet, brace and dewater excavation as required.
13. Deviation from approved jack and bore methods and above specifications is grounds for work stoppage and line replacement at the expense of the CONTRACTOR.

B. Casing Spacers:

Use Stainless Steel Casing Spacers (see County Approved Product List, Appendix F) being on center and restrained as the preferred method for installing the carrier pipe. Use skids installed with 6 ft to 10 ft spacing as recommended by the manufacturer. After the carrier pipe has been tested for leakage, block the casing ends with either an 8" wall of brick masonry with a weep hole installed near the bottom of each wall or casing spacer end seals (see County Approved Product List, Appendix F) with stainless steel bands.

- C. Augering: Conduct augering with the proper equipment and procedure such that the carrier pipe and the casing pipe can be installed to the grades specified without disturbing the adjacent earth. Submit all equipment and procedures for prior approval.
- D. Hand Mining: Conduct hand mining only in casings that are sufficiently large enough to permit such operation. Provide adequate fresh air supply within the casing pipe and conduct all operations in accordance with the requirements of the U.S. Department of Labor Safety and Health Regulations for Construction promulgated under the Occupational Safety and Health Act 7 1970 (PL-91-596).
- E. Jacking Pit: Make the jacking pit of adequate length to provide room for the jacking frame, the jacking head, the reaction blocks, the jacks, auger rig, and the jacking pipe. Make the pit sufficiently wide to allow ample working space on each side of the jacking frame. Make the depth of the pit such that the invert of the pipe, when placed on the guide frame, is at the elevation desired for the completed line. Provide excavation in conformance with Section 312316.
- F. Sheeting: Sheet the jacking pit tightly and keep it dry at all times. Conform sheeting to Section 314000. Have complete design calculation for sheeting the jacking pit sealed and submitted by a Professional Engineer registered in the State of Florida.
- G. Jacking Frame: Use a jacking frame that applies a uniform pressure over the entire pipe wall area of the pipe to be jacked.

- H. Reaction Blocks: Use reaction blocks designed to carry the thrust of the jacks to the soil without excessive soil deflection and in such a manner as to avoid any disturbance of adjacent structures or utilities.
- I. Operation: Use hydraulic jacks in the jacking operation. Use extreme care to hold the pipe to exact line and grade. Advance the excavation at the heading manually or with an auger. Do not allow the advance to exceed one foot ahead of the casing pipe. Make every effort to avoid loss of earth outside the casing.
- J. Safety Railing: Provide a safety railing all around the top of the pit at all times.
- K. Restore property and surface conditions to the original condition in accordance with Collier County DOT specifications and standards.
- L. Carrier Pipe:

Utilize joint restrained pipe for the entire water main or force main pipe length inside the casing. Use special supporting of the carrier pipe within the casing with a design approved by the County Manager or designee.

END OF SECTION

NO TEXT FOR THIS PAGE

SECTION 331200

WATER VALVES AND APPURTENANCES

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Furnish all labor, materials, equipment, and incidentals required and install complete and ready for operation all valves and appurtenances as shown on the Drawings and as specified herein.

1.2 REFERENCES

- A. Codes, specifications, and standards referred to by number or title form a part of this Section to the extent required by the references to codes, specifications, and standards. Latest revisions, as of the date of bid opening, apply, unless otherwise noted on the Drawings or specified in this Section.
- B. Standards

<u>Designation</u>	<u>Title</u>
ANSI/AWWA C111/A21.11	Rubber-Gasket Joints for Ductile-Iron and Gray-Iron Pressure Pipe and Fittings
ANSI/AWWA C500	Gate Valves
ANSI/AWWA C509	Resilient-Seated Gate Valves 3 through 12 NPS, for Water and Sewage Systems
ANSI/AWWA C512	Air Release, Air/Vacuum, and Combination Air Valves for Waterworks Service
ANSI/B16.1	Cast Iron Pipe Flanges and Flanged Fittings, Class 125
ANSI/B16.3	Malleable Iron Threaded Fittings, Class 150 and 300
ANSI/B16.5	Pipe Flanges and Flanged Fittings, Steel Nickel Alloy and Other Special Alloys
ASTM A276	Specification for Stainless and Heat-Resisting Steel Bars and Shapes
ASTM A231	Specification for Steel Casting, Austenitic, for High-Temperature Service

ASTM A743 Specification for Castings, Iron-Chromium,
Iron-Chromium-Nickel, and Nickel-Base
Corrosion-Resistant for General Application

MSS SP-60 Connecting Flange Joint Between Tapping Sleeves and
Tapping Valves

1.3 DEFINITIONS

- A. References to valve sizes on the Drawings and in the Specifications are intended to be nominal size, and shall be interpreted as nominal size.

1.4 SUBMITTALS

- A. General: as specified in:
 - 1. General Conditions;
 - 2. Supplementary General Conditions;

1.5 QUALITY ASSURANCE

- A. Testing: Test valves as specified in this Section.

PART 2 PRODUCTS

2.1 GENERAL:

- A. All valves and appurtenances shall be of the size shown on the Drawings and if possible all equipment of the same type shall be from one manufacturer.
- B. All valves and appurtenances shall have the name of the maker and the working pressure for which they are designed cast in raised letters on the body.
- C. All stainless steel components and hardware shall be a minimum of Type 304, unless otherwise specified.

2.2 MANUFACTURERS (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F).

2.3 DESIGN

- A. Resilient, Wedge or Gate Valves and Boxes
 - 1. Valves for pipe less than 2 inches in diameter shall conform to the requirements of AWWA C509 (latest revisions) and shall be cast iron, single wedge, non-rising stem, screwed bonnet, 125 pounds S.P., 200 pounds W.O.G with stuffing box repackable under pressure and all parts renewable.

Ends shall be as shown or indicated on the drawings. For approved air release line valves, bacterial sampling station line valves, curb stops, corporation stops, and ball valves see County Approved Product List, Appendix F.

2. Resilient, wedge or gate valves 2 inches in diameter and larger shall be ductile iron body, non-rising stem, bronze mounted gate valves, mechanical joint conforming to requirements of the AWWA C515 and shall be provided with a 2 inch square operating nut with the word "open" and an arrow cast in the metal to indicate direction. Valves shall be vertical resilient, wedge, or gate type and shall turn to the left (counter clockwise) to open. The wedge or gate shall be ductile iron per ASTM A536, minimum 65,000-psi strength and, completely encapsulated with urethane rubber, permanently bonded to the wedge or gate to meet ASTM test for rubber metal bond, ASTM D429. The valve stems for non-rising stem assemblies shall be cast bronze with integral collars in full compliance with AWWA. OS & Y stems shall be on bronze bar stock. The NRS stem stuffing box shall be the O-ring seal type with two rings located above thrust collar; the two rings shall be replaceable with valve fully open and subjected to full rated working pressure. The minimum safe working pressure shall be 200 psi. All valves thirty inches (30") or larger shall have a concrete slab placed under the valve to help distribute the total weight of the valve and reduce line sagging. The concrete slab shall have 6"x6" 10/10 welded wire mesh, have lifting eyes, constructed using 3,000 psi concrete, be six inches (6") thick, and sized according to the following table:

Valve Size	Length	Width
30"	42"	30"
36"	48"	36"
42"	54"	42"
48" – 54"	60"	48"
60" – 66"	78"	60"

3. There shall be two low torque thrust bearings located above and below the stem collar. The stem nut shall be independent of wedge and shall be made of solid bronze. There shall be a smooth unobstructed waterway free of all pockets, cavities and depressions in the seat area. The body and bonnet shall be coated with fusion-bonded epoxy both interior and exterior. Each valve shall have the manufacturers name, pressure rating and year manufactured cast on body. The valve shall be designed and tested to be opened and closed under a differential pressure of at least twice the working pressure.

B. Valves for Buried Service

1. Valves for buried service shall meet all the requirements as specified herein but shall have mechanical joint ends and stainless steel cover bolts.

2. All buried valves shall have cast-iron two-piece valve boxes (see County Approved Product List, Appendix F). Valve boxes shall be provided with suitable heavy bonnets to extend to such elevation at the finished grade surface as directed by the ENGINEER. The barrel shall be two-piece, screw type. The upper section shall have a flange at the bottom having sufficient bearing area to prevent settling, shall be designed so as to prevent the transmission of surface loads directly to the valve or piping, and shall be complete with cast iron covers. Covers shall have "WATER" cast into the top. The covers shall be so constructed as to prevent tipping or rattling. All valve boxes located in paved roadways or sidewalks shall have locking covers.
3. Where valves are located out of pavement, the boxes shall be adjusted to finished grade with a concrete collar as shown in the Details.
4. Valve boxes shall be of the heavy duty, traffic bearing cast iron, adjustable screw type with a drop cover. The valve box assembly shall consist of a bottom section, top section and cover which is cast from gray iron, formulated to ASTM specification A-48 latest revision, minimum tensile of 21,000 psi and shall be free from blowholes, shrinkage or other imperfections not true to pattern. The shaft size shall be 5 1/4" and the adjustable length shall be from 18" to 36". The wall thickness shall be 1/4". The weight of the assembly shall be 61 pounds \pm 2 pounds, with the cover weight being a minimum of 13 pounds.
5. The name of the manufacturer and foundry of origin shall be cast into each of the components of the assembly in legible form. The assembly shall be suitable for highway traffic wheel loads of 16,000 pounds and shall withstand a proof load test of 25,000 pounds without failure or permanent deflection.

C. Check Valves

1. All check valve bodies shall be cast iron per ASTM A126 Class B, having integral (not wafer) flanges.
2. The seat shall be centrifugally cast bronze with an O-ring seal and be locked in place with stainless steel lock screws and be field replaceable, without the use of special tools.
3. Swing check valves shall have a shaft of single and continuous stainless steel, extending both sides of the body with a lever and weight. The air cushion cylinder, when specifically required, shall be constructed of corrosion resistant material and the piston shall be totally enclosed within the cylinder and not open at one end. The air cushion cylinder assembly shall be externally attached to either or both sides of the valve body and shall permit adjustability to cushion the closure of the valve. Cushioning shall be by air trapped in the cushion cylinder, which shall be fitted with a one-way adjustable control check valve to cushion disc contact to the seat at

the shut-off point. The bottom cylinder head shall be swivel mounted and not rigid to follow the change of force angles as the lever raises or lowers to open or close the check valve. Valve shall prevent backflow on normal pump shut off or power failure, at zero velocity and be watertight. The disc shall be cast iron utilizing a double clevice hinge connected to a ductile iron disc arm. The disc arm assembly shall be suspended from a stainless steel shaft, which passes through a seal retainer on both sides of the valve body.

4. Rubber flapper swing valves shall have a heavily constructed cast iron body and cover. The body shall be long pattern design (not wafer) with integrally cast-on end flanges. The flapper shall be Buna-N having an O-ring seating edge and be internally reinforced with steel. Flapper shall be captured between the body and the body cover in a manner to permit the flapper to flex from closed to full open position. Flapper shall be easily removed without the need to remove the valve from line. The check valves shall have full pipe size flow area. Seating surface to be on a 45° angle requiring the flapper to travel only 35° from closed to full open position for minimum head loss. Valve has non-slam closure characteristics. Flapper shall create an elastic spring effect to assist the flapper to close against a slight head to prevent or minimize slamming. Valve shall be designed for 175 psi working pressure for water. The valve shall be suitable for buried service.
 5. Valve exterior to be painted with Red Oxide Phenolic Primer Paint as accepted by the FDA for use in contact with Potable Water. Materials shall be certified to the following ASTM specifications:
 - a. Body, cover & disc - Cast Iron - ASTM A126, Class B
 - b. Disc Arm - Ductile Iron - ASTM A536
 - c. Seat - Aluminum Bronze or Stainless Steel - ASTM B148, ASTM A276
 - d. Disc Seat - Buna-N or metal
 - e. Cushion cylinder - Corrosion-resistant Commercial material
- D. Backflow Prevention Devices
1. Backflow prevention devices shall be reduced pressure principle assemblies and shall be USC approved, and shall meet all requirements of the Collier County Cross-Connection Control/Backflow Prevention Ordinance, as then amended. Refer to Section 3, Utility Detail Drawings.
- E. Combination Air Release Valves for Potable Water and Non-Potable Irrigation Systems
1. Air release valves shall exhaust large quantities of air during the filling of a pipeline or vessel. The valve shall be capable of venting air up to sonic

velocity without blowing shut; closing only after all the air has been vented. The valve shall continue to release small quantities of air under pressure as often as needed to keep the system free of accumulated air. The valve shall automatically open to allow air to re-enter during draining or whenever a negative pressure occurs.

2. Combination air valves shall be of the size shown on the plans and conform to the requirements of AWWA C512 and be of the "Kinetic" design capable of exhausting air at up to sonic velocity without blowing shut.
3. Body and cover shall be ASTM A126 Class B cast iron with stainless steel floats and replaceable seats of Buna-N or other suitable material. Internal linkage mechanism shall be 18-8 stainless steel. Plastic or bronze components are not acceptable. Air release orifice shall be suitable for 300 PSI maximum working pressure. Screens shall be installed on the opening of all air release valves.
4. Valves 3-inch size and smaller shall have a threaded inlet connection, and larger valves shall have a flanged inlet faced and drilled per ANSI B16.1 Class 250.
5. Valves shall have a threaded outlet on valves to 4-inch size and a protective cowl on larger sizes.
6. 1 inch NPT inlet and outlet shall be provided, unless otherwise specified on the drawings.
7. Connections from corporation stops to air release valves shall be brass for rigidity.

F. Tapping Valves and Sleeves

1. All tapping sleeve and valve assemblies shall meet the requirements of AWWA Standard C500, latest revision. Cast iron tapping sleeves or stainless steel wrap-around sleeves, and cast iron valves shall be used to make live taps into the existing water mains where shown on the drawings. Flanges must conform to AWWA C207 Class D ANSI 150# drilling. Mechanical Joint (MJ) tapping sleeves are also acceptable. All bolts and nuts shall be stainless steel.
2. CONTRACTOR shall verify type of existing main prior to ordering. The tapping valve shall have an inlet flange to match the sleeve and a mechanical joint outlet for connection to water main pipe. Tapping valve shall meet the requirements for gate valves specified herein. The sleeve shall have provisions for a tap and shall be pressure tested at 150 psi for a minimum of 30 minutes prior to tapping.

G. Service Connection Materials

1. Service Saddles (see County Approved Product List, Appendix F)
 - a. Service saddles or fittings shall be used with taps to all types of pipe. Gasket shall be cemented in place and confined in a retaining groove. Saddles shall be cast iron saddles with double brass straps.
 - b. Tapping sleeves and valves shall be used for all taps.
2. Water Meters
 - a. Potable Water Meters: Potable water meters provided for service connections to the COUNTY water distribution system shall be designed to accept an encoder compatible with the COUNTY Automatic Meter Reading (AMR) system. The COUNTY will install the meter and the AMR encoder unit on 2" and smaller meters. AMRs 3" and larger shall be turned over to the technician doing the full bore flush. All potable water meters larger than 2" shall be installed above ground. These meters shall be equipped with a backflow preventer and installed by the CONTRACTOR at his expense, including the AMR encoder unit. The type of backflow device utilized for potable lines shall be on the Water Department approved list of backflow preventers, Appendix G. All potable water meters 3" or greater shall be purchased by the owner and installed by the CONTRACTOR. The master meter assemblies shall be built in accordance with the design details in Section 3 – Utilities Detail Drawings. The location of all meters shall be clearly shown on the construction plans.
 - b. Non-Potable Irrigation Water Meters: Non-potable water meters provided for service connections to the COUNTY non-potable reclaimed distribution system shall be designed to accept an encoder compatible with the COUNTY Automatic Meter Reading (AMR) system. The COUNTY will install the meter and the AMR encoder unit on 2" and smaller meters. All non-potable water meters 3" or greater shall be purchased by the owner and installed by the CONTRACTOR. The master meter assemblies shall be built in accordance with the design details in Section 3 – Utilities Detail Drawings. The location of all meters shall be clearly shown on the construction plans.
3. Corporation Stops for Service Connections
 - a. Corporation stops (see County Approved Product List, Appendix F) shall meet the requirements of AWWA C800; ends AWWA thread x compression, CTS.
4. Water Service Tubing

- a. Water service connection tubing shall be blue polyethylene municipal service tubing as shown on Utility Detail Drawing W-12.
 - b. Polyethylene tubing shall meet the requirements of AWWA Standard C901. Polyethylene tubing shall be 3406 polyethylene.
5. Polyethylene Service Tube Stiffeners
- a. A solid ring, stainless steel insert shall be installed with each and every compression connection made with polyethylene tubing.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install all valves and appurtenances in accordance with manufacturer's instructions and in the locations shown, true to alignment and rigidly supported. Repair any damage to the above items to the satisfaction of the ENGINEER before they are installed.
- B. After installation, test all valves and appurtenances for at least one hour at the working pressure corresponding to the class of pipe, unless a different test pressure is specified. If any joint proves to be defective, repair it to the satisfaction of the ENGINEER.
- C. Install all floor boxes, brackets, extension rods, guides, the various types of operators and appurtenances as shown on the Drawings that are in masonry floors or walls, and install concrete inserts for hangers and supports as soon as forms are erected and before concrete is poured. Before setting these items, check all plans and figures, which have a direct bearing on their location and assure the proper location of these valves and appurtenances during the construction of the structures.
- D. Flanged joints shall be made with stainless steel bolts.
- E. Buried mechanical joints shall be made with COR-TEN bolts.
- F. Prior to assembly of split couplings, thoroughly clean the grooves as well as other parts. The ends of the pipes and outside of the gaskets shall be moderately coated with petroleum jelly, cup grease, soft soap or graphite paste, and the gasket shall be slipped over one pipe end. After the other pipe has been brought to the correct position, center the gasket properly over the pipe ends with the lips against the pipes. The housing sections then shall be placed. After the bolts have been inserted, tighten the nuts until the housing sections are firmly in contact, metal-to-metal, without excessive bolt tension.
- G. Prior to the installation of sleeve-type couplings, thoroughly clean the pipe ends for a distance of 8". Soapy water may be used as a gasket lubricant. A follower

and gasket, in that order, shall be slipped over each pipe to a distance of about 6" from the end, and the middle ring shall be placed on the already laid pipe end until it is properly centered over the joint. Insert the other pipe end into the middle ring and bring to proper position in relation to the pipe already laid. The gaskets and followers shall then be pressed evenly and firmly into the middle ring flaires. After the bolts have been inserted and all nuts have been made up finger-tight, uniformly tighten diametrically opposite nuts progressively all around the joint, preferably by use of a torque wrench of the appropriate size and torque for the bolts.

- H. Carefully inspect each valve, open it wide and then tightly close it and test the various nuts and bolts for tightness. Special care shall be taken to prevent any foreign matter from becoming lodged in the valve seat. Gate valves, unless shown otherwise, shall be set with their stems vertically above the centerline of the pipe. Remove and replace any valve that does not operate correctly.
- I. Carefully center valve boxes over the operating nuts of the valves so as to permit a valve wrench or key to be fitted easily to the operating nut. Valve boxes shall be set to conform to the level of the finished surface and held in position by a ring of concrete placed under the support flange as shown in Section 3, Utility Detail Drawings. The valve box shall not transmit surface loads to the pipe or valve. Exercise care 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 and reset. Before final acceptance of the work, adjust all valve boxes to finish grade. Valve extension stems or risers shall not be used.

3.2 AIR RELEASE VALVE INSTALLATION

- A. Prior to pressure testing a pipeline, all air release valve assemblies on that pipeline shall be installed.

3.3 SHOP PAINTING

- A. Ferrous surfaces of valves and appurtenances shall receive a coating of epoxy in accordance with AWWA Standard C550 and meets or exceeds all test requirements including the Food and Drug Administration Document Title 21 of the Federal Regulations on Food Additives, Section 175.000 entitled "Resinous and Polymeric Coating"; Impact Test Requirement in accordance with the ASTM D2794.

END OF SECTION

NO TEXT FOR THIS PAGE

SECTION 331619

HYDRANTS

PART 1 GENERAL

1.1 DESCRIPTION OF REQUIREMENTS

- A. Furnish and install fire hydrants where shown on the Drawings or directed by the ENGINEER.

1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS

- A. Section 033100 – Concrete for Non-Plant Work
- B. Section 331200 – Water Valves and Appurtenances

1.3 QUALITY ASSURANCE

- A. Install hydrants to meet current requirements of Collier County Utilities.
- B. Provide manufacturer's certificate those products meet or exceed minimum requirements as specified.

1.4 SUBMITTALS

- A. Submit manufacturer's certificates on conformance.
- B. Shop Drawings: Submit manufacturer's drawings and data sheets for material to be supplied under this Section. Indicate sizes and types to be installed.

1.5 PRODUCT DELIVERY, STORAGE AND HANDLING

- A. During loading, transportation and unloading, exercise care to prevent damage to materials.
- B. Handling: Fire hydrants should be unloaded carefully. The hydrant should be carefully lowered from the truck to the ground, not dropped. Only hoists and slings with adequate load capacity to handle the weight of the hydrant shall be used.
- C. Storage: Hydrants should be stored in the fully closed position to prevent entry of foreign material that could cause damage to the seating surfaces. Whenever practical, hydrants should be stored indoors. If outside storage is required, means should be provided to protect the operating mechanism. In outside storage, parts and flanges should be protected from the weather and foreign materials.

PART 2 PRODUCTS

2.1 FIRE HYDRANTS

- A. Fire hydrants shall be of the dry barrel, compression type conforming to AWWA C502 "Standard for Dry-Barrel Fire Hydrants" and additional requirements as set forth herein.
- B. Hydrant shall have break away upper sections capable of ready replacement without loss in the event of traffic damage. Each hydrant shall have a 6" bottom inlet connection and valve opening at least 5-1/4 inches in diameter. Hydrants shall have a national standard pentagon 1.5 inch, point to flat operating nut and turn to the left (counter clockwise) to open. Each hydrant shall be fitted with one 4-1/2-inch pumper connection and two 2-1/2 inch hose connections, both having threads that conform to the Fire Division Standard for the area. Hose caps shall be chained (unless specified without by appropriate fire control district) to the hydrant barrel and fitted with nuts similar to the hydrant operating nuts. Each hydrant shall have a barrel of sufficient length to bring the bottom of the 6" pipe connection 3 feet below the surface of the finished ground. Each hydrant shall have breakaway flanges and be made in at least two sections bolted together. All interior working parts of the hydrant shall be removable from the top of the hydrant to allow repairs without removing the hydrant barrel after it has been installed. Hydrants shall have renewable O-ring stem seals. Hydrant barrels shall be painted AWWA Safety Yellow (lead free) or as specified by appropriate fire control district. They shall be designed for a working pressure of 150 psi.
- C. Hydrant shall have no drain ports. If ports exist, they shall be plugged with a threaded plug.
- D. Operating stem shall be equipped with anti-friction thrust bearing to reduce operating torque and assure easy opening. Stops shall be provided to limit stem travel. Stem threads shall be enclosed in a permanently sealed lubricant reservoir with O-ring seals.
- E. Hydrants shall be designated for 150 psi working pressure and shop tested to 300 psi pressure with main valve both opened and closed. Under test the valve shall not leak, the automatic drain shall function and there shall be no leakage into the bonnet.
- F. Hydrants shall be of the years manufacture when construction commenced.
- G. Acceptable models, see Appendix F, County Approved Product List.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Set hydrants plumb and in true alignment with mains. Utilize restrained joints as shown in the Collier County Standard Details. Carefully backfill around hydrants so as not to disturb the hydrant and thoroughly compact backfill so as to support the hydrant securely. The hydrants shall have a minimum 18-inch clearance measured from finish grade to the center of pumper connection.
- B. Hydrants shall be located a minimum of 4 feet from the curb in urban areas, and a minimum of 14 feet from the edge of pavement in rural areas, and in accordance with local Fire Department requirements. A gate valve shall be provided at the connection to the main as shown in the Standard Details.
- C. Hydrants requiring a lead to cross a roadway shall have a valve on both sides of the road. The valve nearest the hydrant must be within 20 feet of the hydrant. This requirement is not applicable to privately owned and operated water distribution systems.

END OF SECTION

NO TEXT FOR THIS PAGE

SECTION 333200

PUMP STATIONS

PART 1 GENERAL

1.1 SCOPE OF WORK FOR COUNTY PUMP STATIONS

- A. This section includes the following items for COUNTY owned and operated pump stations: wet wells, access covers, pumps, wet well equipment, valves, emergency bypasses, pump control panels, pump controller, antenna subsystem, disconnects, electric meters, electric service, pump wiring, lightning arrestors, and odor control systems.
- B. Conform all pump stations to the specifications, Utilities Detail Drawings, and latest National Electrical Code (NEC) requirements.
- C. When a pump station has a peak design flow coming into the station greater than 500 gpm, contact Public Utilities Planning and Project Management Department for specifications.
- D. For systems eligible to be taken over by the COUNTY, provide enough room to operate and maintain all water and wastewater systems in a simple and non-awkward manner. If a pump station pump needs to be replaced, provide enough room for the COUNTY to readily remove the pump, and to do so without interfering with traffic. To be eligible for conveyance to the COUNTY, the pump station easement area must be designed to 30'X30', or twice the depth of the wet well by twice the depth of the wet well, whichever is larger, as defined in the Collier County Standards and Procedures Ordinance, Subsection 7.7(c), as amended or superseded.
- E. Schedule required COUNTY inspections of (1) pump station installation prior to cover-up and (2) pump station start-up.
- F. Install all fencing and gates around the pump station in accordance with Section 323113.
- G. Communications: When proposing fiber-optic connectivity at pump stations, a letter of availability shall be requested to the COUNTY for review and approval.
- H. Elevated platforms shall be provided where necessary to provide access to wet wells, pump station control panels, electrical devices and panels, generators, and bypass equipment. Typically, these platforms shall be limited to locations with existing grades requiring equipment to be located at a higher elevation due to the Florida Building Code (FBC), FEMA, and the ASCE Standard 7 and 24 requirements.

1.2 SCOPE OF WORK FOR PRIVATE GRINDER PUMP STATIONS

- A. This section includes the following items for privately owned and operated grinder pump stations: wet wells, pumps, impeller, valves, level control, alarm, well equipment, pump control panels, pump controller, disconnects, and sloping requirements for private pump stations.
- B. All maintenance tasks for private grinder pump stations must be possible without entry into the grinder pump station per 29 CFR 1910.146 (OSHA Permit-Required Confined Spaces).
- C. The grinder pump station shall be free from electrical and fire hazards as required for functionality in a residential environment. The completed assembled and wired grinder pump station shall be listed by Underwriters Laboratories, Inc. (UL) to be safe and appropriate for the intended use. UL listing of components of the grinder pump station, or third-party testing to UL standard is not acceptable.
- D. All private grinder pump stations shall bear the seal of NSF International to show that station meets accepted standards for plumbing equipment in or near residences, shall be free from noise, odor, or health hazards, and shall have been tested by an independent laboratory to certify its capability to perform as specified in either individual or low-pressure sewer system applications.
- E. Private pump service sewers shall conform to applicable parts of the Florida Building Code and the COUNTY's Design Criteria. Where the COUNTY's standards are more restrictive than the Florida Building Code, the COUNTY's standards shall prevail.
- F. Private pump station force main connections must follow the COUNTY's requirements for testing.
- G. Schedule required COUNTY inspections of (1) testing of force main connection prior to cover-up and (2) pump station start-up.
- H. Prior to the start-up inspection, the following documentation must be furnished to the COUNTY via electronic mail or a secure electronic file transfer service:
 - 1. As-built drawing (in both PDF and DWG formats) showing the completed pump station and force main locations, sizes, materials, and elevations along with the location of all valves, the pump-out connection, the control panel, and the generator receptacle on the property and
 - 2. A pump test curve from the pump manufacturer.

PART 2 EQUIPMENT

2.1 MATERIALS FOR COUNTY PUMP STATIONS

- A. All stainless steel components and hardware shall be a minimum of Type 304, unless otherwise specified.
- B. Wet Well: The concrete structure shall consist of precast, reinforced sections conforming to ASTM C76 and/or ASTM C478. 8-foot diameter wet wells shall have a minimum wall thickness of 8 inches. Wall thickness for larger wet wells shall conform to ASTM standards for wall thickness, but shall not be less than 8 inches in any case. The minimum inside diameter for all wet wells eligible to be owned and maintained by Collier County shall be 8 feet. As a deviation, a 6-foot

diameter wet well can be utilized if the ENGINEER can demonstrate that the wet well is sufficient hydraulically and the developer can demonstrate that the pump station shall be used for the perpetual and exclusive use of that development. For pump stations that will not be owned and maintained by Collier County, the ENGINEER shall set the design specifications for the wet well, provided such design does not in any way endanger the health, safety and/or welfare of the public. Base riser section shall be monolithically cast with the base slab. All concrete shall utilize Type 2 cement and have a minimum compressive strength of 4000 psi at 28 days. On new construction, if more than one hole is abandoned and required to be cemented in, provide a new wet well barrel section. Reinforcing steel for all wet well structures should be sized by the unit manufacturer and verified by the ENGINEER. All connections to the wet well for gravity sewer piping shall be equal to those for manholes as described in Section 333913. Factory double coat all exterior surfaces with an acceptable bituminous or epoxy sealer a minimum of 18 mils thick. Seal all riser joints utilizing plastic joint sealing compound (see County Approved Product List, Appendix F). Reinforcement and top slab thickness shall be specified by the design ENGINEER for H-20 loadings in all cases. Minimum reinforced slab thickness shall be 8 inches. Typical standards for wet wells are available in the Collier County Standard Details. The ENGINEER shall be responsible for designing all wet well structures to overcome buoyancy forces exerted on the installed structure. Coat all wet well interiors with an acceptable field applied internal protection (see County Approved Product List, Appendix F) in accordance with Section 099723.

- C. Above-Ground Valves and Piping: Above-ground valves and piping must be positioned so that it does not lie above any gravity sewer line entering the wet well, unless field conditions dictate otherwise and the COUNTY has granted prior approval. Typical above-ground valves and piping standards are shown in the Collier County Standard Details. All valve and flange bolting shall be Type 316 stainless steel.
- D. Pumps: Sewage pumps (see County Approved Product List, Appendix F) shall be of the submersible type suitable for operation in sewage of temperature not exceeding 115 degrees Fahrenheit. Pump head curves and design specifications for each application proposed shall be submitted for review and approval within the ENGINEER's hydraulic design report. All pumps shall be three-phase unless approved by a Utility Deviation Form. At least one (1) pump in each wet well shall be equipped with an opening in the volute with a bolted cover for a mix-flush system (see County Approved Product List, Appendix F).
- E. Access Covers: Access covers for pump station wet wells shall be above the 100-year flood elevation unless the structure is located within a documented velocity and tidal flood zone, and elevation differentials prohibit such installation. In such cases, watertight access covers shall be utilized. The ENGINEER shall provide shop drawings of such access covers for review and approval by THE County Manager or designee prior to use. Access covers shall be constructed of diamond plate aluminum sheets and aluminum structural members. All access covers shall be attached to aluminum angle frames with stainless steel hinges and fasteners. Angle frames shall be firmly anchored into the top concrete slab of the structure.

All access covers shall be equipped with a ratchet-type restraint mechanism to prevent accidental closing of the cover and torsion bar or spring assist type openers. Assist openers shall be manufactured of stainless steel. Access covers shall be designed for H-20 loadings.

- F. **Wet Well Equipment:** All pump discharge piping shall be HDPE pipe and shall be in conformance with pipe utilized for wastewater force mains. All fittings shall be HDPE fused, flange/flange, or Uni-Flange connections. All nuts, bolts, fasteners, brackets, pump guide rails and other hardware located inside the wet well shall be 316 stainless steel. A pump out with a screened vent shall be provided on all installations, with the pipe extended through the wet well lid (see details). Electrical systems and components (e.g. motors, lights, cables, conduits, switch boxes, control circuits, etc.) in raw wastewater wetwells, or in enclosed or partially enclosed spaces where hazardous concentrations of flammable gases or vapors may be present shall comply with the National Electrical Code (NEC) requirements for Class I Group D, Division 1 locations. Electrical equipment located in wet wells shall be suitable for use under corrosive conditions.
- G. **Valves:** Discharge piping for each pump shall be equipped with a weighted check valve and plug valve. A tee with an isolation plug valve, equipped with a quick coupling (see County Approved Product List, Appendix F), shall be provided for a means of emergency bypass access to the wastewater force main. Valves shall be supported by stainless steel pipe supports.
- H. **Emergency Bypass:** A 4-inch emergency bypass connection shall be provided down-stream from the in-line discharge piping valves. The connection shall be readily accessible and be equipped with a plug-type isolation valve and 4-inch male camlock type quick coupling and cap.
- I. **Pump Control Panel** (see County Approved Product List, Appendix F): Panel enclosure construction shall be equal to a NEMA 4X stainless steel with 3-point latch where required and utilize stainless steel. When possible, panel door shall open away from wetwell and not towards wetwell hatch to ensure safety during maintenance of wetwell and panel. To ensure proper installation of control panel, contact the Wastewater Division prior to rough-in or installation of control panel, for a pre-construction meeting with respective Wastewater Collections personnel. Control panels shall be mounted on two 6-inch by 6-inch precast concrete posts. All mounting bars, nuts, bolts, etc. shall be stainless steel. A 110/120-volt (110V) receptacle shall be provided inside the control panel for pump stations that have outdoor control panels. Ground fault interruption (GFI) protection shall be provided for all outdoor outlets.
- J. **Pump Controller:** Provide a pump control panel (see County Approved Product List, Appendix F) including a telemetry control unit (TCU) for pump controlling purposes. At a minimum, the TCU shall include an integrated 2-Watt digital radio with an Ethernet module for dual communications capability, an 18-amp-hour back-up battery, a manufacturer's prefabricated wire harness, all manufacturer recommended surge protection, and suitable devices for measuring wastewater flow. The TCU shall incorporate three on-board fail-safe HOA switches and

Triplex/Duplex/Simplex configurable operation mode. An on-board 240 or 460 VAC three-phase monitor shall be provided. The Alarm light and bell shall be activated by the TCU and the external push-button alarm silence switch shall be wired into the TCU. The TCU shall incorporate an on-board 4- by 20- character LCD display for elapsed runtime of each pump. During the automatic sequence, the pumps shall be controlled in an alternate mode. Pump controller shall be Data Flow Systems model TCU800 with features listed above.

- K. Antenna Subsystem: Provide a high gain antenna (see County Approved Product List, Appendix F) for use to transmit and receive TCU data to and from the COUNTY's existing SCADA server. Antenna shall utilize all welded-aluminum elements. Element connections utilizing nuts and bolts are not acceptable. Antenna shall have a single radiator element connected to a type N female connector. Antenna shall be supported on a mast/pole and have DC grounding for lightning protection. Antenna mounting hardware shall be made of stainless steel. Antenna shall meet or exceed the quality, reliability and performance of the RTA series as provided by Data Flow Systems, Inc. Antenna mast/pole shall be a 21foot by 1.25 inch SCH80 galvanized pole. Mounting of the antenna mast/pole shall be in accordance with all applicable local and state building codes as they pertain to structural strength and wind velocity requirements. Tower shall meet or exceed the quality and reliability of the 25G manufactured by Rohn. Coaxial cable shall be RTC 400 as supplied by Data Flow Systems, Inc. Type N connectors shall be utilized at both ends of the coax. Type N connectors shall be sealed with 3-inch sections of Alpha FIT321-1-0 sealant shrink tubing. Coaxial cable shall be secured to the mast/pole with E.V.A.-coated 316 stainless steel cable ties. Cable ties shall meet or exceed the quality, reliability and performance of AE112 cable ties manufactured by Band-It. For pump stations to be conveyed to the County, a startup and successful testing of Data Flow telemetry equipment by Data Flow representatives and County Wastewater Collections instrumentation and telemetry representatives is required prior to County acceptance. After initial startup, for pump stations to be conveyed to the County, the latitude and longitude of pump stations shall be provided.
- L. Disconnect: A circuit breaker disconnect shall be provided to isolate the pump control panel. Disconnect shall be installed on the service line between the electric meter and control panel and shall be lockable in the "ON" or "OFF" position. Disconnects shall be housed in a NEMA 4X, stainless steel enclosure or better.
- M. Electric Meter: The electric meter servicing the pump station shall be located adjacent to the pump control panel, and shall be located and wired to service only the pump station facility.
- N. Electric Service: All underground electric services shall be fully conduited in 2-inch diameter Schedule 80 PVC pipe from the power company source point to the pump control panel. The maximum length of the electric service from the power company transformer to the pump control panel shall be 200 feet. One spare conduit shall be provided and terminated in the meter. Only copper service wire shall be utilized. Sizing of the service wire shall be verified with the power company and the

extent and location of the service shall be indicated on the record drawings. The CONTRACTOR shall certify that the voltage drop across the service does not exceed five percent (5%) of the power company's line voltage at full load start-up of the pump station pumps. All pump stations shall have minimum 100-amp service. All electrical components shall be located within the COUNTY right-of-way or County Utility Easement (CUE).

- O. Pump Wiring: Power wiring for each pump, from the control panel to the wet well shall be conduited in separate 2-inch diameter Schedule 80 PVC pipe and an appropriately sized water-tight fitting with separate strain relief shall be installed on each line. A spare parallel 2-inch PVC pipe conduit from the panel to the wet well shall be provided. All wire shall be stranded THHN or MTW copper wire. The pump motor cords shall be flexible and serviceable under conditions of extreme usage. Total of angle bends shall be 180 degrees or less. All conduits between wetwell and control panel shall not exceed a total of 180 degrees of bends per run. All service conduits shall be 2" Schedule 80 PVC except where noted. The pump motor cords shall be flexible and have an appropriate amount of slack.
- P. Lightning Arrestors: All pump stations shall be equipped with lightning arrestor(s) (see County Approved Product List, Appendix F). The lightning arrestor shall be installed externally on the load side of the disconnect, between the disconnect and the main breaker. The penetration through the disconnect must be made below the working mechanism of the disconnect.
- Q. Odor Control Systems for Community Pump Stations: Furnish and install an 8'X11' concrete slab for potential future odor control system. A Pre-Engineered Biofiltration Odor Control System shall be furnished if required by the engineer of record.
- R. Platforms and stairs shall meet the Occupational Safety and Health Administration (OSHA) Part 1910, applicable FBC requirements, and ASCE Standards 7 and 24. All platform and stair designs and plans shall be prepared by a Florida Registered Professional Engineer. The Engineer of Record shall identify Flood Hazard Area, Flood Design Class (ASCE 24) and other applicable loadings. All components shall be aluminum with stainless steel hardware. Standard stairs shall be utilized. Fall protection shall be provided on all exposed sides by use of an OSHA approved guardrail system. Where required for access, removable guardrail sections shall be provided. Grating shall be slip resistant and banded at ends of bearing bars and openings.
- S. All platforms and stairs shall be supported by a concrete foundation system. The foundation designs and plans shall be prepared by a Florida Registered Professional Engineer. It shall meet the requirements of the FBC, ASCE 7 (Dead, Live, Flood, and Wind), ASCE 24 (Flood Resistant) and other regulatory requirements. Where head clearance under the platform is less than 6'-8", provisions shall be made to limit access.

2.2 MATERIALS FOR PRIVATE PUMP STATIONS

- A. All private grinder pump stations shall conform to the requirements specified in Section 2.1 above, unless otherwise stated in this section.
- B. Pumps: Private pump stations shall be constructed using progressive cavity, non-clogging, non-jamming, positive or semi-positive displacement grinder pump(s) capable of operating at a negative total dynamic head (TDH) equipped with thermal overload protection. Grinder pumps shall be capable of grinding all material typically found in domestic or commercial wastewater to a fine slurry that will pass through the pump, 1-1/4-inch NPT discharge piping and downstream appurtenances.
- C. Impeller: The grinder impeller shall be a one-piece, rotating type cutter wheel constructed from hardened 4140 steel. The cutter teeth shall be treated and hardened to 56 to 60 Rockwell C. The shredder ring shall be stationary type with a staggered tooth pattern and made of white cast iron per ASTM A532(1B).
- D. Valves: In addition to valve requirements described in Section 2.1, an anti-siphon valve shall be integral with the grinder pump station pump. The anti-siphon port diameter shall be no less than 60% of the inside diameter of the grinder pump station discharge piping. The check valve will provide a full-ported passageway when open and shall introduce a friction loss of less than 6 inches of water at maximum rated flow.
- E. Level Control: Level sensing control for private grinder pump stations shall be a non-fouling type with no moving parts in contact with the wastewater.
- F. Alarms: All grinder pump station shall be equipped with a high level audible and visual warning alarm to notify the residential or commercial property owner(s) of a high wet well level.
- G. Wet Well: The wet-well basin for all grinder pump stations shall be constructed from any watertight material suitable for light commercial applications, such as high-density polyethylene (HDPE), polyethylene (PE), or glass-fiber reinforced polyester (FRP). FRP wet wells must conform to ASTM D3753. All grinder pump station components must function normally when exposed to 150 percent of the maximum external soil and hydrostatic pressure. The grinder pump station shall have all necessary penetrations molded in and factory sealed. To ensure a leak free installation, no field penetrations will be acceptable. No secondary welding of the wet well basin or cover will be accepted. The wet well shall be vented to the atmosphere.
- H. Wet Well Equipment: Pumps and all electrical devices, components, and connections inside the wet well shall be explosion proof.
- I. Anti-Siphon/Check Valve: All private grinder pump stations shall be equipped with a factory installed, gravity operated flapper-type integral check valve and anti-siphon valve built into the stainless-steel discharge piping, per Section 2.1 and Section 2.2. valve requirements.
- J. Pump Control Panel: All electrical elements for private grinder pump stations shall be furnished pre-wired and housed in a NEMA 4X enclosure. In a flood zone, a NEMA 6P

enclosure is required if the control panel is mounted less than a foot above the base flood elevation. A NEMA Control circuit shall be 115 volts. The door of the control box shall be hinged of the dead type with locking hasp and suitable accessories to allow wall mounting. Motor shall be activated by a magnetic type contactor and protected by a UL-listed electrical monitoring system against damaging high current or low voltage conditions. An automatic reset, integral thermal overload protector shall protect the motor against excessive heat. The sensor shall reset automatically when the motor cools. An alarm test switch, HOA switch, run light, auto/off switch, and overload reset button shall be supplied inside the control box. A terminal strip with box type connections shall be supplied to make all power and control connections. All terminals shall be marked for easy identification. A ground terminal strip shall also be provided and labeled.

- K. Disconnect: The grinder pump station shall be equipped with a factory-installed NEMA 6P electrical quick disconnect for all power and control functions.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Finished grade shall be 1 inch to 4 inches below the bottom of the lid and shall slope away from the wet well.
- B. Fill grinder pump stations with water prior to backfill compaction to prevent deformation of the basin wall and follow all other manufacturer's installation instructions.

END OF SECTION

NO TEXT FOR THIS PAGE

SECTION 333313

WASTEWATER VALVES AND APPURTENANCES

PART 1 GENERAL

1.1 SCOPE OF WORK

- A. Furnish all labor, materials, equipment and incidentals required and install complete and ready for operation all valves and appurtenances as shown on the Drawings and as specified herein.
- B. The equipment shall include, but not be limited to, the following:
 - 1. Eccentric Plug Valves
 - 2. Check Valves
 - 3. Vacuum Breakers
 - 4. Air Release Valves
 - 5. Flange Adapter Couplings
 - 6. Flexible Couplings
 - 7. Diaphragm Seals
 - 8. Unions
 - 9. Mechanical Type Seals
 - 10. Hose End Faucets
 - 11. Pressure Gauges
 - 12. Reduced Pressure Backflow Preventer
 - 13. Flow Meters

1.2 DESCRIPTION OF SYSTEMS

- A. All the equipment and materials specified herein are intended to be standard for use in controlling the flow of wastewater and reclaimed water.

1.3 QUALIFICATIONS

- A. All the types of valves and appurtenances shall be products of well-established reputable firms who are fully experienced, reputable and qualified in the manufacture of the equipment to be furnished. The equipment shall be designed, constructed and installed in accordance with the best practices and methods and shall comply with these specifications as applicable.

1.4 SUBMITTALS

- A. Submit within 30 days after execution of the contract a list of materials to be furnished, the names of the suppliers and the date of delivery of materials to the site.
- B. Complete shop drawings of all valves and appurtenances shall be submitted to the ENGINEER for approval in accordance with the General Conditions.

1.5 TOOLS

- A. Special tools, if required for normal operation and maintenance shall be supplied with the equipment.

PART 2 PRODUCTS

2.1 GENERAL

- A. All valves and appurtenances shall be of the size shown on the Drawings and as far as possible all equipment of the same type shall be from one manufacturer.
- B. All valves and appurtenances shall have the name of the maker and the working pressure for which they are designed cast in raised letters upon some appropriate part of the body.
- C. All stainless steel components and hardware shall be a minimum of Type 304, unless otherwise specified.

2.2 DESIGN

- A. Eccentric Plug Valves
 - 1. All valves (see County Approved Product List, Appendix F) shall be eccentric plug valves unless otherwise specified.
 - 2. Plug valves shall be tested in accordance with AWWA C504 Section 5. Each valve shall be performance tested in accordance with AWWA C504 Section 5.2 and shall be given a leakage test and hydrostatic test as described in AWWA C504 Paragraphs 5.3 and 5.4. The leakage test shall be applied to the face of the plug tending to unseat the valve. The Manufacturer shall furnish certified

copies of reports covering proof of design testing as described in AWWA C504 Section 5.5.

3. Plug valves shall be of the tight closing, resilient faced, non-lubricating variety and shall be of eccentric design such that the valve's pressure member (plug) rises off the body seat contact area immediately upon shaft rotation during the opening movement. Valve pressure ratings shall be as follows and shall be established by hydrostatic tests as specified by ANSI B16.1-1967. Valves shall be drip-tight in both directions (bi-directional) at rated pressure of 175 psi through 12-inch diameter, and 150 psi for 14-inch diameter and above. The valve shall be provided with a 2-inch square operating nut.
4. The valve body shall be constructed of cast iron ASTM A126, Class B. Body ends shall be mechanical joint to meet the requirements of AWWA C111/ANSI A21.11 or single gasket push-on type.
5. The valve plug shall be constructed of cast iron or ductile iron and shall have a conical seating surface that is eccentrically offset from the center of the plug shafts. The plug and shafts shall be integral. The entire plug face shall be totally encapsulated with Buna N (Nitrile) rubber in all valve sizes. The rubber to metal bond must withstand 75 lbs. pull under test procedure ASTM D-429-73, Method B. When the plug is in full open position, plug geometry and body waterway contours must provide a passageway that allows flow capacity equal to 100% of the adjacent pipe area.
6. Valve seat mating surface shall be constructed of a welded-in overlay of not less than 90% nickel or be a one-piece stainless steel ring. Seat ring contour must be precision machined.
7. A mechanical "brake" shall be supplied on all valves and shall be capable of "locking" the valve in any intermediate position between full-open and full-closed.
8. Valves shall have multiple V-type packing and packing glands and shall be capable of being field adjusted or repacked without the bonnet or plug being removed from the valve with the valve under the full rated pressure. Valves shall have a port position indicator.
9. For corrosion protection, the interior ferrous surfaces of all plug valves shall have a 2-part epoxy internal coating to a minimum of 20 mils thickness.
10. Valve shaft seals shall be adjustable and comply with AWWA C507 Section 10 and with AWWA C507 Section 11.
11. Manual valves shall have lever or gear actuators and tee wrenches, extension stems, floorstands, etc. as indicated on the plans. All valves 6" and larger shall be equipped with gear actuators. All gearing shall be enclosed in a semi-steel housing and be suitable for running in a lubricant with seals provided on all

shafts to prevent entry of dirt and water into the actuator. All actuator shafts shall be supported on permanently lubricated bronze bearings. Actuators shall clearly indicate valve position and an adjustable stop shall be provided to set closing torque. All adjustable stop shall be provided to set closing torque. All exposed nuts, bolts, and washers shall be stainless steel. Valve packing adjustment shall be accessible without disassembly of the actuator.

12. Valves and gear actuators for submerged service shall have seals on all shafts and gaskets on the valve and actuator covers to prevent entry of water. Actuator mounting brackets for buried or submerged service shall be totally enclosed and shall have gasket seals. All exposed nuts, bolts, springs and washers shall be stainless steel.
13. Three-way plug valves shall be non-lubricated gear oriented. Valve bodies shall be ASTM A-126 Class, and be semi-steel with 125 lb. ANSI standard flanges. Plugs shall be resilient faced. Three-way valves shall be 3-way, 3-port 270-degree turn.
14. Plug valves installed such that actuators are 6 feet or more above the floor shall have chain wheels.
15. Where shown on the Drawings, plug valves shall be installed with extended shafts and actuators. Actuators for extended shafts shall be mounted on floor stands where indicated on the drawings or shall be removable handwheels where floor stands are not called for. Six-inch sleeves shall be provided for extended shafts in all floors; where necessary covers shall be provided. Shafts shall be of adequate strength to operate the valve and shall be stainless steel where submerged and carbon steel elsewhere. Floor stands and covers, where called for shall be cast iron. Floor stands shall be equipped with valve position indicators. Where shown on the drawings, plug valves shall be furnished with extended bonnets, equal to DeZurik Figure 640.
16. All buried plug valves shall have a remote position indicator in the valve box showing position of the valve. A stainless steel centering and I.D. plate shall be provided showing direction of opening and number of turns to open for each valve.

B. Valves for Buried Service

1. Valves for buried service shall meet all the requirements as specified herein for interior except that buried valves shall have mechanical joint ends.
2. All buried valves shall have cast-iron two-piece valve boxes (see County Approved Product List, Appendix F), valve boxes shall be provided with suitable heavy bonnets to extend to such elevation at the finished grade surface as directed by the ENGINEER. The barrel shall be two-piece, screw type. The upper section shall have a flange at the bottom having sufficient bearing area to prevent settling, shall be designed to prevent the transmission of surface loads

directly to the valve or piping, and shall be complete with cast iron covers. Covers shall have "SEWER" cast into the top. The covers shall be so constructed as to prevent tipping or rattling. All valve boxes located in paved roadways or sidewalks shall have locking covers.

3. Where valves are located out of pavement, the boxes shall be adjusted to finished grade and a concrete slab two feet square and six inches thick shall be poured around the box, as shown in the Details.
4. Valve boxes shall be of the heavy duty, traffic bearing cast iron, adjustable screw type with a drop cover. The valve box assembly shall consist of a bottom section, top section and cover which is cast from gray iron, formulated to ASTM specification A-48 latest revision, minimum tensile of 21,000 psi and shall be free from blowholes, shrinkage or other imperfections not true to pattern. The shaft size shall be 5 1/4" and the adjustable length shall be from 18" to 36". The wall thickness shall be 1/4". The weight of the assembly shall be 61 pounds \pm 2 pounds, with the cover weight being a minimum of 13 pounds.
5. The name of the manufacturer and foundry of origin shall be cast into each of the components of the assembly in legible form. The assembly shall be suitable for highway traffic wheel loads of 16,000 pounds and shall withstand a proof load test of 25,000 pounds without failure or permanent deflection. The valve box shall be cast, machined, assembled, and packaged within the United States and shall fully comply with the Buy American provisions of Public Law 102-240, enacted 12/18/91.

C. Check Valves

1. All check valve bodies shall be cast iron per ASTM A126 Class B, having integral (not Wafer) flanges.
2. The seat shall be centrifugally cast bronze with an O-ring seal and be locked in place with stainless steel lock screws and be field replaceable, without the use of special tools.
3. The shaft shall be single and continuous stainless steel, extending on one side of the body with a lever and weight.
4. The air cushion cylinder, when specifically required, shall be constructed of corrosion-resistant material and the piston shall be totally enclosed within the cylinder and not open at one end. The air cushion cylinder assembly shall be externally attached to either or both sides of the valve body and will permit adjustability to cushion the closure of the valve. Cushioning shall be by air trapped in the cushion cylinder, which shall be fitted with a one-way adjustable control check valve to cushion disc contact to the seat at the shut-off point. The bottom cylinder head shall be swivel mounted and not rigid to follow the change of force angles as the lever raises or lowers to open or close the check valve.

Valve shall prevent backflow on normal pump shut-off or power failure, at zero velocity, and be watertight.

5. The disc shall be cast iron utilizing a double clevice hinge connected to a ductile iron disc arm. The disc arm assembly shall be suspended from a stainless steel shaft, which passes through a seal retainer on both sides of the valve body.
6. Valve exterior to be painted with Red Oxide Phenolic Primer Paint as accepted by the FDA for use in contact with Potable Water. Materials shall be certified to the following ASTM specifications:
 - a. Body, cover & disc - Cast Iron - ASTM A126, Class B
 - b. Disc Arm - Ductile Iron - ASTM A536
 - c. Seat - Aluminum Bronze or Stainless Steel - ASTM B148, ASTM A276
 - d. Disc Seat - Buna-N or metal
 - e. Cushion cylinder - Corrosion-resistant Commercial material
 - f. Exposed Nuts and Bolts – 316 Stainless Steel
7. For corrosion protection, the interior ferrous surfaces of all check valves used in sewage applications shall be coated with a factory applied, two-part epoxy coating to a minimum of 20 mils thick.

D. Automatic Air Release Valves for Wastewater Systems

All force mains shall have automatic air release valves installed as they are indicated on the plans. These Automatic Air Release Valves (ARV's) shall conform to the following:

1. The ARV shall be a "Combination" ARV modified with a check valve on the discharge of the air piping to allow air release only operation.
2. The body of these valves shall be conical shaped to maintain maximum air gap to ensure no contact between the sewage and the seal.
3. The ARV shall seal at zero (0) psi and have an overall operating range of 0 – 250 psi, (0 – 17.2 bar).
4. The ARV shall close watertight when liquid enters the valve, even when the fluid is rising without pressure, (no minimum operating pressure required).
5. The working pressure shall be 250 psi (17.2 bar) tested to 360 psi (25 bar).

6. The ARV shall include both a Polypropylene Debris Shield funnel and an Orifice Strainer to prevent solids from entering sealing area.
7. The ARV shall have a rolling cup seal diaphragm for infinitely variable operation, providing water hammer inhibition.
8. The ARV body shall be constructed of 316 stainless steel. The float shall be Delrin (Polyoximethylene, POM) and the Float Spindle shall be of 316 stainless steel. The valve seat and all internal working parts shall be of corrosion-resistant materials. ARV flange hardware (nuts, bolts, washers) shall be of 316 stainless steel construction.
9. The threaded or flanged outlet size of the ARVs shall be sized by the design engineer. A minimum diameter of two inches (2") shall be provided.
10. All parts required for ARV maintenance shall be the same for all connection sizes (i.e. the internal parts for the 2" ARV are identical to the internal parts for the 4" ARV).
11. All ARV manufacturers and models shall comply with the County Approved Product List (Appendix F). All ARVs shall be installed in accordance with manufacturer recommendations and shall have an isolation valve connection for control.
12. All ARVs installed for wastewater transmission systems (except at pump stations or wastewater treatment facilities) shall be installed in above ground polyethylene enclosures as shown on the County's standard details. Color of enclosures shall be dark green.

E. Flange Adapter Couplings

1. Flange adapter couplings shall be of the size and pressure rating required for each installation and shall be suitable for use on either cast iron or ductile iron pipe. They shall be similar or equal to Dresser Company, Style 128. All couplings shall have enough factory installed anchor studs to meet or exceed the test pressure rating for this project, 100-psi minimum.

F. Flexible Couplings:

1. Flexible couplings shall be either the split type or the sleeve type as shown on the Drawings.
 - a. Split type coupling shall be either the split type or the sleeve type as shown on the Drawings. The couplings shall be mechanical type for radius groove piping. The couplings shall mechanically engage and lock grooved pipe ends in a positive coupling and allow for angular deflection and contraction and expansion.

- b. Couplings shall consist of malleable iron, ASTM Specification A47, Grade 32510 housing clamps in two or more parts, a single chlorinated butyl composition sealing gasket with a "C" shaped cross-section and internal sealing lips projecting diagonally inward, and two or more oval track head type bolts with hexagonal heavy nuts conforming to ASTM Specification A183 and A194 to assemble the housing clamps. Bolts and nuts shall be stainless steel.
- c. Victaulic type couplings and fittings may be used in lieu of flanged joints. Pipes shall be radius grooved as specified for use with the Victaulic couplings. Flanged adapter connections (see County Approved Product List, Appendix F) at fittings, valves, and equipment.
- d. Sleeve type couplings (see County Approved Product List, Appendix F) shall be used with all buried piping. The couplings shall be of steel. The coupling shall be provided with stainless steel bolts and nuts unless indicated otherwise.
- e. All couplings shall be furnished with the pipe stop removed.
- f. Couplings shall be provided with gaskets of a composition suitable for exposure to the liquid within the pipe.
- g. If the CONTRACTOR decides to use victaulic couplings in lieu of flanged joints, he shall be responsible for supplying supports for the joints.

G. Diaphragm Seals (see County Approved Product List, Appendix F):

- 1. Diaphragm seals shall be installed on pressure gauge connection to all lines where shown on the Drawings, to protect pressure switches used to monitor excessive pressures on pipe lines. The diaphragm shall be "thread attached" to both piping and pressure switches. Diaphragm seals shall be constructed of cadmium plated carbon steel, except for the lower housing which shall be specifically chosen according to the fluid pressure being monitored.
- 2. Diaphragm seals shall have a flushing connection.

H. Unions

- 1. Unions on ferrous pipe 2" in diameter and smaller shall be 150 pounds malleable iron, zinc-coated. Unions on water piping 2 1/2" in diameter and larger shall be flange pattern, 125-pound class, zinc-coated. Gaskets for flanged unions shall be of the best quality fiber, plastic, or leather. Unions shall not be concealed in walls, ceilings, or partitions.

I. Mechanical Type Seals

1. Mechanical type seals (see County Approved Product List, Appendix F) shall consist of an adjustable modular bolted, synthetic rubber and plastic sealing element.

J. Hose End Faucets

1. Hose end faucets (see County Approved Product List, Appendix F) for potable water supply at submersible stations shall be furnished with removable key and shall be lockable.

K. Pressure Gauges

1. Each pressure gauge shall be direct mounted, cast aluminum case, with a four inch (4") diameter dial and furnished with a clear glass crystal window, 3/8" shut-off valve, and a bronze pressure snubber. Provide diaphragm seals between shut-off valve and pressure gauge on all sludge and lines with nonclear matter in suspension of solution. All gauges shall be weatherproofed. The face dial shall be white finished aluminum with jet black graduations and figures. The face dial shall indicate the units of pressure being measured (e.g., feet, inches, etc.) or be dual scale.
2. Gauges shall be sized with an appropriate range of pressure readings shown in pounds per square inch (PSI).

L. Reduce Pressure Backflow Preventer

1. If shown on the drawings, backflow preventers shall be supplied at each pump station, and installed in accordance with the Collier County Standard Details.

M. Flow Meters for Master Pumping Stations

1. Meters shall be of the magnetic type (see County Approved Product List, Appendix F). Flow meters shall be designed to record both the peak pumping station capacity and anticipated minimum flows with equally high accuracy. All meters shall be tied to the Radio Telemetry SCADA System. The flow metering system shall be installed within the pumping station structure, if space is available, or in an exterior protected and drained pit. In all cases, meter by-pass valves and piping shall be provided.
2. Flow meters shall be supplied for "Master Pumping Stations" only.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install all valves and appurtenances in the locations shown, true to alignment and rigidly supported. Repair any damage to the above items to the satisfaction of the ENGINEER before they are installed.
- B. Carefully inspect each valve, open it wide and then tightly close it, and test the various nuts and bolts for tightness. Take special care to prevent any foreign matter from becoming lodged in the valve seat. Valves, unless shown otherwise shall be set with their operator shaft vertically. Repair and replace any valve that does not operate correctly.
- C. Carefully center valve boxes over the operating nuts of the valves to permit a valve wrench or key to be fitted easily to the operating nut. Valve boxes shall be set to conform to the level of the finished surface and held in position by a ring of concrete placed under the support flange as shown on the Collier County Standard Details. The valve box shall not transmit surface loads to the pipe or valve. 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, adjust all valve boxes to finish grade. Valve operating risers shall be installed with any valves required to ensure that the operating nut is 30-inches or less from the ground surface.
- D. After installation, test all valves and appurtenances for at least 1 hour at the working pressure corresponding to the class of pipe, unless a different test pressure is specified. If any joint proves to be defective, repair it to the satisfaction of the ENGINEER.
- E. Install all floor boxes, brackets, extension rods, guides, the various types of operators and appurtenances as shown on the Drawings that are in masonry floors or walls, and install concrete inserts for hangers and supports as soon as forms are erected and before concrete is poured. Before setting these items, check all plans and figures that have a direct bearing on their location and he shall be responsible for the proper location of these valves and appurtenances during the construction of the structures.
- F. Pipe for use with flexible couplings shall have plain ends as specified in the respective pipe sections.
- G. Buried mechanical joints shall be made with COR-TEN bolts.
- H. Prior to assembly of split couplings, thoroughly clean the grooves as well as other parts. The ends of the pipes and outside of the gaskets shall be moderately coated with petroleum jelly, cup grease, soft soap or graphite paste, and the gasket shall be slipped over one pipe end. After the other pipe has been brought to the correct position, center the gasket properly over the pipe ends with the lips against the pipes. The housing sections then shall be placed. After the bolts have been inserted, tighten

the nuts until the housing sections are firmly in contact, metal-to-metal, without excessive bolt tension.

- I. Prior to the installation of sleeve-type couplings, thoroughly clean the pipe ends for 8 inches. Soapy water may be used as a gasket lubricant. A follower and gasket, in that order, shall be slipped over each pipe to about 6" from the end, and the middle ring shall be placed on the already laid pipe end until it is properly centered over the joint. Insert the other pipe end into the middle ring and bring to proper position in relation to the pipe already laid. The gaskets and followers shall then be pressed evenly and firmly into the middle ring flaires. After the bolts have been inserted and all nuts have been made up finger-tight, uniformly tighten diametrically opposite nuts progressively all around the joint, preferably by use of a torque wrench of the appropriate size and torque for the bolts.

3.2 AIR RELEASE VALVE INSTALLATION

- A. Each air release valve shall be installed at a high point in the pipeline.
- B. Prior to pressure testing a pipeline, all air release valve assemblies on that pipeline shall be installed.

3.3 SEWER SERVICE CONNECTIONS

- A. Materials, Construction:
 1. All sewer service connections shall be of SDR 35 PVC as specified herein with elastomeric gaskets on pipe and fittings.
 2. Service lines shall be connected to the sewer mains by means of a PVC wye fitting. The service branch of the wye fitting will be elevated depending on the depth of the sewer and the elevation of the property to be served. 45-degree bends or other fittings shall be used to connect the service line at the wye branch. Service lines shall be installed at such grades as will adequately serve the properties, minimum 1% slope.
 3. Service lines shall extend from the sewer to the property line and be plugged. Plugs shall be plastic with sealer. Service lines shall be 6 inches for single residential properties and 6 inches pipe and larger for commercial, industrial, and multiple residential services. Service lines will have a minimum of 3 feet and a maximum of 5 feet of cover at the property line. Service will be provided to each lot. All laterals shall have a vertical clean out installed at the property line. Clean outs shall extend 24 inches above grade and should be capped. After final connection of the lateral to a structure the clean out shall be cut off at grade and capped.

3.4 SHOP PAINTING

- A. Coat ferrous surfaces of valves and appurtenances with rust-inhibitive primer. Cap all pipe connection openings to prevent the entry of foreign matter prior to installation.

3.5 FIELD PAINTING

- A. Paint all metal valves and appurtenances specified herein and installed in valve and meter pits as specified.

3.6 INSPECTION AND TESTING

- A. Subject completed pipe to hydrostatic pressure test at full working pressure. Repair all leaks and retest the line as approved by the ENGINEER. Prior to testing, support the gravity pipelines in an approved manner to prevent movement during tests.

END OF SECTION

SECTION 333913
SEWER MANHOLES

PART 1 GENERAL

1.1 SUMMARY

- A. Section Includes: Requirements for providing sewer manholes and all other appurtenances for a complete installation. Provide precast reinforced concrete manholes conforming to ASTM C478 in accordance with the Collier County Standard Details.
- B. Related Work Specified in Other Sections Include:
 - 1. Section 055600 – Metal Castings
 - 2. Section 099723 – Concrete Coatings

1.2 REFERENCE

- A. Codes and standards referred to in this Section are:
 - 1. ASTM C 76 - Specification for Reinforced Concrete Culvert, Storm Drain and Sewer Pipe.
 - 2. ASTM C 478 - Specification for Precast Reinforced Concrete Manhole Sections
 - 3. ASTM C 32 - Specification for Sewer and Manhole Brick (Made for Clay or Shale)
 - 4. ASTM C 443 - Specification for Joints for Circular Concrete Sewer and Culvert Pipe, Using Rubber Gaskets [Metric]

1.3 SUBMITTALS

- A. Shop Drawings: Submit shop drawings of sewer manholes as specified in Division 1.
- B. Quality Control: Submit shop and field test reports of concrete samples tested in an approved laboratory.

1.4 DELIVERY, STORAGE AND HANDLING

- A. General: Take every precaution to prevent injury to the manhole sections during transportation and unloading. Unload manhole sections using skids, pipe hooks, rope slings, or suitable power equipment, if necessary, and keep the sections under control at all times. Do not allow the manhole sections to be dropped, dumped or dragged under any conditions. Follow applicable requirements specified in Division 1.
- B. Damaged Section: If any manhole section is damaged in the process of transportation or handling (see Section 2.3.C below), contact the Public Utilities Wastewater Department for visual inspection. If the Wastewater Department deems it necessary to reject the manhole section, reject and immediately remove such sections from the site, and replace the damaged manhole sections at no increase in Contract Amount.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. See County Approved Product List, Appendix F, for acceptable manufacturers of plastic joint sealing compound and sewer manhole frames and covers.

2.2 MATERIALS

- A. Concrete, Steel Reinforcement and Aggregates: Provide reinforced concrete, cementitious materials, aggregates and steel reinforcement conforming to the requirements of ASTM C 478, with 4000 psi concrete, Grade 40 reinforcement bars, Type II cement, and a minimum wall thickness of 8 inches.
- B. Steel reinforced polymer concrete manholes may be furnished and installed instead of the Type II cement manholes described above. If provided, steel reinforced polymer concrete manholes shall not require interior and exterior protection as described in part 3.1 F and 3.1 G. All steel reinforced polymer concrete structures shall be supplied by a qualified company with a minimum of 5 years' experience manufacturing polymer concrete. All steel reinforced polymer concrete structures shall be manufactured and installed in accordance with the applicable requirements of ASTM C76, C478, C443, D6783, C33, C267, A82, A165, A496, A497, A615, and A615M.
- C. Manhole Frames and Covers: Provide manhole frames and covers as shown on the Collier County Standard details. Castings for manhole frames, covers and other items shall conform to the ASTM Designation A48, Class 30. Castings shall be true to pattern in form and dimensions and free of pouring faults and other defects in positions which would impair their strength, or otherwise make them unfit for the service intended. The scating surfaces between frames and covers shall be machined to fit true so the frames and covers do not shift under traffic

conditions or permit entry of storm water from flooding. Lifting or "pick" holes shall be provided, but shall not penetrate the cover. The words SANITARY SEWER, as well as COLLIER COUNTY shall be cast in all manhole covers except those owned by a private party. All manhole frames and covers shall be traffic bearing unless otherwise specified. Frames and covers shall be fully bedded in mortar to the correct finished grade elevation with materials shown in the COUNTY'S Standard Detail Drawings.

- D. Preformed Joint Sealing Compound: Provide preformed joint sealing compound for joining manhole sections.
- E. Concrete Protective Liner: Provide concrete protective liner conforming to Section 02608.
- F. Pipeline Connections: Provide neoprene boots with type 316 stainless steel clamps of a design approved by the County Manager or designee for joining sewers to manhole riser sections. Fill the unfilled portion of the connection with mortar or concrete to guarantee a watertight seal.
- G. Doghouse Manholes: Doghouse manholes over existing sanitary sewer pipes are permitted, and in a number of instances, preferred. Provide a concrete base a minimum of 8 inches thick, with proper reinforcing rods to prevent cracking. Pour concrete base upon a 12-inch base of gravel. Precast manhole rings may be set in the concrete over the existing pipe. Concrete should then be used to form both the bench and to seal the pipe entrances, both inside and especially outside. Once dry, remove the top of the pipe in the manhole.
- H. Standard Manholes: The standard manhole shall be 4 feet or more in depth measured from the base of the cover frame to the top of the concrete footing and shall be of the concentric cone type, as shown in the Standard Details. If the manhole is 4 feet or less in depth, it shall be classified as a "Shallow Manhole" as specified below.
- I. Shallow Manholes: The shallow manhole shall be 4 feet or less in depth measured from the base of the cover frame to the top of the concrete footing and shall be of flat top construction, as shown in the Standard Details.
- J. Manhole Inverts: Form manhole inverts from concrete having a minimum 28 day compressive strength of 2500 psi, and as shown in the Standard Details. Inverts for "straight-through" manholes may be formed by laying the pipe straight through the manhole, pouring the concrete invert, and then cutting out the top half of the pipe. Construct curved inverts of concrete, as shown in the Standard Details, and form a smooth, even, half pipe section. Precast inverts may be used, however, no large "bowls" shall be permitted in the center of the manhole. To alleviate this problem, grout the invert to form a smooth, uniform invert as shown in the Standard Details. Maintain a 0.1 foot drop across the manhole.

- K. Inflow Protectors: In all manholes, install an inflow protector manufactured from a high-quality 304 stainless steel with a consistent thickness of not less than 18 gage (see County Approved Product List, Appendix F). The inflow shall have a deep-dish bowl design with no less than 8 inches in depth to allow easy and unobstructed removal of the manhole cover. The manhole inflow protector is to be manufactured with a one-piece rubber gasket installed at the factory for a tight, consistent fit. The rubber gasket is to be designed to securely wrap around the entire leading edge of the inflow protector at the point where it comes in contact with the manhole frame and cover. The wrap around rubber gasket is to be manufactured to a width of no less than 3/8 inches, consistent on top and bottom of the leading edge of the inflow protector. The gasket shall be no more than 3/32 inches thick. The insert removal handle shall be manufactured of a high-quality stainless steel for strength and durability. The handle is installed in such a way that it does not interfere with the installation or removal of the manhole lid. The insert handle will be manufactured to withstand a minimum pull force of 500 pounds before it fails or separates from the insert. The inscription "PROPERTY OF COLLIER COUNTY UTILITIES" shall be etched, at the base of the handle frame, to provide a long-lasting identification marker for the COUNTY.
- L. Chimney Seals: Install a minimum of two (2) precast concrete or HDPE riser rings with a chimney seal (see County Approved Product List, Appendix F) between manhole and cast iron frame.

2.3 SOURCE QUALITY CONTROL

- A. If requested by the County Manager or designee, at least three cylinders shall be taken each day that manhole sections are cast, with batch samples to be designated by the laboratory representative. At least one set of cylinders will be taken from each 9 cubic yards of concrete used in manhole section construction. These samples will be tested for strength. If the samples fail to meet specified minimum concrete strength requirements, all manhole sections manufactured from the concrete from which the cylinders were made will be rejected.
- B. The County Manager or designee reserves the right to core manholes either at the job site or point of delivery to validate strength of concrete and placement of steel. If cores fail to demonstrate the required strength or indicate incorrect placement of reinforcing steel, all sections not previously tested will be considered rejected until sufficient additional cores are tested, at no increase in Contract Amount, to substantiate conformance to these requirements.
- C. Components of the manhole shall be free of fractures, cracks, and undue roughness. Concrete shall be free of defects, which indicate improper mixing or placing, and surface defects such as honeycomb or spalling. Cracks or broken ends due to improper handling will not be acceptable. No lift holes will be allowed except in rise and corbel sections. These holes shall not penetrate the wall and shall be filled with non-shrink grout after installation.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Lifting Holes: Grout lifting holes through the structure with non-shrink grout.
- B. Precast Base: Provide a precast base of not less than 8 inches in thickness with a minimum dimension across the precast base of 72 inches poured monolithically with the bottom section of the manhole walls, reinforced, with a minimum 28-day compressive strength of 3000 psi.
- C. Joining Manhole Sections: Join precast sections using plastic joint sealing compound (see County Approved Product List, Appendix F) and trimmed prior to grouting. The first construction joint shall be not less than 2 feet above the base slab. Use tongue and groove joints suitable for the flexible gasket. Use non-shrink grout inside and outside for sealing between manhole precast sections. Grout shall be of a type acceptable to the County Manager or designee and designed for use in water. Seal all openings and joints watertight.
- D. Top Termination: Terminate manhole tops at such elevations as will permit laying up grade rings under the manhole frame to make allowances for future street grade adjustments.
- E. Drop Connections: Manufacture drop connections, where required on precast manholes, with the manhole elements at the casting yard. Drop manholes shall be constructed per the Collier County Standard Details.
- F. Internal Protection: Provide internal protection for all manholes by either of the following (not required for steel reinforced polymer concrete manholes as described in 2.2 B. above):
 - 1. Sewpercoat, or
 - 2. IET Coating system, or
 - 3. Raven Lining Systems

Install the coating systems per manufacturer's recommendation and completely protect the structure from corrosion. The liner or coating systems must extend and seal onto manhole ring, seal onto and around pipe openings, and any other protrusions, completely cover the bench and flow invert. Provide a five (5)-year unlimited warranty on all workmanship and products. The work includes the surface preparation and application of the coating or liner system, and shall protect the structure for at least five (5) years from all leaks and from failure due to corrosion from exposure to corrosive gases such as hydrogen sulfide.

Repair internal coating of existing manholes cored during tie-in of new sewers by applying approved coating material as listed above in accordance with the manufacturer's recommendations. If existing manhole has an internal coating

other than that listed above, sandblast the interior of the existing manhole and apply an approved coating in accordance with the manufacturer's recommendations.

- G. Coal Tar Epoxy: Coat all manhole, wet well, and valve vault exteriors with two (2) coats of coal tar epoxy to a minimum thickness of 8 dry mils (not required for steel reinforced polymer concrete manholes as described in 2.2 B. above).

END OF SECTION

SECTION 334713

HDPE IRRIGATION POND LINER

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Specifications and guidelines for MANUFACTURING and INSTALLING geomembrane.

1.2 REFERENCES

- A. American Society for Testing and Materials (ASTM)
 - 1. D 1004 Test Method for Initial Tear Resistance of Plastic Film and Sheeting.
 - 2. D 1238 Standard Test Method for Flow Rates of Thermoplastics by Extrusion Plastometer.
 - 3. D 1505 Test Method for Density of Plastics by the Density-Gradient Technique.
 - 4. D 1603 Test Method for Carbon Black in Olefin Plastics.
 - 5. D 3895 Standard Test Method for Oxidative-Induction Time of Polyolefins by Differential Scanning Calorimetry.
 - 6. D 4833 Standard Test Method for Index Puncture Resistance of Geotextiles, Geomembranes, and Related Products.
 - 7. D 5199 Standard Test Method for Measuring Nominal Thickness of Geotextiles and Geomembranes.
 - 8. D 5397 Standard Test Method for Evaluation of Stress Crack Resistance of Polyolefin Geomembranes Using Notched Constant Tensile Load Test.
 - 9. D 5596 Standard Test Method for Microscopic Evaluation of the Dispersion of Carbon Black in Polyolefin Geosynthetics.
 - 10. D 5994 Standard Test Method for Measuring Core Thickness of Textured Geomembranes.
 - 11. D 6392 Standard Test Method for Determining the Integrity of Nonreinforced Geomembrane Seams Produced Using Thermo-Fusion Methods.

12. D 6693 Standard Test Method for Determining Tensile Properties of Nonreinforced Polyethylene and Nonreinforced Flexible Polypropylene Geomembranes.

B. Geosynthetic Research Institute

1. GRI GM 13 Test Properties, Testing Frequency and Recommended Warranty for High Density Polyethylene (HDPE) Smooth and Textured Geomembranes.
2. GRI GM 17 Test Properties, Testing Frequency and Recommended Warranty for Linear Low Density Polyethylene (LLDPE) Smooth and Textured Geomembranes.

1.3 DEFINITIONS

- A. Lot- A quantity of resin (usually the capacity of one rail car) used in the manufacture of geomembranes. Finished roll will be identified by a roll number traceable to the resin lot used.
- B. Construction Quality Assurance Consultant (CONSULTANT) - Party, independent from MANUFACTURER and INSTALLER that is responsible for observing and documenting activities related to quality assurance during the lining system construction.
- C. ENGINEER- The individual or firm responsible for the design and preparation of the project's Contract Drawings and Specifications.
- D. Geomembrane Manufacturer (MANUFACTURER) - The party responsible for manufacturing the geomembrane rolls.
- E. Geosynthetic Quality Assurance Laboratory (TESTING LABORATORY)- Party, independent from the OWNER, MANUFACTURER and INSTALLER, responsible for conducting laboratory tests on samples of geosynthetics obtained at the site or during manufacturing, usually under the direction of the OWNER.
- F. INSTALLER- Party responsible for field handling, transporting, storing, deploying, seaming and testing of the geomembrane seams.
- G. Panel- Unit area of a geomembrane that will be seamed in the field that is larger than 100 ft².
- H. Patch- Unit area of a geomembrane that will be seamed in the field that is less than 100 ft².
- I. Subgrade Surface- Soil layer surface which immediately underlies the geosynthetic material(s).

1.4 SUBMITTALS POST-AWARD

- A. Furnish the following product data, in writing, to ENGINEER prior to installation of the geomembrane material:
 - 1. Resin Data shall include the following.
 - 2. Certification stating that the resin meets the specification requirements (see Section 1.09).
 - 3. Geomembrane Roll.
 - 4. Statement certifying no recycled polymer and no more than 10% rework of the same type of material is added to the resin (product run may be recycled).
- B. The INSTALLER shall furnish the following information to the ENGINEER and OWNER prior to installation:
 - 1. Installation layout drawings:
 - a. Must show proposed panel layout including field seams and details.
 - b. Must be approved prior to installing the geomembrane.
 - 2. Approved drawings will be for concept only and actual panel placement will be determined by site conditions.
 - 3. Installer's Geosynthetic Field Installation Quality Assurance Plan.
- C. The INSTALLER will submit the following to the ENGINEER upon completion of installation:
 - 1. Certificate stating the geomembrane has been installed in accordance with the Contract Documents.
 - 2. Material and installation warranties.
 - 3. As-built drawings showing actual geomembrane placement and seams including typical anchor trench detail.

1.5 QUALITY ASSURANCE

- A. The OWNER will engage and pay for the services of a Geosynthetic Quality Assurance Consultant and Laboratory to monitor geomembrane installation.

1.6 QUALIFICATIONS

- A. MANUFACTURER

1. See County Approved Product List, Appendix F, for approved geomembrane manufacturer.
2. MANUFACTURER shall have manufactured a minimum of 5000,000 square feet of polyethylene geomembrane during the last year.

B. INSTALLER

1. Installation shall be performed by the manufacturer approved dealer/installer.
2. INSTALLER shall have installed a minimum of 15,000 square feet of HDPE geomembrane during the last 3 years.
3. INSTALLER shall have worked in a similar capacity on at least 3 projects similar in complexity to the project described in the contract documents, and with at least 5,000 square feet of HDPE geomembrane installation on each project.
4. The Installation Supervisor shall have worked in a similar capacity on projects similar in size and complexity to the project described in the Contract Documents.
5. The INSTALLER shall provide a minimum of one Master Seamer for work on the project.
 - a. Must have completed a minimum of 15,000 square feet of geomembrane seaming work using the type of seaming apparatus proposed for the use on this Project.

1.7 MATERIAL LABELING, DELIVERY, STORAGE AND HANDLING

- A. Labeling - Each roll of geomembrane delivered to the site shall be labeled by the MANUFACTURER. The label will identify:
1. manufacturer's name
 2. product identification
 3. thickness
 4. length
 5. width
 6. roll number
- B. Delivery- Rolls of liner will be prepared to ship by appropriate means to prevent damage to the material and to facilitate off-loading.

C. Storage- The on-site storage location for geomembrane material, provided by the CONTRACTOR to protect the geomembrane from punctures, abrasions and excessive dirt and moisture for should have the following characteristics:

1. level (no wooden pallets)
2. smooth
3. dry
4. protected from theft and vandalism
5. adjacent to the area being lined

D. Handling- Materials are to be handled so as to prevent damage.

1.8 WARRANTY

- A. Material shall be warranted, on a pro-rata basis against Manufacturer’s defects for a period of 5 years from the date of geomembrane installation.
- B. Installation shall be warranted against defects in workmanship for a period of 1 year from the date of geomembrane completion.

1.9 GEOMEMBRANE

- A. Material shall be smooth/textured polyethylene geomembrane as shown on the drawings.
- B. Resin
 1. Resin shall be new, first quality, compounded and manufactured specifically for producing geomembrane.
 2. Natural resin (without carbon black) shall meet the following minimum requirements:

Property	Test Method	HDPE	LLDPE
Density [g/cm ³]	ASTM D 1505	0.932	0.915
Melt Flow Index [g/10 min.]	ASTM D 1238 (190/2.16)	• 1.0	• 1.0
OIT [minutes]	ASTM D 3895 (1 atm/200°C)	100	100

C. Geomembrane Rolls:

1. Do not exceed a combined maximum total of 1 percent by weight of additives other than carbon black.
2. Geomembrane shall be free of holes, pinholes as verified by on-line electrical detection, bubbles, blisters, excessive contamination by foreign matter, and nicks and cuts on roll edges.
3. Geomembrane material is to be supplied in roll form. Each roll is to be identified with labels indicating roll number, thickness, length, width and MANUFACTURER.
4. All liner sheets produced at the factory shall be inspected prior to shipment for compliance with the physical property requirements listed in section 1.09, B, and be tested by an acceptable method of inspecting for pinholes. If pinholes are located, identified and indicated during manufacturing, these pinholes may be corrected during installation.

D. Smooth surfaced geomembrane shall meet the requirements shown in the following table(s) for the following material(s):

Table 1.1: Minimum Values for Smooth Black-Surfaced HDPE Geomembranes

Property	Test Method ⁽¹⁾	Thicknes (mils)	Thicknes (mils)	Thicknes (mils)	Thicknes (mils)	Thicknes (mils)	Thicknes (mils)
Thickness, mil (mm)	ASTM D 5199						
Minimum Average		30 (0.75)	40 (1.0)	60 (1.5)	80 (2.0)	100 (2.5)	120 (3.0)
Lowest Individual Reading		27 (0.69)	36 (0.91)	54 (1.4)	72 (1.8)	90 (2.3)	108 (2.7)
Density, g/cm ³	ASTM D 1505	0.94	0.94	0.94	0.94	0.94	0.94
Carbon Black Content, %	ASTM D 1603, mod.	2.0	2.0	2.0	2.0	2.0	2.0
Carbon Black Dispersion	ASTM D 5596	<i>Note 2</i>					
<i>Tensile Properties:</i> (each direction)	ASTM D 6693						
Strength at Yield, lb/in (kN/m)		63 (11)	84 (15)	130 (23)	173 (30)	216 (38)	259 (45)
Strength at Break, lb/in (kN/m)		122 (21)	162 (28)	243 (43)	324 (57)	405 (71)	486 (85)
Elongation at Yield, %	(1.3" gauge length)	13	13	13	13	13	13
Elongation at Break, %	(2.0" gauge length)	700	700	700	700	700	700
Tear Resistance, lb (N)	ASTM D 1004	21 (93)	28 (124)	42 (187)	56 (249)	70 (311)	84 (373)
Puncture Resistance, lb (N)	ASTM D 4833	59 (263)	79 (352)	119 (530)	158 (703)	198 (881)	238 (1059)
Notched Constant Tensile Load, hours	ASTM D 5397, app.	400	400	400	400	400	400
Oxidative Induction Time, min.	ASTM D 3895	100	100	100	100	100	100

¹ Some test procedures have been modified for application to geosynthetics. All procedures and values are subject to change without prior notification.

² Only near spherical agglomerates are considered. 9 of 10 views shall be Category 1 or 2. No more than one view Category 3.

- E. Textured surfaced geomembrane shall meet the requirements shown in the following table(s) for the following material(s).

Table 2.1: Minimum Values for Black Surfaced Coextruded Textured HDPE Geomembranes

Property	Test Method ⁽¹⁾	Thicknes (mils)	Thicknes (mils)	Thicknes (mils)	Thicknes (mils)	Thickness (mils)
Thickness, mil (mm)	ASTM D 5994					
Minimum Average		30 (0.75)	40 (1.0)	60 (1.5)	80 (2.0)	100 (2.5)
Lowest Individual Reading		27 (0.69)	36 (0.91)	54 (1.4)	72 (1.8)	90 (2.3)
Density, g/cm ³	ASTM D 1505	0.94	0.94	0.94	0.94	0.94
Carbon Black Content, %	ASTM D 1603, modified	2.0	2.0	2.0	2.0	2.0
Carbon Black Dispersion	ASTM D 5596	Note 4				
<i>Tensile Properties⁽²⁾: (each direction)</i>	ASTM D 6693					
Strength at Yield, lb/in (kN/m)		63 (11)	84 (15)	130 (23)	173 (30)	216 (38)
Strength at Break, lb/in (kN/m)		45 (8)	60 (11)	90 (16)	120 (21)	150 (27)
Elongation at Yield, %	(1.3" gauge length)	13	13	13	13	13
Elongation at Break, %	(2.0" gauge length)	150	150	150	150	150
Tear Resistance, lb (N)	ASTM D 1004	21 (93)	28 (124)	42 (187)	56 (249)	70 (311)
Puncture Resistance, lb (N)	ASTM D 4833	54 (240)	72 (320)	108 (480)	144 (641)	180 (801)
Notched Constant Tensile Load ⁽³⁾ , hours	ASTM D 5397, appendix	400	400	400	400	400
Oxidative Induction Time, min.	ASTM D 3895	100	100	100	100	100

¹ Some test procedures have been modified for application to geosynthetics. All procedures and values are subject to change without prior notification.

² The combination of stress concentrations due to coextrusion texture geometry and the small specimen size results in large variations of test results. Therefore, these tensile properties are minimum average roll values.

³ NCTL on coextruded textured product is conducted on representative smooth membrane samples.

⁴ Only near spherical agglomerates are considered. 9 of 10 views shall be Category 1 or 2. No more than one view Category 3.

F. Extrudate Rod or Bead:

1. Extrudate material shall be made from same type resin as the geomembrane.
2. Additives shall be thoroughly dispersed.
3. Materials shall be free of contamination by moisture or foreign matter.

1.10 EQUIPMENT

A. Welding equipment and accessories shall meet the following requirements:

1. Gauges showing temperatures in apparatus (extrusion welder) or wedge (wedge welder) shall be present.
2. An adequate number of welding apparati shall be available to avoid delaying work.

3. Power source must be capable of providing constant voltage under combined line load.

1.11 DEPLOYMENT

- A. Assign each panel a simple and logical identifying code. The coding system shall be subject to approval and shall be determined at the job site.
- B. Visually inspect the geomembrane during deployment for imperfections and mark faulty or suspect areas.
- C. Deployment of geomembrane panels shall be performed in a manner that will comply with the following guidelines:
 1. Unroll geomembrane using methods that will not damage geomembrane and will protect underlying surface from damage (spreader bar, protected equipment bucket).
 2. Place ballast (commonly sandbags) on geomembrane which will not damage geomembrane to prevent wind uplift.
 3. Personnel walking on geomembrane shall not engage in activities or wear shoes that could damage it. Smoking will not be permitted on the geomembrane.
 4. Do not allow heavy vehicular traffic directly on geomembrane. Rubber-tired ATV's and trucks are acceptable if wheel contact is less than 6 psi.
 5. Protect geomembrane in areas of heavy traffic by placing protective cover over the geomembrane.
- D. Sufficient material (slack) shall be provided to allow for thermal expansion and contraction of the material.

1.12 FIELD SEAMING

- A. Seams shall meet the following requirements:
 1. To the maximum extent possible, orient seams parallel to line of slope, i.e., down and not across slope.
 2. Minimize number of field seams in corners, odd-shaped geometric locations and outside corners.
 3. Slope seams (panels) shall extend a minimum of five-feet beyond the grade break into the flat area.
 4. Use a sequential seam numbering system compatible with panel numbering system that is agreeable to the CONSULTANT and INSTALLER.

5. Align seam overlaps consistent with the requirements of the welding equipment being used. A 6-inch overlap is commonly suggested.

B. During Welding Operations

1. Provide at least one Master Seamer who shall provide direct supervision over other welders as necessary.

C. Extrusion Welding

1. Hot-air tack adjacent pieces together using procedures that do not damage the geomembrane.
2. Clean geomembrane surfaces by disc grinder or equivalent.
3. Purge welding apparatus of heat-degraded extrudate before welding.

D. Hot Wedge Welding

1. Welding apparatus shall be a self-propelled device equipped with an electronic controller which displays applicable temperatures.
2. Clean seam area of dust, mud, moisture and debris immediately ahead of hot wedge welder.
3. Protect against moisture build-up between sheets.

E. Trial Welds

1. Perform trial welds on geomembrane samples to verify welding equipment is operating properly.
2. Make trial welds under the same surface and environmental conditions as the production welds, i.e., in contact with subgrade and similar ambient temperature.
3. Minimum of two trial welds per day, per welding apparatus, one made prior to the start of work and one completed at mid shift.
4. Cut four, one-inch wide by six-inch long test strips from the trial weld.
5. Quantitatively test specimens for peel adhesion, and then for shear strength.
6. Trial weld specimens shall pass when the results shown in Table 3 are achieved in both peel and shear test.

- a. The break, when peel testing, occurs in the liner material itself, not through peel separation (FTB).
 - b. The break is ductile.
 7. Repeat the trial weld, in its entirety, when any of the trial weld samples fail in either peel or shear.
 8. No welding equipment or welder shall be allowed to perform production welds until equipment and welders have successfully completed trial weld.
- F. Seaming shall not proceed when ambient air temperature or adverse weather conditions jeopardize the integrity of the liner installation. INSTALLER shall demonstrate that acceptable seaming can be performed by completing acceptable trial welds.
- G. Defects and Repairs
1. Examine all seams and non-seam areas of the geomembrane for defects, holes, blisters, undispersed raw materials, and any sign of contamination by foreign matter.
 2. Repair and non-destructively test each suspect location in both seam and non-seam areas. Do not cover geomembrane at locations that have been repaired until test results with passing values are available.

1.13 FIELD QUALITY ASSURANCE

- A. MANUFACTURER and INSTALLER shall participate in and conform to all terms and requirements of the Owner's quality assurance program. CONTRACTOR shall be responsible for assuring this participation.
- B. Quality assurance requirements are as specified in this Section and in the Field Installation Quality Assurance Manual if it is included in the contract.
- C. Field Testing
1. Non-destructive testing may be carried out as the seaming progresses or at completion of all field seaming.
 - a. Vacuum Testing
 - (1) Shall be performed in accordance with ASTM D 5641, Standard Practice for Geomembrane Seam Evaluation by Vacuum Chamber.
 - b. Air Pressure Testing

- (1) Shall be performed in accordance with ASTM D 5820, Standard Practice for Pressurized Air Channel Evaluation of Dual Seamed Geomembranes.
 - c. Other approved methods.
2. Destructive Testing (performed by CONSULTANT with assistance from INSTALLER)
 - a. Location and Frequency of Testing
 - (1) Collect destructive test samples at a frequency of one per every 1500 lineal feet of seam length.
 - (2) Test locations will be determined after seaming.
 - (3) Exercise Method of Attributes as described by GRI GM-14 (Geosynthetic Research Institute, <http://www.geosynthetic-institute.org>) to minimize test samples taken.
 - b. Sampling Procedures are performed as follows:
 - (1) INSTALLER shall cut samples at locations designated by the CONSULTANT as the seaming progresses in order to obtain field laboratory test results before the geomembrane is covered.
 - (2) CONSULTANT will number each sample, and the location will be noted on the installation as-built.
 - (3) Samples shall be twelve (12) inches wide by minimal length with the seam centered lengthwise.
 - (4) Cut a 2-inch wide strip from each end of the sample for field-testing.
 - (5) Cut the remaining sample into two parts for distribution as follows:
 - (a) One portion for INSTALLER, 12-inches by 12 inches
 - (b) One portion for the Third Party laboratory, 12-inches by 18-inches
 - (c) Additional samples may be archived if required.
 - c. Destructive testing shall be performed in accordance with ASTM D 6392, Standard Test Method for Determining the Integrity of Non-

Reinforced Geomembrane Seams Produced Using Thermo-Fusion Methods.

- d. INSTALLER shall repair all holes in the geomembrane resulting from destructive sampling.
- e. Repair and test the continuity of the repair in accordance with these Specifications.

D. Failed Seam Procedures

- 1. If the seam fails, INSTALLER shall follow one of two options:
 - a. Reconstruct the seam between any two passed test locations.
 - b. Trace the weld to intermediate location at least 10 feet minimum or where the seam ends in both directions from the location of the failed test.
 - c. The next seam welded using the same welding device is required to obtain an additional sample, i.e., if one side of the seam is less than 10 feet long.
 - d. If sample passes, then the seam shall be reconstructed or capped between the test sample locations.
 - e. If any sample fails, the process shall be repeated to establish the zone in which the seam shall be reconstructed.

1.14 REPAIR PROCEDURES

- A. Remove damaged geomembrane and replace with acceptable geomembrane materials if damage cannot be satisfactorily repaired.
- B. Repair any portion of unsatisfactory geomembrane or seam area failing a destructive or non-destructive test.
- C. INSTALLER shall be responsible for repair of defective areas.
- D. Agreement upon the appropriate repair method shall be decided between CONSULTANT and INSTALLER by using one of the following repair methods:
 - 1. Patching- Used to repair large holes, tears, undispersed raw materials and contamination by foreign matter.
 - 2. Abrading and Re-welding- Used to repair short section of a seam.
 - 3. Spot Welding- Used to repair pinholes or other minor, localized flaws or where geomembrane thickness has been reduced.

4. Capping- Used to repair long lengths of failed seams.
 5. Flap Welding- Used to extrusion weld the flap (excess outer portion) of a fusion weld in lieu of a full cap.
 6. Remove the unacceptable seam and replace with new material.
- E. The following procedures shall be observed when a repair method is used:
1. All geomembrane surfaces shall be clean and dry at the time of repair.
 2. Surfaces of the polyethylene which are to be repaired by extrusion welds shall be lightly abraded to assure cleanliness.
 3. Extend patches or caps at least 6 inches for extrusion welds and 4 inches for wedge welds beyond the edge of the defect, and around all corners of patch material.
- F. Repair Verification
1. Number and log each patch repair (performed by CONSULTANT).
 2. Non-destructively test each repair using methods specified in this Specification.

1.15 MEASUREMENT AND PAYMENT

- A. Payment for geomembrane installation will be as per contract unit price per square foot, as measured parallel to liner surface, including designed anchor trench material and is based upon net lined area.
- B. Net lined area is defined to be the true area of all surfaces to be lined plus designed burial in all anchor trenches, rubsheets, and sacrificial layers.
- C. Prices shall include full compensation for furnishing all labor, material, tools, equipment, and incidentals.

END OF SECTION

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SECTION 409500

FIBER-OPTIC COMMUNICATION STANDARDS

PART 1 GENERAL

1.1 OVERVIEW

- A. The standards herein pertain to all work associated with the procurement, installation, configuration, and testing of fiber-optic communications and associated infrastructure for County installations.
- B. All contractors and subcontractors selected to perform fiber-optic communications work for the County shall adhere to the standards described in this document.
- C. Additional requirements may be defined in engineering plans related to the fiber-optic communications work performed. In the event of a conflict, the most stringent requirement shall be followed. In the event of a conflict where the most stringent requirement cannot be resolved, Contractor shall inform County in writing identifying the discrepancy for final direction.

1.2 DEFINITIONS

A. Common Abbreviations

- 1. Amps: Ampere.
- 2. ANSI: American National Standards Institute.
- 3. ASTM: American Society for Testing and Materials.
- 4. AWG: American Wire Gauge.
- 5. CCITD: Collier County Information Technology Department.
- 6. CFR: Code of Federal Regulations.
- 7. dB: Decibel.
- 8. EIA: Electronic Industries Alliance.
- 9. FDEP: Florida Department of Environmental Protection.
- 10. HASB: High Airspeed Blowing.
- 11. HDPE: High Density Polyethylene.
- 12. IT: Information Technology.
- 13. km: Kilometer.
- 14. lbs: Pounds.
- 15. m: Meter.
- 16. N: Newton.

17. NEC: National Electric Code.
18. NEMA: National Electrical Manufacturers Association.
19. NESC: National Electrical Safety Code.
20. nm: Nanometer.
21. OSHA: Occupational Safety and Health Administration.
22. OTDR: Optical Time Domain Reflectometer.
23. PVC: Polyvinyl Chloride.
24. RCDD: Registered Communications Distribution Designer.
25. RUS: United States Rural Utilities Service.
26. SC: Subscriber Connection.
27. SDR: Standard Dimension Ratio.
28. SMF: Single Mode Fiber.
29. SRM: Standard Route Marker.
30. TIA: Telecommunications Industry Association.
31. UV: Ultraviolet.
32. VAC: Volts Alternating Current.
33. WGU: Wire Grounding Unit.

1.3 COORDINATION ACTIVITIES

- A. Work involving the installation of fiber-optic cabling and equipment will interface with equipment provided by Others including, but not limited to, the following:
 1. Mounting of the IT Telecommunications Panel
 - a. The IT telecommunications panel shall be mounted to an equipment rack at the installation site. Refer to County Utility Detail G-12.
- B. Contractor shall determine all interface and installation requirements at the site prior to procurement and delivery and coordinate as required with County.
- C. Permitting:
 1. Contractor is responsible for determining and obtaining all necessary permits for the work being performed, including, but not limited to:
 - a. Stormwater.
 - b. Utilities.
 - c. Right-of-way.
 - d. Canal crossings [South Florida Water Management District].
 - e. FDEP.
 2. Contractor is responsible for all permitting fees.

1.4 QUALITY ASSURANCE

- A. Contractor Qualifications:

1. Contractor shall be firms, corporations, individuals, or partnerships normally engaged in the deployment, maintenance, and repairs of fiber-optics at the municipal, county or state level.
2. Contractor shall have one or more of the following certifications
 - a. Registered Communications Distribution Designer (RCDD)
 - b. IMSA Fiber Optics for Traffic Stem Technician 2
 - c. IMSA Traffic Signal Technician Level 2
 - d. IMSA Traffic Signal Technician Level 3
3. Contractor shall have a minimum of 5 years of experience performing fiber-optic communications work based on the relevant scope definition category or categories above.

PART 2 PRODUCTS

2.1 GENERAL

- A. Each subsection below specifies the minimum requirements for each type of product. Contractor shall adhere to product requirements below unless otherwise approved by County in writing.

2.2 FIBER-OPTIC CABLE

- A. General: Provide all-dielectric, dry-filled, loose-tube, dispersion-unshifted, single-mode fiber (SMF) with low water peak, gel free, and suitable for underground (i.e., in conduit) and aerial outside plant installation. All fiber optic cable shall be splice-compatible with existing dispersion-unshifted SMF and require no electronic equipment for dispersion compensation between new and existing fiber. Ensure that all components that comprise a single length of cable are continuous and of the same material. Furnish only commercial off-the-shelf materials, equipment, and components.

B. Optical Fibers:

1. Ensure that the optical fibers used in the cable meet or exceed the Telecommunications Industry Association (TIA) and Electronic Industries Alliance (EIA) TIA/EIA-492-CAAB specification, the U.S. Department of Agriculture Rural Utilities Service (RUS) 7 CFR 1755.900, and International Telecommunication Union ITU-T G.652.D requirements. Use only optical fibers meeting the additional requirements as follows:
 - a. Optical:
 - 1) Cabled Fiber Attenuation:
 - a) 1310 nm; Less than or equal to 0.35 dB/km.
 - b) 1550 nm; Less than or equal to 0.25 dB/km.
 - 2) Point Discontinuity:
 - a) 1310 nm; Less than or equal to 0.05 dB/km.
 - b) 1550 nm; Less than or equal to 0.05 dB/km.

2. Ensure that all fiber in the buffer tube is usable fiber that complies with attenuation requirements. Ensure that fibers do not adhere to each other. Ensure that the fiber is free of surface imperfections and inclusions. Ensure that all fiber optic core glass is from the same manufacturer.

C. Buffer Tubes: Ensure that the fiber optic cable includes loose buffer tubes that isolate internal optical fibers from outside forces and provide protection from physical damage as well as water ingress and migration. Ensure that buffer tubes provide freedom of movement for internal optical fibers. Ensure buffer tubes allow for expansion and contraction of the cable without damage to internal optical fiber. Ensure that fiber does not adhere to the inside of the tube. Ensure that buffer tubes permit intentional scoring and breakout without damage to the fiber. Ensure that each fiber optic cable buffer tube contains 12 fibers per tube.

D. Color Code:

1. Ensure that the marking and color-coding of the fibers and buffer tubes conforms to the TIA-598-D standard.
2. Ensure that colors are permanent and stable during temperature cycling, and not subject to fading or smearing onto each other or into the water-blocking material. Ensure that fibers are colored with UV curable inks that remain clearly distinguishable as the intended color.

E. Strength Member: Ensure that the fiber optic cable contains a dielectric central and outside elements that prevent buckling of the cable and provide tensile strength. Ensure that the fiber optic cable can withstand a pulling tension of 600 lbs. without damage to any components of the fiber optic cable.

F. Outer Jacket:

1. Mark the jacket with the cable manufacturer's name, fiber type, fiber count, date of manufacture", and the sequential cable lengths marked in feet. All fiber-optic cabling shall have a stripe, yellow in color, along the entire length of the cable, and shall be marked "Collier County BCC IT" at three-foot intervals. Provide legible marking with contrasting color to that of the cable jacket.

G. Performance:

1. Bend radius: Ensure that the fiber optic cable is capable of withstanding a minimum unloaded bend radius of 10 times the cable diameter and a minimum loaded bend radius of 20 times the cable diameter when loaded to pulling tension of 600 pounds. Test the cable as required in the TIA -455-33B standard. Ensure that bending the fiber optic cable up to the minimum bend radius does not affect the optical characteristics of the fiber.

2. Cable Strength: Ensure that the fiber optic cable is capable of withstanding a pulling tension of 600 pounds during installation without increasing the fiber attenuation more than 0.8 dB/mile and without changing other optical fiber characteristics after the tensile load is removed. Ensure that optical fiber is proof-tested by the fiber manufacturer at a minimum of 100 kilo pounds per square inch. Ensure that the cable will withstand 25 impact cycles and the change in attenuation does not exceed 0.2 dB at 1550 nm when tested according to the requirements as detailed in the TIA -455-25D standard. Ensure that the change in attenuation will not exceed 0.15 dB during loading at 1550 nm, and that no fiber displays a measurable change in attenuation after load removal.

2.3 FIBER-OPTIC CONNECTION HARDWARE

A. General: Ensure that all splice enclosures, organizers, cable end preparation tools, and procedures are compatible with the fiber optic cable, and are approved by the County in writing.

B. Splice Enclosures:

1. Contain all optical fiber splices within a splice enclosure. Ensure that the enclosures provide storage for splices, fiber, and buffer tubes. Ensure that the splice enclosure restores the mechanical and environmental integrity of the fiber optic cable, encases the sheath opening in the cable, and organizes and stores optical fiber. Ensure all hinges and latching devices are stainless steel. Ensure that the enclosure is airtight and prevents water intrusion. Ensure that the splice enclosure can accommodate pressurization and has the ability to be reentered without requiring specialized tools or equipment. Ensure that the enclosure provides fiber and splice organizers including splice trays and strain relief.
2. Ensure that splice enclosures are hermetically sealed to protect internal components from environmental hazards such as moisture, insects, and UV light. Fiber optic splice enclosures shall also:
3. Comply with the Telcordia Technologies' GR-771-CORE standard and all applicable NEC requirements.
4. Provide space for future expansion equal to 100% of the initial utilization.
5. Provide fiber optic cable penetration end caps to accommodate a minimum installation of two trunk fiber optic cables and two fiber optic drop cables. Ensure that the enclosure end caps are factory-drilled to the proper diameter to accept and seal the fiber optic cable entries. Ensure that the cable entry locations can accommodate an assortment of cables with outside diameters ranging from 0.45 inches to 0.55

inches, plus 10%, without jeopardizing the waterproof characteristics of the enclosure.

C. Splice Trays: Ensure that splice trays are securely attached and accessible and provide sufficient storage for the fiber cable. Ensure splice trays provide access to individual fibers without disrupting other fibers in the tray. Ensure that splice trays hold the buffer tubes rigidly in place and provide protection for fusion splices. Ensure that the raceway accommodates the minimum bend radius of the fiber. Ensure that splice trays allow visible inspection of the fiber. Ensure that splice trays include a cover with a locking mechanism to hold it in place.

D. Cable Terminations:

1. Use Type SC connectors for all new network installations. Ensure that all connectors include a ceramic ferrule and provide a strain relief mechanism when installed on a single fiber cable that contains strength elements. Ensure that the optical fiber within the body of all connectors is mechanically isolated from cable tension, bending, and twisting.

E. Pre-Terminated Connector Assemblies: Ensure that pre-terminated cable assemblies consist of fiber optic cables with factory-installed connectors on one end of the cable and an un-terminated optical fiber on the other. Ensure that the pre-terminated connector assemblies are installed with fusion splices. Ensure that all buffer tubes and fibers are protected once the attachment of pre-terminated connector assemblies is complete.

F. Buffer Tube Fan-Out Kits: Ensure that a buffer tube fan-out kit is installed when fiber optic cables are terminated. Use a kit compatible with the fiber optic cable being terminated and that is color-coded to match the optical fiber color scheme. Ensure that the buffer tube fan-out kit supports 12 fiber strands.

G. Patch Panels:

1. Ensure that the patch panel is compatible with the fiber optic cable being terminated and color coded to match the optical fiber color scheme. Ensure that the patch panel has a minimum of 12 SC-type panel connectors unless otherwise shown in the Plans. Ensure that the patch panel dimensions do not exceed 14 inches x 6 inches x 4 inches for fiber counts of twelve or less. Ensure the patch panel is suitable for mounting within an approved cabinet at the field device location. Ensure patch panels are sized to accommodate specified coupler housings and maintain sufficient bend radius for cables. Ensure the patch panel is sized to occupy the minimum space required for capacity.
2. Connector Panels:

- a. Ensure that the connector panel provides 12 SC-type, bulkhead-mount coupling connectors. Ensure that each coupling connector allows connection of a cable terminated on one side of the panel to a cable on the opposite side.

2.4 IT TELECOMMUNICATIONS PANEL

A. General:

1. Function: Receive incoming fiber-optic cable at installation site from County network.
2. Major parts include fiber-optic patch panel, network cabling, and accessories.

B. Enclosure Specifications:

1. Manufacturers and Products:
 - a. American Products; AP Minifort Model AM-462418-24RU.
 - b. No substitutions.
2. Panel Size:
 - a. Include mounting bracket accessory from panel manufacturer for installation.
 - b. Increase panel size if and as needed to accommodate additional network equipment or to increase heat dissipation to reach an internal steady-state operating temperature below the maximum operating temperature of all contained equipment.
3. Provide ground bar inside enclosure.
4. All conduit penetrations shall be made through the bottom face of the enclosure. Side or top penetrations are not acceptable.
5. Include quad 120 VAC power receptacle gang box inside enclosure.
6. Enclosure shall include a standard rack for mounting of rack-mounted equipment.

2.5 CONDUIT

A. Materials of Construction: Use materials that have been tested and listed by a Nationally Recognized Testing Laboratory to the following industry standards:

- High Density Polyethylene (HDPE):
 - For use outside site boundaries, such as roadside pull boxes and splice enclosures.
- HDPE Standard Dimension Ratio (SDR) 13.5: ASTM F2160, NEMA TC-7
- All HDPE conduit shall be orange in color.
- Schedule 80 PVC:
 - For use inside site boundary for interconnection of fiber-optic equipment and to on-site fiber-optic handholes, pull boxes, and splice enclosures.

B. Locate Wire: Ensure that locate wire is a single copper solid conductor with a minimum gauge of No. 12 AWG with blue shielding. Ensure locate wire is insulated using a 45-millimeter minimum thickness polyethylene sheath that is orange in color and marked to identify the manufacturer and the conductor size.

C. Locate Wire Grounding: Ensure that locate wires are attached to a wire grounding unit (WGU) dedicated to safely dissipate high transient voltages or other foreign electrical surges induced into the designated system. Ensure the WGU conforms to the following:

1. Allows signals generated by locate system transmitters to pass through the protection system without going to ground.
2. The protection system automatically resets and passes locate system transmitter signals after the unit has been grounded to dissipate over-voltages.
3. Is intended for below or above grade applications. Ground the WGU to a driven rod within 10 feet of the system using a No. 6 AWG single conductor wire with green insulation.
4. The WGU system meets the minimum standards listed below for surge protection:
 - a. Surge Element: Three-element maximum duty fail-safe gas tube.
 - b. Rating: 40,000 Amp surge capacity (single-cycle, 8 by 20 microsecond waveform).
 - c. Life: Minimum 1,000 surges (1000 Amps to ground).
 - d. Insulation Resistance: 1,000 megohm minimum at 100 volts of direct current.
 - e. Clamp Voltages:
 - 1) Impulse at 100 volts per microsecond.
 - 2) Direct Current: 300 to 500 volts.

D. Route Markers:

1. Ensure Standard Route Marker (SRM) is a rigid, three-sided driven post used for location and notification purposes only.
2. Ensure that each SRM is labeled and identified as a County IT fiber optic cable marker unless otherwise shown in the Plans. The labels must include the contact information for the Collier County IT department, and a telephone number to call prior to any excavation in the area. Ensure that the identification information is permanently imprinted on the top fitting, and will not peel, fade, or deteriorate.
3. Ensure that SRM posts are white with an orange top fitting cover with black or white lettering and graphics. Ensure that the SRM is a tubular configuration, and both the marker post and the top fitting are made

from virgin Type 111 HDPE. Ensure that any fasteners used with the SRM are constructed of stainless steel.

4. Ensure that all SRMs have a minimum outside diameter of 3.5 inches with a minimum wall thickness of 0.125 inches. Ensure that the top fitting cover is a minimum of 1.5 feet long and has an outside diameter of 3.75 inches with a minimum wall thickness of 0.125 inches. Ensure that each SRM provides a tensile strength of 4,200 pounds per square inch as required in ASTM D638. Ensure that each SRM is manufactured for use in temperatures range of minus 30° to 165°F in accordance with NEMA TS 2.
5. Ensure the SRM can withstand an impact force of 70 pounds per foot at 32°F in accordance with ASTM D2444, before and after UV conditioning for 2,000 hours in accordance with ASTM G154. Ensure that the control sample of any material tested maintains a minimum of 70 percent of its original tensile strength.
6. Ensure that SRMs installed at the minimum 2-foot depth can withstand at least one impact at 45 miles per hour by a vehicle weighing at least 3,500 pounds and that after impact, post returns to an upright position within 10 degrees of vertical alignment within 30 seconds from the time of impact.

2.6 PULL AND SPLICE BOXES

A. General:

1. The box bodies and covers shall be free of flaws such as cracks, sharp, broken, or uneven edges, and voids.
2. Ensure in-ground boxes have an open bottom design.

B. Marking:

1. The following information shall be permanently cast or engraved into the top surface of all pull and splice box covers. If used, identification plates shall be UV stable, mechanically fastened, and bonded with adhesive material suitable for outdoor applications.
 - a. Mark application as "COMMUNICATIONS"
 - b. Manufacturer's name or logo.

C. Dimensions:

1. For fiber optic cable applications, pull boxes with nominal cover dimensions of 24 inches wide by 36 inches long or larger and no less than 18 inches deep shall be provided.
2. Rectangular splice boxes with nominal cover dimensions of 30 inches wide by 48 inches long or larger and no less than 18 inches deep shall be provided.

D. Fabrication:

1. Box covers shall be constructed of concrete, polymer concrete or other materials meeting the requirements of this Section.
2. Box covers with lifting slots and a flush-seating lockdown mechanism shall be provided. Penta-head or other non-standard, security type lockdown lag bolts shall be used. Lockdown bolts and lifting slots shall be Type 316, 304, or 302 passivated stainless steel or brass. Lockdown bolt assembly shall be designed to prevent seizing and can be removed without damaging the cover or box body. The lockdown bolt threaded insert/nut assembly shall be field replaceable.
3. The box construction shall be an ANSI Tier 22 Quazite brand enclosure.

PART 3 EXECUTION

3.1 PREPARATION

A. Conduit:

1. Ensure installed conduit system conforms to fiber-optic system requirements, including:
 - a. Conduits: Size and number.
 - b. Access Holes, Handholes, and Pull Boxes: Location and size, to ensure cables may be installed without exceeding manufacturer's limitations.
 - c. Outlet Boxes: Size to coordinate with outlet cover plates for adequate volume and bend radius.
2. Expansion Plugs: Seal conduit to stop ingress of water and grit with fabricated expansion plugs.
3. Ensure duct bank, conduit, and other confined routing is free and clear of debris before cable placement.

3.2 SOURCE QUALITY CONTROL

- A. Cable End Sealing: Ensure that fiber optic cable ends are capped or sealed to prevent the entry of moisture during shipping, handling, storage, and installation. Equip one end of the fiber optic cable with flexible pulling eyes.
- B. Protective Wrap: Ensure that the fiber optic cable is shipped and stored with a protective wrap or other approved mechanical reel protection device over the outer turns of the fiber optic cable on each reel. Ensure that the wrap is weather resistant and protects the cable reel from environmental hazards. Ensure that the cable reel remains wrapped until cable is to be installed.
- C. Packaging, Shipping and Receiving: Ensure that the packaging and delivery of fiber optic cable reels comply with the following minimum requirements:

1. Ensure cable is shipped on reels of marked continuous length.
2. Ensure each cable is shipped on a separate, strongly constructed reel designed to prevent damage to the cable during shipment and installation.
3. Ensure each reel has a minimum of 6 feet on each end of the cable available for testing.
4. Ensure that all fiber optic cable is continuous and free from damage.
5. Ensure no point discontinuities greater than 0.1 dB per reel.
6. Ensure satisfactory transmission loss test results as required by the TIA-455-61-A standard.
7. Ensure that the manufacturer submits the date of manufacture; product and serial numbers; cable data, including the reel length; refraction index; the project name and location; type of fiber and quantity of strands used; technical product data sheets; and reel numbers.

D. Manufacturer Testing and Certification: Submit documentation of all factory tests performed by the manufacturer for all fiber optic cable, splicing material, cable terminations, and patch panels as requested by the County.

3.3 INSTALLATION

A. Fiber-Optic Cable Installation:

1. Install all materials and equipment according to the latest version of the manufacturer's installation procedures. Ensure that all materials and installation practices are in accordance with the applicable OSHA requirements as found in 29 CFR Part 1926, Safety and Health Standards for Construction. In addition, perform the following:
 - a. Ensure conduit and innerduct is clean and free from damage prior to installing fiber optic cable.
 - b. Document the sequential cable length markings at each splice box and pull box wall that the cable passes through and include the information with the as-built documentation.
2. Provide all incidental parts needed to complete the installation as necessary for a complete and properly operating system.
3. Cable Identification:
 - a. All fiber cable shall be striped with a yellow color along the entire length of the cable.
 - b. A cable tag with permanent ink shall denote "COLLIER COUNTY BCC IT FIBER-OPTIC CABLE" shall be affixed on the cable at every 3-foot interval.
4. Pulling:
 - a. Install the fiber optic cable by hand or by using a mechanical pulling machine. If a mechanical pulling machine is used, equip the machine with a monitored or recording tension meter.

- Ensure that at no time the manufacturer's recommended maximum pulling tension is exceeded. Ensure that the central strength member and aramid yarn are attached directly to the pulling eye during cable pulling. Use pulling attachments to ensure that the optical and mechanical characteristics are not degraded during the fiber optic cable installation.
- b. Ensure that excess cable is coiled in a figure eight and fed manually when pulling through pull boxes and splice boxes by hand. If pulleys and sheaves will be used to mechanically pull through pull boxes and splice boxes, ensure that the cable will never be pulled through a radius less than the manufacturer's minimum bend radius. Use large diameter wheels, pulling sheaves, and cable guides to maintain the appropriate bend radius. Provide tension monitoring at all times during the pulling operation. Ensure that cable pulling lubricant used during installation is recommended by the optical fiber cable manufacturer.
5. Blowing: Use either the high airspeed blowing (HASB) method or the piston method. When using the HASB method, ensure that the volume of air passing through the conduit does not exceed 600 cubic feet per minute or the conduit manufacturer's recommended air volume, whichever is more restrictive. When using the piston method, ensure that the volume of air passing through the conduit does not exceed 300 cubic feet per minute or the conduit manufacturer's recommended air volume, whichever is more restrictive.
 6. Slack Cable Storage: Provide and store fiber optic cable at each pull box and splice box to allow for future splices, additions, or repairs to the fiber network. Store the fiber optic cable without twisting or bending the cable below the minimum bend radius.
 - a. Store a total of 200 feet of fiber optic backbone cable in splice boxes, with 100 feet of cable on each side of the cable splice point.
 - b. Store a minimum of 100 feet of fiber optic drop cable in splice boxes.
 - c. Store 100 feet of spare fiber optic cable in pull boxes.
 7. Fiber Optic Connection - Splicing:
 - a. Perform all optical fiber splicing using the fusion splicing technique, and according to the latest version of the manufacturer's cable installation procedures, industry accepted installation standards, codes, and practices. Ensure that all splices match fiber and buffer tube colors.
 - b. Ensure that splice loss does not exceed a maximum of 0.05 dB per splice as measured on the fusion splice machine when splicing newly installed fibers together. Ensure that splice loss does not exceed a maximum of 0.1 dB per splice as measured

on the fusion splice machine when splicing newly installed fibers to existing fibers.

- c. Where a fiber cable is to be accessed for lateral or drop signal insertion, only open the buffer tube containing the fiber to be accessed and only cut the actual fiber to be accessed. If a fiber end is not intended for use, cut the fiber to a length equal to that of the fiber to be used and neatly lay it into the splice tray.
- d. Treat any fibers exposed during splicing with a protective coating and place in a protective sleeve or housing to protect the fiber from damage or contaminants. Neatly store all splice enclosures within a splice box.

8. Splice Plan: Submit a splice plan showing the location and configuration of splices in the system for approval by the County. Perform all splicing according to the splice plan. Document each splice location and identify the source and destination of each fiber in each splice tray. Document all fiber colors and buffer jacket colors used during installation and develop a sequential fiber numbering plan as required in the TIA -598-D standard for color-coding in the documentation.

9. Splice Equipment: Use a fusion splice machine to splice all optical fiber. Ensure that splice equipment is new from the factory, or equipment has been serviced and certified by the factory or its authorized representative within the previous 12 months from the commencement of its use. Ensure that the calibration certificate is maintained in the splicing equipment case or provided electronically when requested. Clean all splicing equipment and calibrate according to the manufacturer's recommendations prior to each splicing session at each location.

B. Cable Termination Installation: Ensure that cables, buffer tubes, or strands are neatly routed, secured, and terminated in a patch panel in coordination with the County. Ensure all cable termination points include documentation regarding the identification, route, and function of each fiber installed at that location. Ensure that a copy of this information is placed alongside the installed equipment (for instance, in a document pouch or drawer within a field cabinet).

C. Patch Panel Installation: Ensure that patch panels are neatly installed and secured in a weather-proof enclosure.

D. Conduit Installation:

- 1. Install the conduit in accordance with NEC or National Electrical Safety Code (NESC) requirements and the Standard Plans. Construct conduit runs as straight as possible. Mark the location of the conduit system

with route markers every 1,000 feet and at every pull box and splice box. Ensure that all route markers used are new and consistent in appearance.

2. Install a No. 12 AWG pull wire or polypropylene cord inside the full length of all conduits. Ensure that a minimum of 24 inches of pull wire/cord is accessible at each conduit termination.
3. Ensure the conduit includes all required fittings and incidentals necessary to construct a complete installation.
4. Prevent the ingress of water, dirt, sand, and other foreign materials into the conduit prior to, during, and after construction. Seal the ends of conduit after wiring is complete with a moisture resistant sealant that is designed for this specific application.
5. Install the conduit system so the fiber optic cable maintains the minimum bend radius. Use approved methods for connecting inner duct or conduit within or between plowed portions, trenched portions, and bored portions. Coupling method and material to be in compliance with manufacturer's installation guidelines.
6. Conduit Terminations:
 - a. Where conduit enters a box, fitting, or other enclosure, provide a bushing or adapter (end bell, conduit adapter, etc.) to protect the conductor or cable from abrasion unless the box, fitting, or enclosure provides equivalent protection.
 - b. For conduit to be encased in concrete, wrap with tape, or otherwise protect all terminations to prevent the entrance of concrete.
 - c. Connect new underground conduits to existing underground conduits with a pull box.
 - d. Seal conduits terminating in a pull box or junction box with a moisture resistant sealant.
7. Restoration of Trench Areas: Restore the conduit trench construction area to an acceptable condition. Such work includes repair or replacement of all pavement areas, sidewalks, driveways, curbs, structures, landscaping, grass areas (including removal of excavated materials and spoils), removal and disposal of drilling fluids, and backfilling areas disturbed by the conduit installation.
8. Above-Ground Installation
 - a. Use conduit designed and manufactured for use in long-term above-ground applications with UV stabilization to prevent material deterioration.
 - b. Securely attach above-ground conduit installations to the surface of the supporting structure using conduit straps. As a minimum, use conduit straps located on 5-foot centers.
9. Elbow Curvature:
 - a. For 2-inch conduit, the radius of curvature of the centerline of any bend shall not be less than 9.5 inches.

E. Fiber-Optic Cable Locate Wire:

1. Installation:
 - a. Install locate wire in the trench or bore with all underground conduits to provide end-to-end electrical continuity for electronically locating the underground conduit system. When conduit is placed by trenching, bury locate wire along the centerline of the top outer surface of installed conduit.
 - b. Do not run locate wires into field cabinets. Terminate locate wires at the following locations or as shown on the Plans, nearest pull box to a field cabinet, nearest pull box to a building, and splice box locations. Ensure that wire termination occurs in a pull box.
 - c. Install WGUs in pull boxes and splice boxes as shown in the Plans. Mount the device in a location high enough from the bottom of the box to allow access to terminal facilities without disturbing cables present within the box. Terminate the locate wires and connect the WGU to ground in accordance with the manufacturer's instructions.
2. Testing: Test the locate wire system after installation to ensure that it functions and can be used to accurately locate the conduit system. Perform continuity tests and insulation resistance tests on all locate wires. Replace, or repair defective locate wire at no additional cost.

F. Route Markers:

1. Install route markers for new fiber optic cable installations, replace route markers as shown in the Plans, and ensure the following:
 - a. Markers are plumb and level and the notification information is clearly visible when viewed from the side facing the roadway.
 - b. Markers are set within the right of way.
 - c. Markers are placed at a one-foot offset from the conduit system.
 - d. The top of the marker post is a minimum of five feet and maximum of six feet above the finish grade
 - e. Place marker at each pull box location.
 - f. Markers are installed on both sides of a stream, river, or other water crossing, and on both sides of aboveground attachments such as bridges and walls.
2. Remove and replace all marker posts damaged during installation at no additional cost. Provide as-built documentation at the completion of installation that includes location of all installed route markers and correlates the marker to the fiber optic infrastructure that it signifies.

G. Pull and Splice Boxes:

1. Do not install power and communication cables in the same box.

2. Install pull and splice boxes in accordance with Plans. Ensure that the pull or splice box cover is flush with the concrete apron or sidewalk. Prior to installation, pour in a bed of pea rock or crushed stone at least one foot deep, with horizontal dimensions four inches longer than the width and length of the pull box. The pull or splice box installation shall be placed so that the inside edge of the box rests entirely on a gravel bed. Do not install pull or splice boxes in roadways, driveways, parking areas, ditches, or public sidewalk curb ramps. Avoid placing pull and splice boxes in low-lying locations with poor drainage. Ensure that pull and splice boxes house fiber optic cable without exceeding the cable bend radius.
3. Provide conductive metal ground rod that is at least 5/8 inches in diameter and 48 inches long. Ground rod shall be installed vertically within three inches of the inside edge of the pull or splice box, with at least 10 inches of the rod exposed above the gravel base.
4. Placement and Spacing: Pull boxes shall be spaced a maximum of 1,000 feet apart, and within 20 feet of either side of a roadway, and within 10 linear feet of any fiber optics termination point. The County agency shall reserve sole determination whether spacing of pull boxes shall be less or more than the standard 1,000 feet apart.
5. Relocation of Pull and Splice Boxes:
 - a. Relocation of pull and splice boxes shall consist of removing an existing box and installing the box at the location shown in the Plans. Restore the area of the box removal and relocation to the condition of the adjacent area. The costs for restoration will be included in the Contract unit price of the relocation.
 - b. Boxes damaged due to the Contractor's operations must be replaced by the Contractor at no cost to the County. Replacement boxes must be of the same material and size of the existing box, unless directed otherwise by the CCITD.

3.4 FIELD QUALITY CONTROL

A. Installation Testing:

1. General:

- a. Notify the CCITD of cable testing at least 14 calendar days in advance. Submit the testing procedures to the CCITD staff for approval prior to commencement of testing. Perform all tests at 1310 nm and 1550 nm wavelengths, and include the last calibration date of all test equipment with the test parameters set on the equipment in the test documentation. Ensure that the last calibration date of all test equipment is within the last 12 months and that the calibration certificate is maintained in the test equipment case or provided electronically when requested. Test all installed fibers (terminated and un-terminated) using

methods identified in this Section. All tests must be conducted with a launch box.

- b. Fibers containing splices or fibers terminated on both ends must be bidirectionally tested.
 - c. Present the results of the optical time domain reflectometer (OTDR) testing (i.e., traces for each fiber) and a loss table showing details for each splice and termination tested to the CCITD in an approved electronic format. Ensure all OTDR testing complies with the EIA/TIA-455-61 standard.
2. OTDR Attenuation Testing: Perform testing on all fibers to ensure that attenuation does not exceed allowable loss (0.35 dB/km for 1310 nm wavelength, 0.25 dB/km for 1550 nm wavelength, plus 0.5 dB for any connectors and 0.1 dB for splices). Repair or replace cable sections exceeding allowable attenuation at no cost to the County.
 3. OTDR Tracing: Test all fibers with an OTDR at wavelengths of 1310 and 1550 nm.
 4. Splice Loss Testing: Ensure that the splice loss for a SMF fusion splice does not exceed a maximum bidirectional average of 0.1 dB per splice when measured using an OTDR. Repair or replace splices that exceed allowable attenuation at no cost to the County.
 5. Connector Loss Testing: Ensure that the attenuation in the connector at each termination panel and its associated splice does not exceed 0.6 dB when measured using an OTDR. Repair or replace connectors exceeding allowable attenuation at no cost to the County.
- B. Fiber Optic Cable Locator: Locate and mark all existing County owned or maintained fiber optic facilities within project limits prior to performing any subsurface work. Locate and mark as necessary to ensure that all fiber optic facilities are located and visibly marked at all times.
- C. Fiber-Optic Cable Warranty: Ensure that the fiber optic cable, the splice enclosures, and terminations have a manufacturer's warranty covering defects for a minimum of two years from the date of final acceptance. Ensure the warranty includes providing replacements, within 10 calendar days of notification, for defective parts and equipment during the warranty period at no cost to the County.
- D. Pull and Splice Box Warranty: Ensure all pull, splice, and junction boxes have a manufacturer's warranty covering defects for a minimum of one year from the date of final acceptance. Ensure the warranty includes providing replacements, within 30 calendar days of notification, for defective parts and equipment during the warranty period at no cost to the County.
- E. Documentation and Closeout

1. Within ten (10) days following successful installation and testing of the fiber-optic communication work, Contractor shall provide the County both printed and electronic copies of as-built network drawings.
2. At minimum, as-builts shall contain:
 - a. Network block diagrams, identifying endpoints for fiber termination, number of fiber strands and cables, and topology layout.
 - b. Updated site plan of each affected installation site identifying location of the IT telecommunications cabinet, in addition to pull boxes and handhole locations at the installation and interconnecting conduit.
 - c. Updated overall site plan identifying the fiber-optic cable installation for the entire project, including all interconnecting segments between installations or other endpoint locations. Overall site plan shall include all pull boxes, splice vaults, handholes, and fiber cable lengths.
 - d. As-built plans shall additionally be provided as converted Google Earth and Visio formats for County use.

END OF SECTION

SECTION 3
UTILITIES DETAIL DRAWINGS

For the latest revisions to the Utilities Detail Drawings visit:

**Collier County Public Utilities
Engineering and Project Management Resources Webpage.**

**COLLIER COUNTY WATER-SEWER DISTRICT
UTILITIES STANDARDS MANUAL**

SECTION 3

UTILITIES DETAIL DRAWINGS

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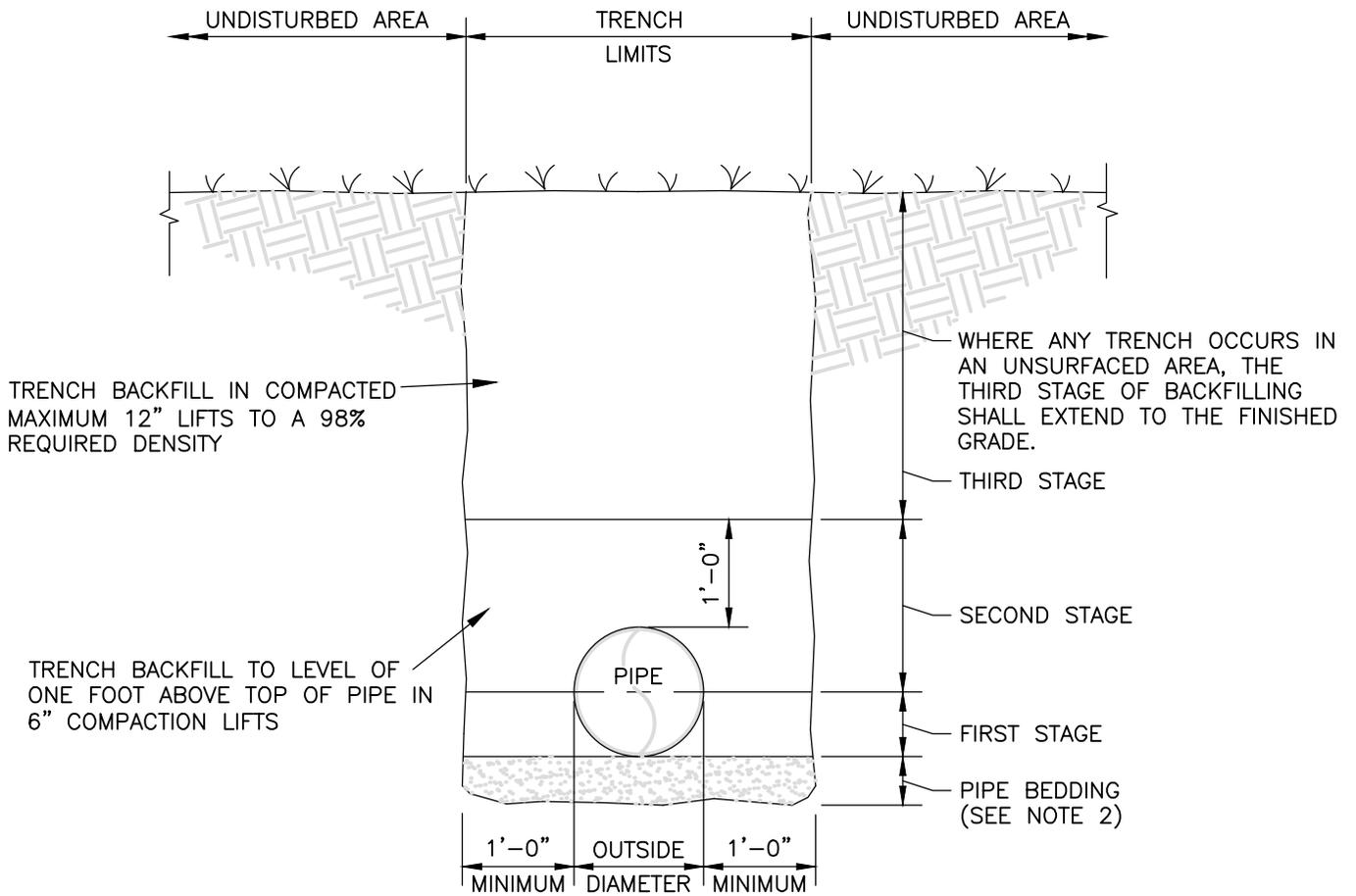
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W-9A	Alternate Temporary Backflow Preventer and Fire Protection Meter Tie-in Assembly	01/2009
W-10	Not Used	
W-10A	Not Used	
W-11	3" and Larger Fire System Detector Check Assembly Detail	07/2018
W-11A	4" Through 10" Only Compact Fire System Detector Check Assembly Detail	07/2011
W-12	Typical Short and Long Side Water Service Meter Setting Detail for Connection to Water Main	01/2025
W-12A	Service Connection Sizing Chart and Notes	01/2025
W-13	3" and Over Potable Water Meter Assembly Detail	01/2025
W-14	4" and Over Potable Water Fire and Domestic Meter Assembly Detail	01/2025
W-14A	Maintenance Driveway for Water Meters 3" and Larger	07/2018
W-15	Not Used	
W-16	Fire Service Dual Detector Check Assembly Over 10" Fire Main Detail (Dual 8" Assemblies)	07/2011

Wastewater Details

WW-1	Force Main Connection to Gravity Sanitary Sewer Detail	04/2006
WW-2	Private Force Main Connection to County Force Main Detail	07/2018
WW-3	Precast Reinforced Concrete Manhole Detail	01/2025
WW-4	Shallow Manhole Detail	01/2025
WW-5	Drop Manhole Detail	01/2025
WW-6	Manhole Ring and Cover Detail	01/2025
WW-7	Pump Station Detail – Profile	01/2025
WW-7A	Pump Station and Wastewater Details	01/2015
WW-7B	Pump Station Concrete Details	01/2015
WW-7C	Pump Station and Wastewater Details	07/2018
WW-7D	Private Grinder Pump Station Detail	01/2025
WW-8	Pump Station Detail – Plan	01/2025
WW-8A	Community Pump Station with Generator Detail – Plan	01/2025

<u>Drawing No.</u>	<u>Title</u>	<u>Revision Date</u>
WW-8B	Community Pump Station with Diesel Pump Detail – Plan	01/2025
WW-9	Pump Station Control Panel Detail	01/2025
WW-9A	Community Pump Station Control Panel Detail – VFD Station with Generator	01/2025
WW-9B	Community Pump Station Control Panel Detail – Non-VFD Station with Generator	01/2025
WW-9C	Pump Station Lightning Protection Details	01/2015
WW-9D	Community Pump Station – Riser Diagram with Generator Backup	01/2015
WW-9E	Community Pump Station – Riser Diagram with Diesel Backup Pump	01/2015
WW-10	Sewer Connection Details – Property, ROW or Easement Line	05/2009
WW-11	Sewer Clean-out Detail - Paved Areas	07/2018
WW-12	Sewer Clean-out Detail - Non Paved Areas	01/2014
WW-13	Force Main Air Release Valve Detail	01/2015
WW-14	Not Used	
WW-15	Typical Flow Line Channels Detail	04/2006
WW-16	Double Sewer Clean-out Detail	05/2009
WW-17	Telemetry Antenna Mount Detail	08/2008
WW-18	Grease Interceptor	08/2008
WW-18A	Grease Interceptor Tables	04/2006



NOTES:

1. BACKFILL SHALL BE OF SUITABLE MATERIAL REMOVED FROM EXCAVATION EXCEPT WHERE OTHER MATERIAL IS SPECIFIED. BACKFILL MATERIAL SHALL CONSIST OF EARTH, LOAM, SANDY CLAY, GRAVEL, CRUSHED LIMESTONE, OR OTHER APPROVED MATERIAL. REFER TO TECHNICAL SPECIFICATIONS FOR DETAIL REQUIREMENTS.
2. IF TRENCH BOTTOM CONTAINS ROCK, THEN A MINIMUM OF A 6" PIPE BEDDING SHALL BE USED.

**UNPAVED AREA TRENCH
BACKFILL DETAIL**

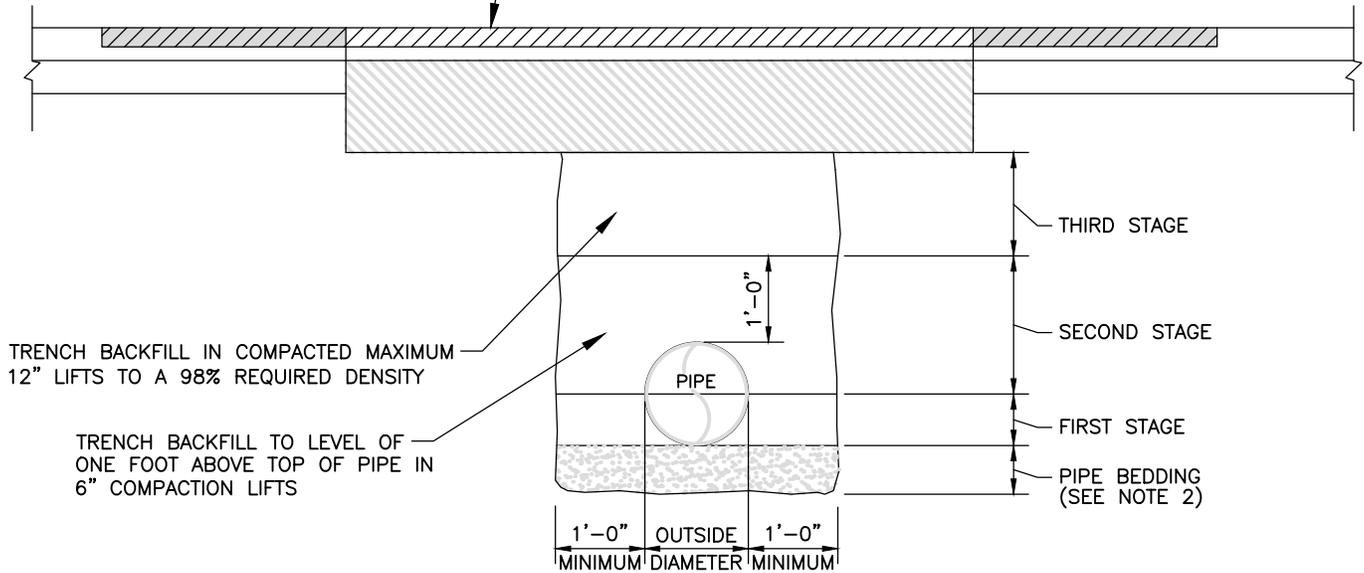
NTS

REVISION DATE:
APRIL 2006



SHEET NO.
G-1

FOR ROADWAY AND BASE RESTORATION
DETAILS, REFER TO THE COLLIER
COUNTY RIGHT OF WAY HANDBOOK.



NOTES:

1. BACKFILL SHALL BE OF SUITABLE MATERIAL REMOVED FROM EXCAVATION EXCEPT WHERE OTHER MATERIAL IS SPECIFIED. BACKFILL MATERIAL SHALL CONSIST OF EARTH, LOAM, SANDY CLAY, GRAVEL, CRUSHED LIMESTONE, OR OTHER APPROVED MATERIAL. REFER TO TECHNICAL SPECIFICATIONS FOR DETAIL REQUIREMENTS.
2. IF TRENCH BOTTOM CONTAINS ROCK, THEN A MINIMUM OF A 6" PIPE BEDDING SHALL BE USED.

**PAVED AREA TRENCH RESTORATION
DETAIL FOR PRIVATE ROADS**

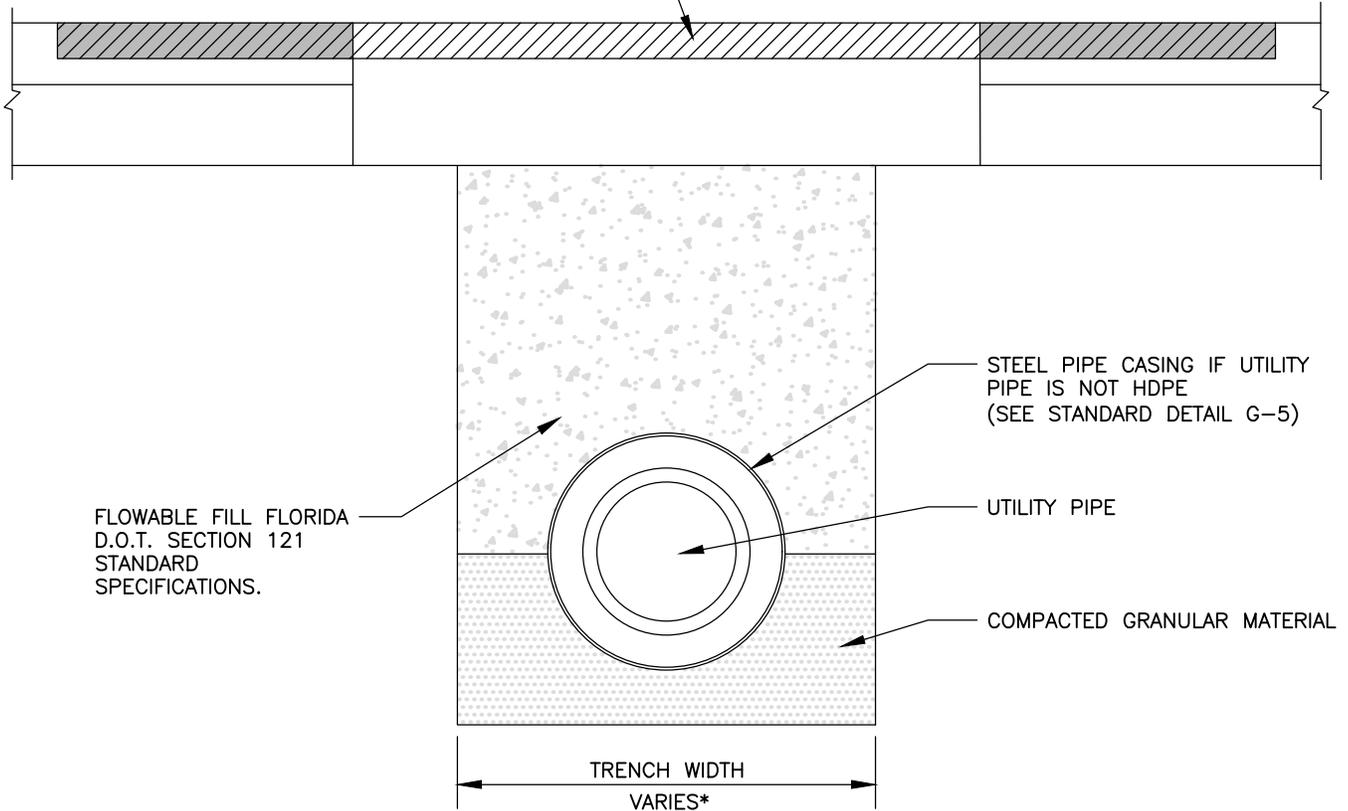
NTS

REVISION DATE:	JULY 2018



SHEET NO.
G-2

FOR ROADWAY AND BASE RESTORATION
DETAILS, REFER TO THE COLLIER COUNTY
RIGHT OF WAY HANDBOOK.



*TRENCH WIDTH = PIPE OUTSIDE DIAMETER PLUS 2 FEET

NOTES:

1. BACKFILL SHALL BE OF SUITABLE MATERIAL REMOVED FROM EXCAVATION EXCEPT WHERE OTHER MATERIAL IS SPECIFIED. BACKFILL MATERIAL SHALL CONSIST OF EARTH, LOAM, SANDY CLAY, GRAVEL, CRUSHED LIMESTONE, OR OTHER APPROVED MATERIAL. REFER TO TECHNICAL SPECIFICATIONS FOR DETAIL REQUIREMENTS.
2. ALL PIPES SHALL BE CONSTRUCTED WITHIN A STEEL CASING PIPE IF INSTALLED ON A ROAD TO BE WIDENED, UNLESS THE UTILITY PIPE IS HDPE.

**STATE ROAD, MAJOR COUNTY ROAD, AND
NUMBERED COUNTY ROAD FLOWABLE FILL
ROAD AND TRENCH RESTORATION**

NTS

REVISION DATE:

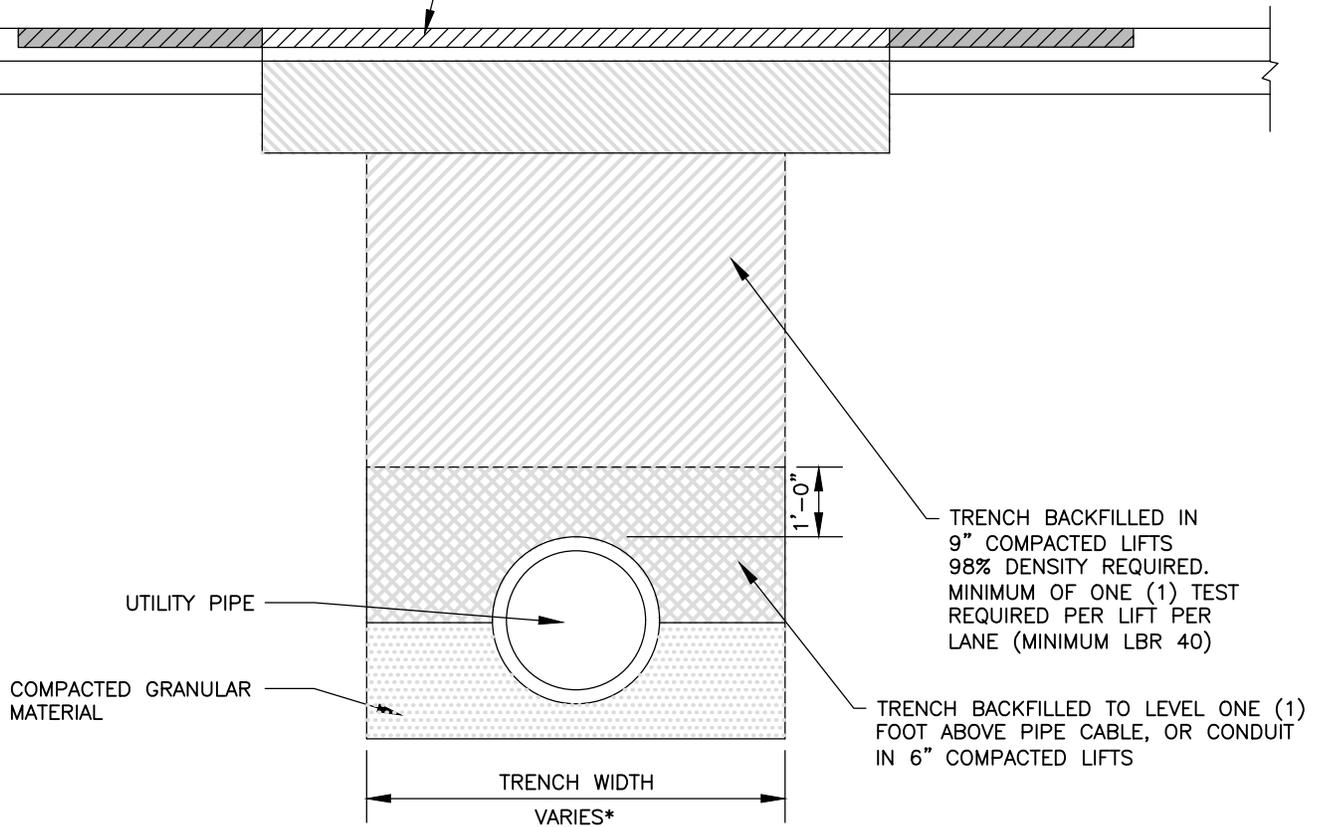
JULY 2018



SHEET NO.

G-2A

FOR ROADWAY AND BASE RESTORATION
DETAILS, REFER TO THE COLLIER
COUNTY RIGHT OF WAY HANDBOOK.



*TRENCH WIDTH = PIPE OUTSIDE DIAMETER PLUS 2 FEET

NOTES:

1. ALL MODIFIED PROCTOR AND DENSITY TESTS SHALL BE TAKEN BY A CERTIFIED LABORATORY.
2. ALL TESTS SHALL BE COMPLETED AND SHALL MEET MINIMUM DENSITY REQUIREMENTS PRIOR TO ADDITIONAL BACKFILLING.
3. RIGHT-OF-WAY PERMIT STIPULATIONS OVERRIDE THIS DETAIL WHERE TRENCH IS LOCATED WITHIN A COUNTY RIGHT-OF-WAY.
4. ASPHALT PATCH AND TAPERS MUST BE FLUSH WITH ADJACENT ASPHALT AND CURBING.

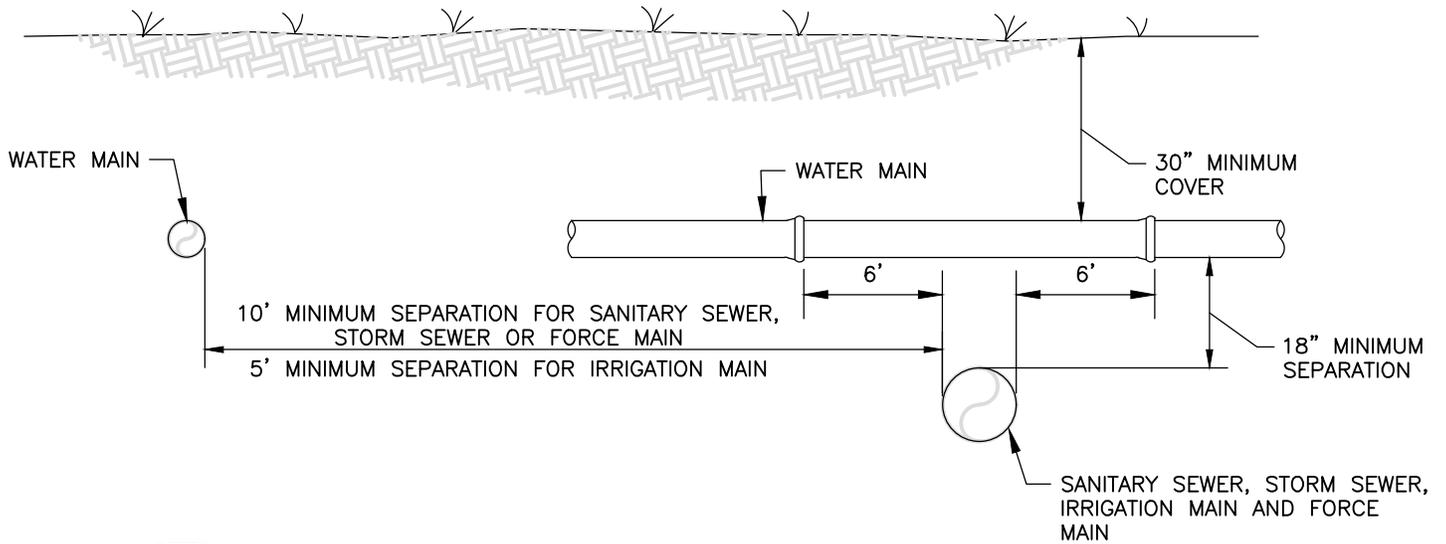
**ROAD AND TRENCH RESTORATION
FOR LOCAL ROADS**

NTS

REVISION DATE:
JULY 2018



SHEET NO.
G-2B



NOTES:

1. WATER MAINS SHALL BE SEPARATED FROM STORM SEWER, SANITARY SEWER, NON-POTABLE IRRIGATION MAINS, AND FORCE MAINS BY A MINIMUM CLEAR VERTICAL DISTANCE OF 18 INCHES MEASURED BETWEEN THE BOTTOM OF THE UPPER PIPE AND THE TOP OF THE LOWER PIPE. THE 18 INCHES MINIMUM VERTICAL SEPARATION DISTANCE DOES NOT APPLY TO SEPARATIONS OF SEWER LATERALS AND POTABLE WATER MAIN PIPELINE INSTALLATIONS. ALSO, WATER MAINS SHALL BE SEPARATED FROM STORM SEWER, SANITARY SEWER AND FORCE MAINS BY 10 FEET AND FROM IRRIGATION MAINS BY 5 FEET MEASURED HORIZONTALLY BETWEEN OUTSIDE OF PIPES.
2. ALL CROSSINGS WITH VERTICAL CLEARANCE LESS THAN 18 INCHES SHALL REQUIRE SUBMISSION AND APPROVAL OF A DEVIATION. IF A DEVIATION IS SUBMITTED, THE FOLLOWING MINIMUM STIPULATIONS APPLY: THE CROSSING SHALL BE MADE USING A FULL LENGTH OF THICKNESS CLASS 200 (DR14) AWWA C-900 PVC OR CLASS 235 (DR18) AWWA C-905 PVC PIPE CENTERED ON THE CROSSING.
3. 18 INCHES CLEAR DISTANCE SHALL NOT BE REDUCED IN CASES WHERE WATER CROSSES UNDER SEWER LINE.
4. WATER MAINS, SANITARY SEWER, STORM SEWER, AND NON-POTABLE IRRIGATION MAINS SHALL BE IN SEPARATE TRENCHES.
5. WATER MAINS CROSSING ANY TYPE OF SANITARY SEWER, INCLUDING FORCE MAIN, OR STORM SEWER SHALL HAVE THE ONE FULL LENGTH OF WATER MAIN CENTERED ABOVE OR BELOW THE OTHER PIPELINE SO THAT THE WATER JOINTS WILL BE AS FAR AS POSSIBLE FROM THE OTHER PIPELINE. ALTERNATIVELY, AT SUCH CROSSINGS, THE PIPES SHALL BE ARRANGED SO THAT ALL WATER MAIN JOINTS ARE AT LEAST THREE FEET FROM ALL JOINTS IN VACUUM-TYPE SANITARY SEWERS, STORM SEWERS, STORMWATER FORCE MAINS, OR PIPELINES CONVEYING RECLAIMED WATER REGULATED UNDER PART III OF CHAPTER 62-610, FAC, AND AT LEAST SIX FEET FROM ALL JOINTS IN GRAVITY- OR PRSSURE-TYPE SANITARY SEWERS, FORCE MAINS, OR PIPELINES CONVEYING RECLAIMED WATER NOT REGULATED UNDER PART III OF CHAPTER 62-610.
6. IF THE VERTICAL SEPARATION BETWEEN GRAVITY SANITARY SEWER AND STORMWATER LINES IS LESS THAN 18 INCHES, THEN 57 STONE SHALL BE UTILIZED BETWEEN THE TWO LINES.
7. SEE SECTION 1- DESIGN CRITERIA FOR ADDITIONAL REQUIREMENTS.

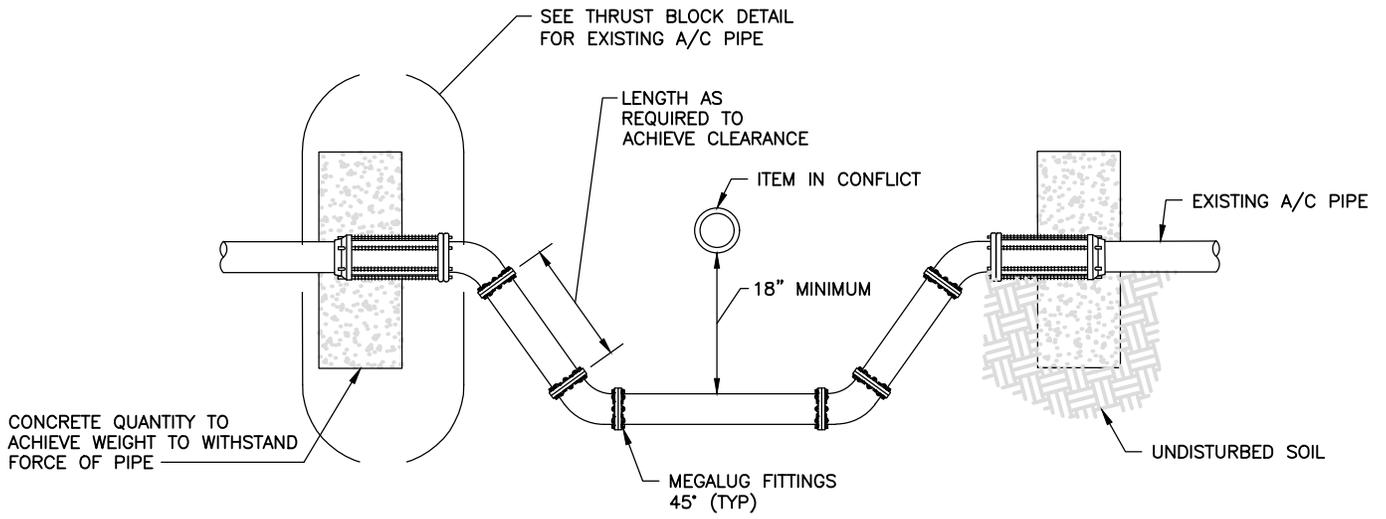
PIPE SEPARATION DETAIL

REVISION DATE:
JULY 2018

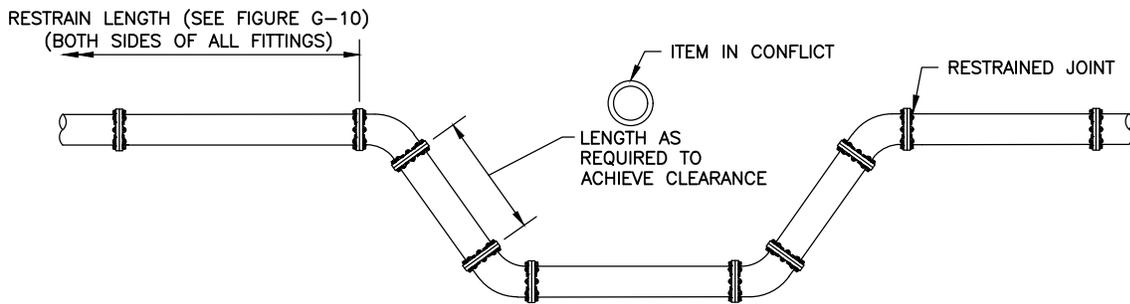


SHEET NO.
G-3

NTS



EXISTING A/C PIPE – HEADWALL

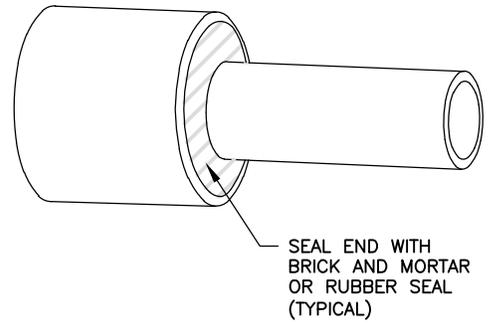
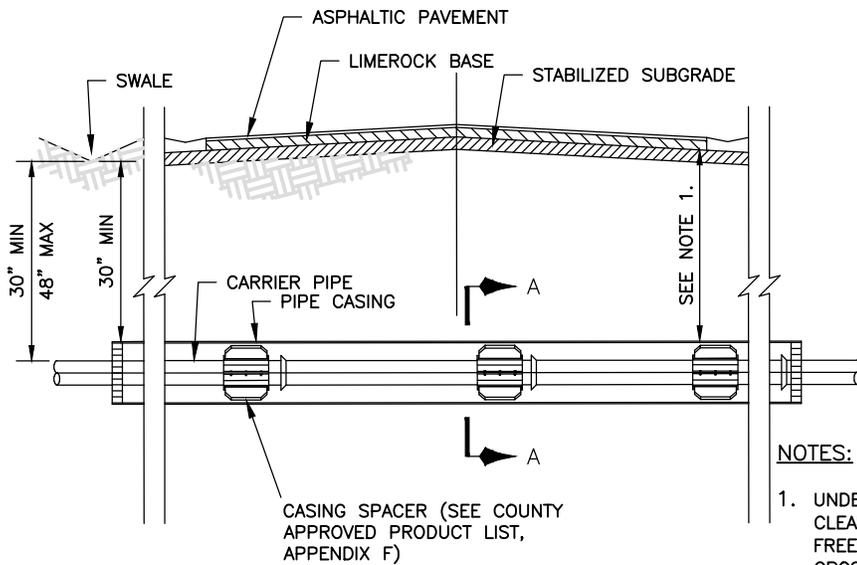


NEW & EXISTING PIPE – RESTRAINED JOINT

NOTES

1. SEE SECTION 1 – DESIGN CRITERIA FOR AIR RELEASE VALVE REQUIREMENTS.

REVISION DATE:
APRIL 2006



CASING END SEAL

NOTES:

1. UNDERGROUND CROSSINGS REQUIRE A MINIMUM VERTICAL CLEARANCE OF 48" BELOW PAVEMENT SURFACE FOR FREEWAYS, 36" FOR OTHER HIGHWAYS AND SUBAQUEOUS CROSSINGS OR 30" BELOW UNPAVED GROUND INCLUDING DITCH GRADE PER FLORIDA D.O.T.
2. SEE TECHNICAL SPECIFICATIONS FOR CARRIER PIPE AND CASING PIPE REQUIREMENTS.

STAINLESS STEEL SPACERS:

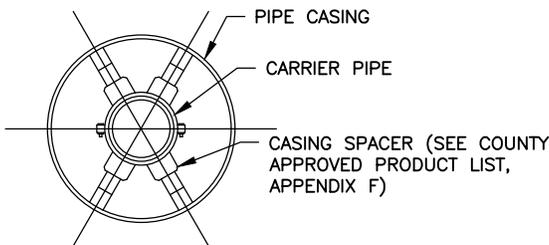
1. SPACERS SHALL BE BOLT-ON STYLE WITH A TWO PIECE SOLID SHELL MADE FROM T-304 STAINLESS STEEL OF A MINIMUM 14 GAUGE THICKNESS. THE SHELL SHALL BE LINED WITH A RIBBED PVC SHEET OF A 0.090" THICKNESS THAT OVERLAPS THE EDGES. RUNNERS MADE FROM UHMW POLYMER SHALL BE ATTACHED TO RISERS AT APPROPRIATE POSITIONS TO PROPERLY LOCATE THE CARRIER WITHIN THE CASING AND TO EASE INSTALLATION. RISERS SHALL BE MADE FROM T-304 STAINLESS STEEL OF A MINIMUM 14 GAUGE THICKNESS AND SHALL BE ATTACHED TO THE SHELL BY MIG WELDING. ALL WELDS SHALL BE FULLY PASSIVATED. ALL FASTENERS SHALL BE MADE FROM T-304 STAINLESS STEEL. CASING SPACERS (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F).

PLACEMENT OF SPACERS ON CARRIER PIPE:

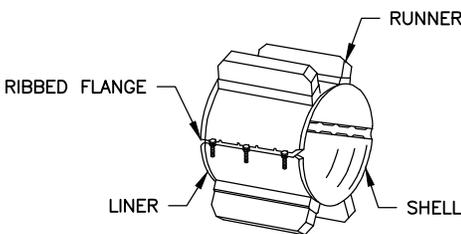
1. GENERAL - ONE SPACER SHALL BE PLACED NOT MORE THAN TWO FEET FROM EACH END OF CASING. SUBSEQUENT SPACERS SHALL BE PLACED AT 6' TO 10' INTERVALS WITHIN THE CASING, OR IN ACCORDANCE WITH PIPE MANUFACTURER'S RECOMMENDATIONS.
2. PVC CARRIER - ONE SPACER SHALL BE PLACED ON THE SPIGOT END OF EACH SEGMENT AT THE LINE MARKING THE LIMIT OF INSERTION INTO THE BELL. WHEN THE JOINT IS COMPLETE, THE SPACER SHALL BE IN CONTACT WITH THE BELL OF THE JOINT SO THAT THE SPACER PUSHES THE JOINT AND RELIEVES COMPRESSION WITHIN THE JOINT. SUBSEQUENT SPACERS SHALL BE PLACED AT 6' TO 10' INTERVALS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

CARRIER PIPE:

1. CARRIER PIPE SHALL BE CENTERED WITHIN CASING BY USE OF STAINLESS STEEL CASING SPACERS (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F).



SECTION A-A



SPACER

STANDARD NUMBER OF RUNNERS REQUIRED

UP TO 14" CARRIER PIPE	- 4 REQUIRED
OVER 14" THROUGH 36" CARRIER PIPE	- 6 REQUIRED
OVER 36" THROUGH 48" CARRIER PIPE	- 7 REQUIRED

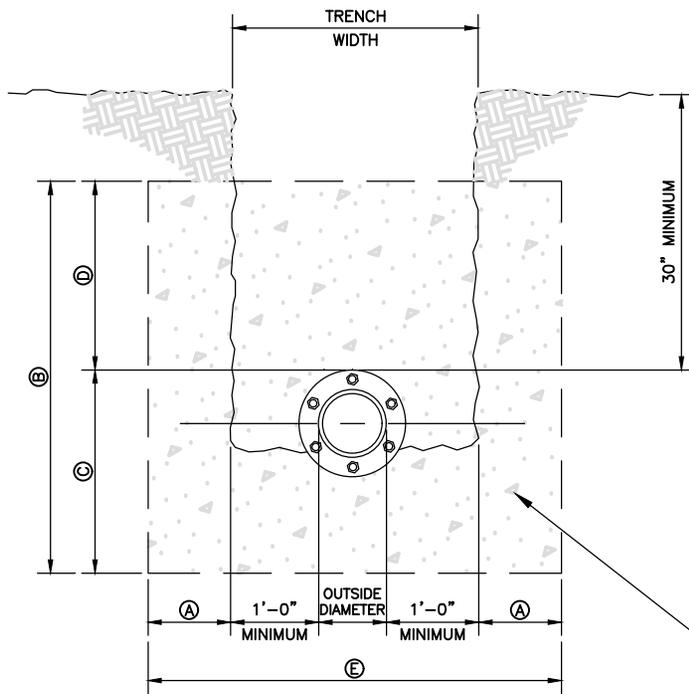
JACK AND BORE DETAIL

NTS

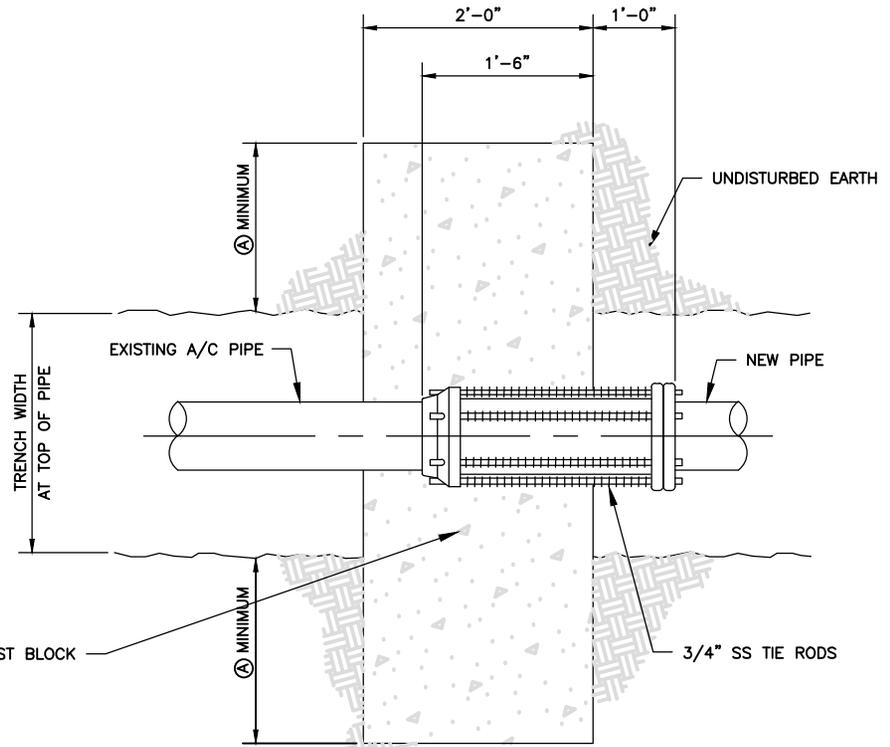
REVISION DATE:
AUGUST 2008



SHEET NO.
G-5



CROSS SECTION



PLAN VIEW

PIPE DIAMETER	A	B	C	D	E	NUMBER OF TIE RODS REQUIRED	CY.
4"	9"	36"	20"	16"	3'-10"	2	.85
6"	12"	36"	21"	15"	4'-6"	2	1.00
8"	12"	36"	22"	14"	4'-8"	2	1.04
10"	12"	36"	23"	13"	4'-10"	2	1.07
12"	18"	36"	24"	12"	6'-0"	2	1.33
16"	18"	36"	32"	4"	6'-4"	4	1.41

DESIGN ENGINEER SHALL VERIFY ABOVE DIMENSIONS AND THE NUMBER OF TIE RODS.

$$\text{CUBIC YARDS OF CONCRETE (CY)} = \frac{\left(\frac{B \times E}{12}\right) \times 2}{27}$$

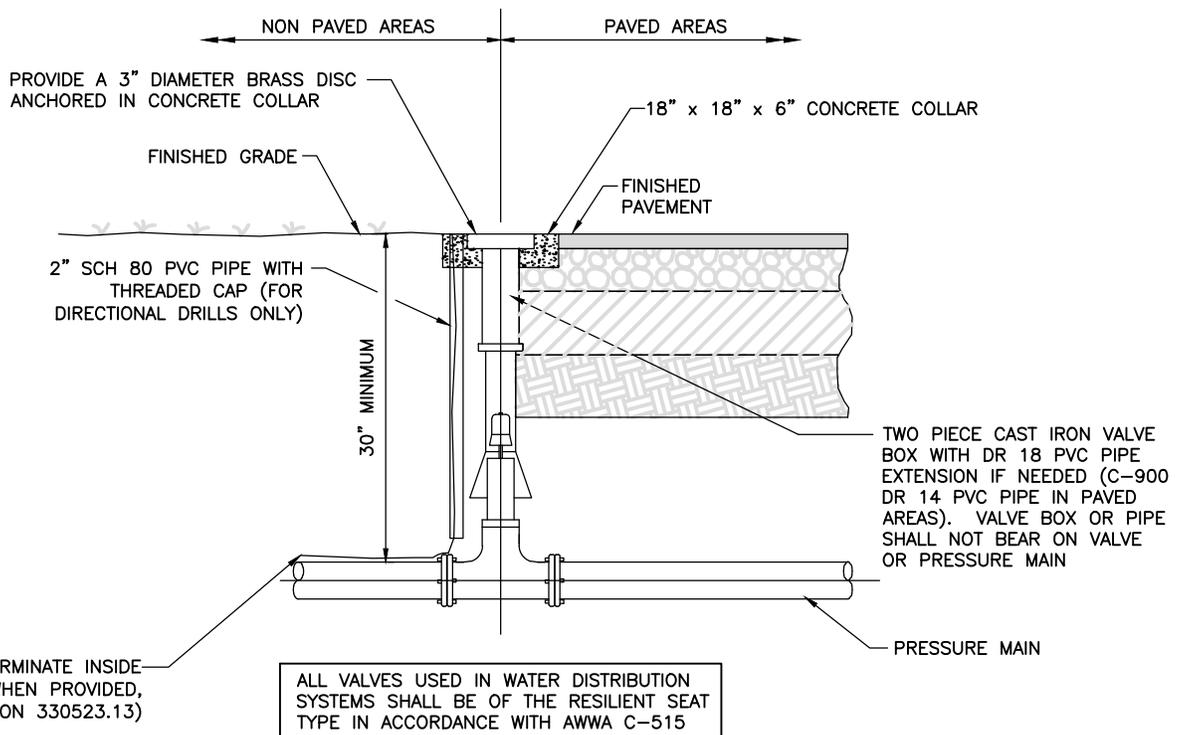
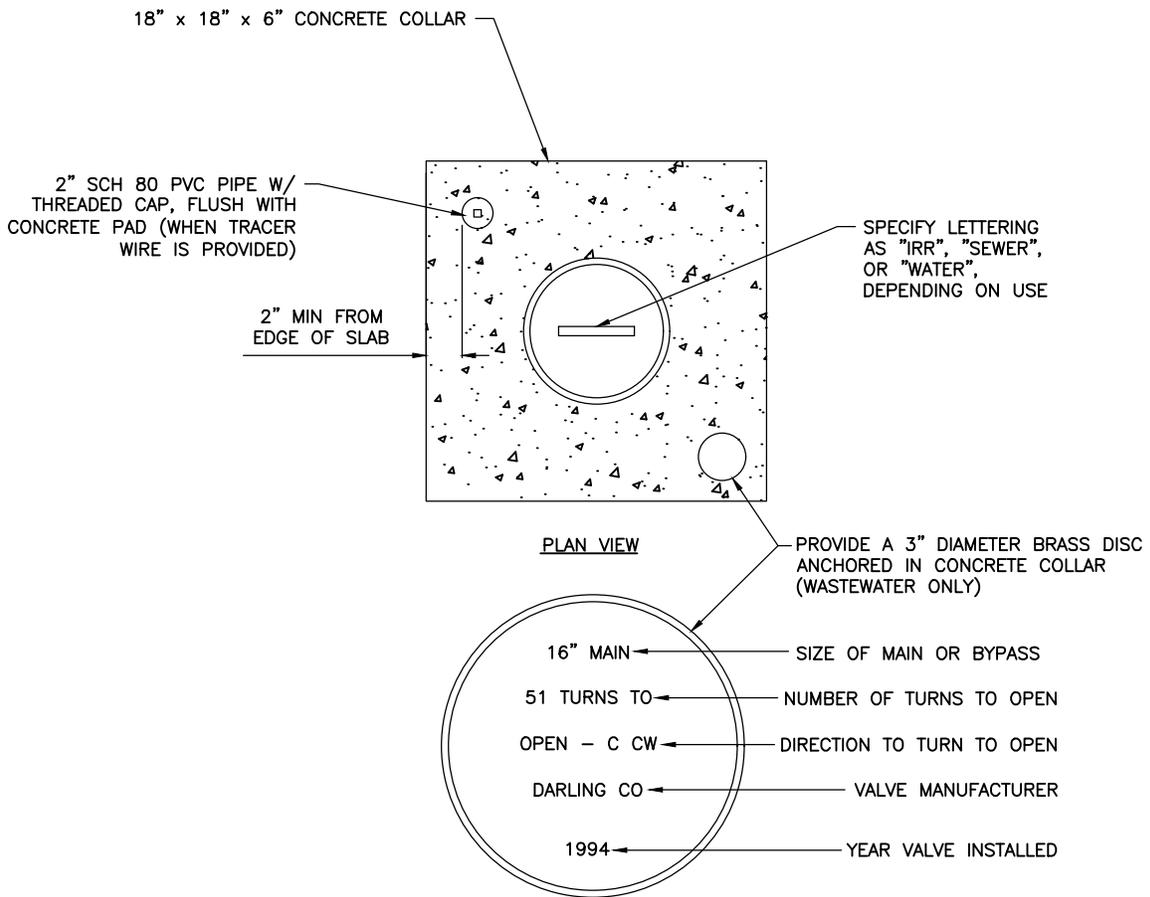
THRUST BLOCK DETAIL FOR EXISTING A/C PIPE

NTS

REVISION DATE:
APRIL 2006



SHEET NO.
G-6



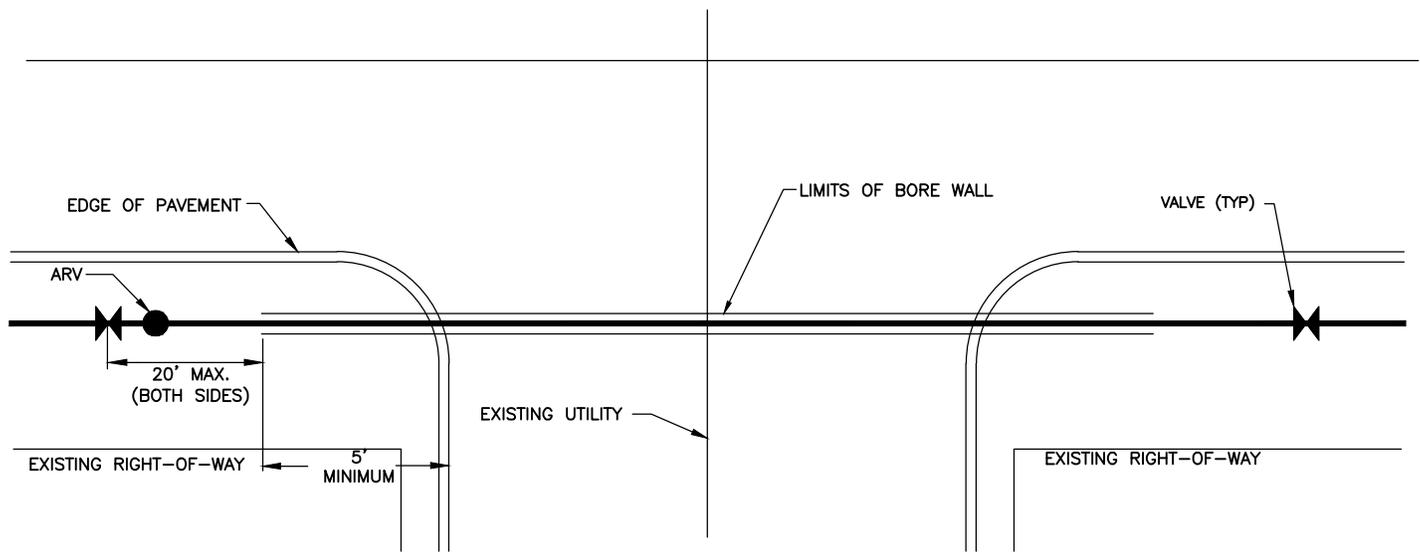
**TYPICAL VALVE
SETTING DETAIL**

NTS

REVISION DATE:
JULY 2018

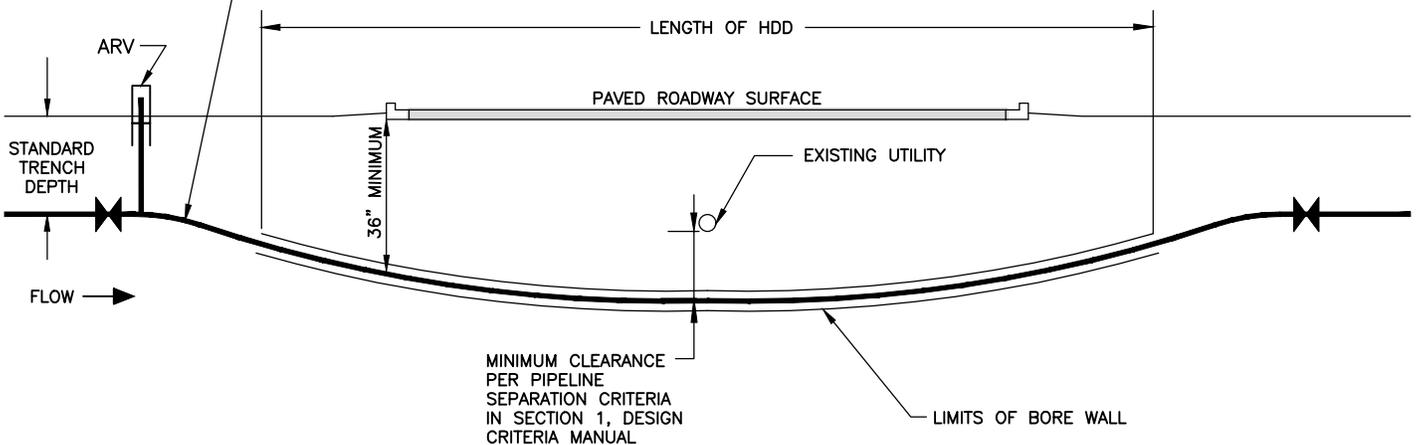


SHEET NO.
G-7



PLAN
HORIZONTAL MINIMUM CLEARANCES

MAINTAIN MIN. BEND RADIUS OF 100X O.D. WITHIN 5X O.D. OF A VALVE OR FITTING AND 25X O.D. ELSEWHERE. OR PROVIDE A BEND (TYP).



PROFILE
VERTICAL MINIMUM CLEARANCES

HDD INSTALLATION NOTES:

1. ALL WORK SHALL BE IN ACCORDANCE WITH THE COLLIER COUNTY UTILITIES TECHNICAL SPECIFICATION SECTION 330523.13.
2. ALL HDD INSTALLATION ACTIVITIES SHALL BE IN ACCORDANCE WITH THE FLORIDA D.O.T. UTILITY ACCOMMODATIONS MANUAL AND THE COLLIER COUNTY UTILITIES STANDARDS.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFICATION OF AFFECTED AGENCIES AND COORDINATION WITH ALL UTILITIES PRIOR TO CONSTRUCTION.
4. ALL CONSTRUCTION MATERIALS, INCLUDING DRILLING FLUID, SHALL BE REMOVED FROM THE SITE PRIOR TO RESTORATION OF DISTURBED AREAS.
5. PLACE ARV ON UPSTREAM SIDE. WHEN BIDIRECTIONAL FLOW CONDITIONS EXIST, AN ARV WILL BE REQUIRED AT EACH END OF THE HDD.
6. VALVES SHALL BE INSTALLED A MAXIMUM OF 20' FROM THE END OF ALL DIRECTIONAL DRILLS.

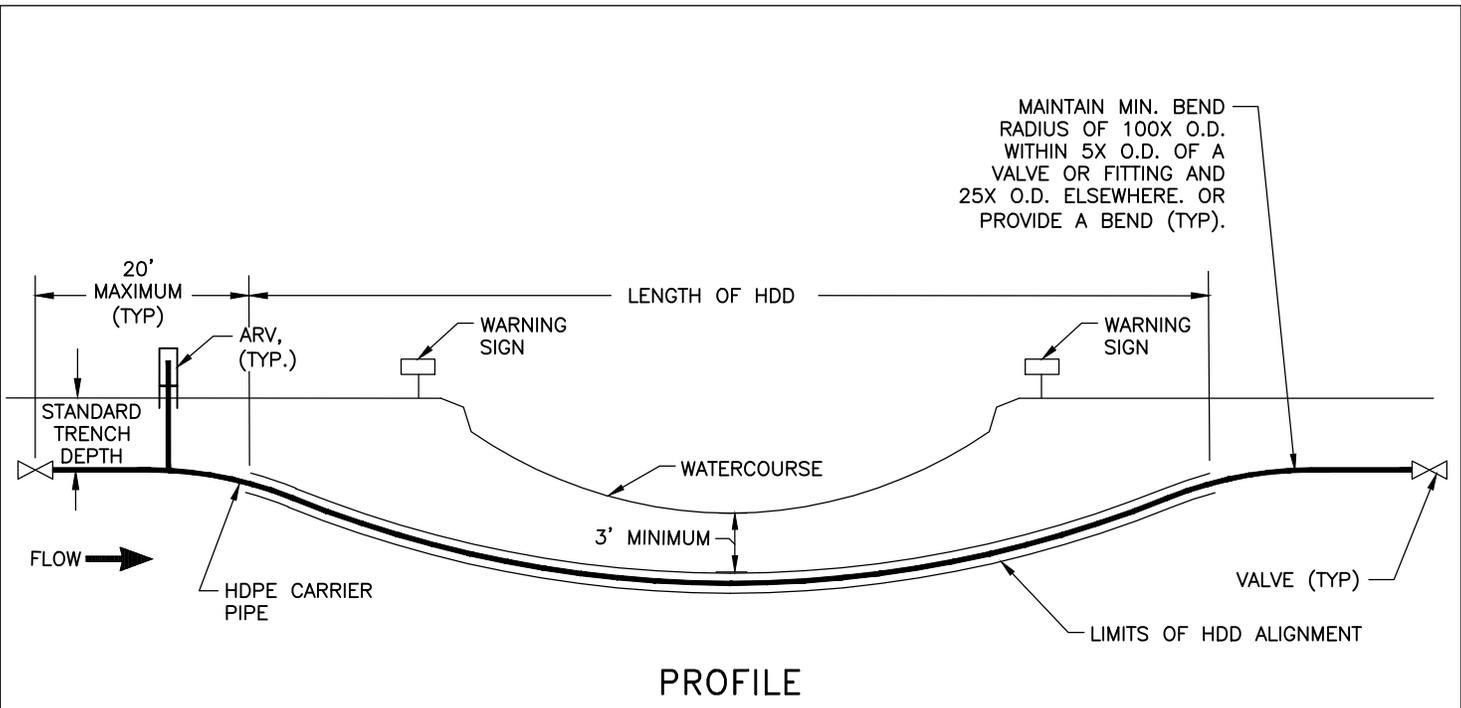
TYPICAL HORIZONTAL DIRECTIONAL DRILL (HDD) UNDER A ROADWAY

NTS

REVISION DATE:
JULY 2018



SHEET NO.
G-8



HDD INSTALLATION NOTES:

1. PROVIDE VALVES AT BOTH ENDS OF SUBAQUEOUS CROSSING. FOR WATERMAIN CROSSINGS, TWO 1" SERVICE TAPS AND SADDLES SHALL BE PROVIDED ON BOTH SIDES OF THE VALVE CLOSEST TO THE WATER SUPPLY AND TERMINATED INTO A METER BOX. SEE DETAIL G-9A.
2. PLACE ARV ON UPSTREAM SIDE. WHEN BIDIRECTIONAL FLOW CONDITIONS EXIST, AN ARV WILL BE REQUIRED AT EACH END OF THE HDD.
3. ALL SUBAQUEOUS CROSSINGS SHALL BE DISCUSSED AT A PLAN PRE-SUBMITTAL CONFERENCE WITH REPRESENTATIVES OF THE WATER OR WASTEWATER DEPARTMENTS. SUBAQUEOUS WATER MAINS SHALL REQUIRE APPROVAL BY THE WATER OR WASTEWATER DEPARTMENT.
4. WARNING SIGNS SHALL BE PLACED ALONG BANKS OF WATERWAY TO CLEARLY IDENTIFY SUBAQUEOUS CROSSING. SIGNS SHALL INDICATE TYPE OF PIPELINE AND DEPTH OF PIPELINE BELOW BOTTOM OF WATER BODY.
5. VALVES SHALL BE INSTALLED WITHIN 20' OF THE END OF ALL DIRECTIONAL DRILLS.
6. DEPTH OF COVER BENEATH THE WATERCOURSE SHALL BE A MINIMUM OF 3' OR AS REQUIRED BY ACOE, SFWMD, OR OTHER APPLICABLE REGULATORY AGENCY.

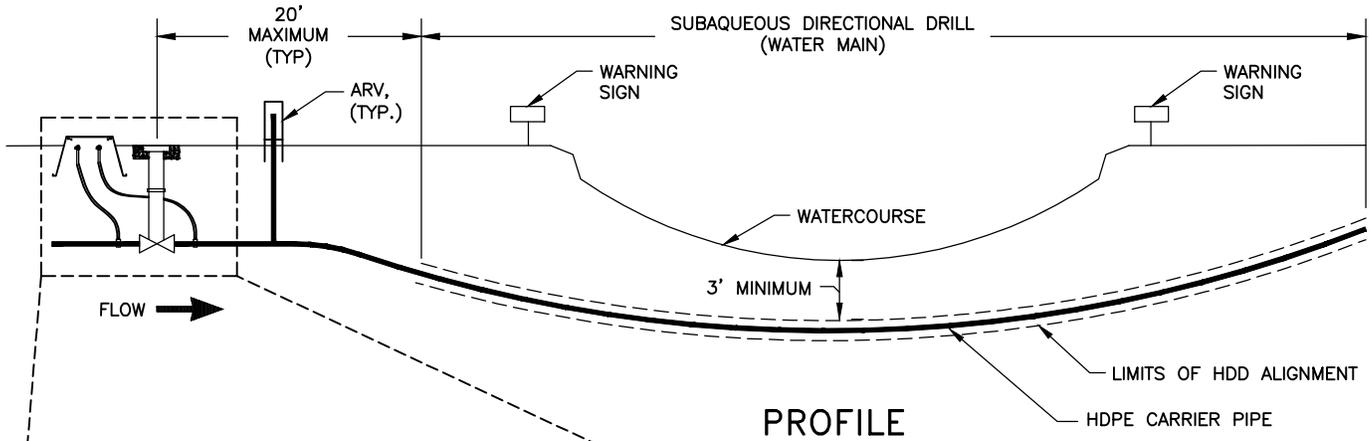
**TYPICAL SUBAQUEOUS HORIZONTAL
DIRECTIONAL DRILL (HDD)**

REVISION DATE:
JULY 2018

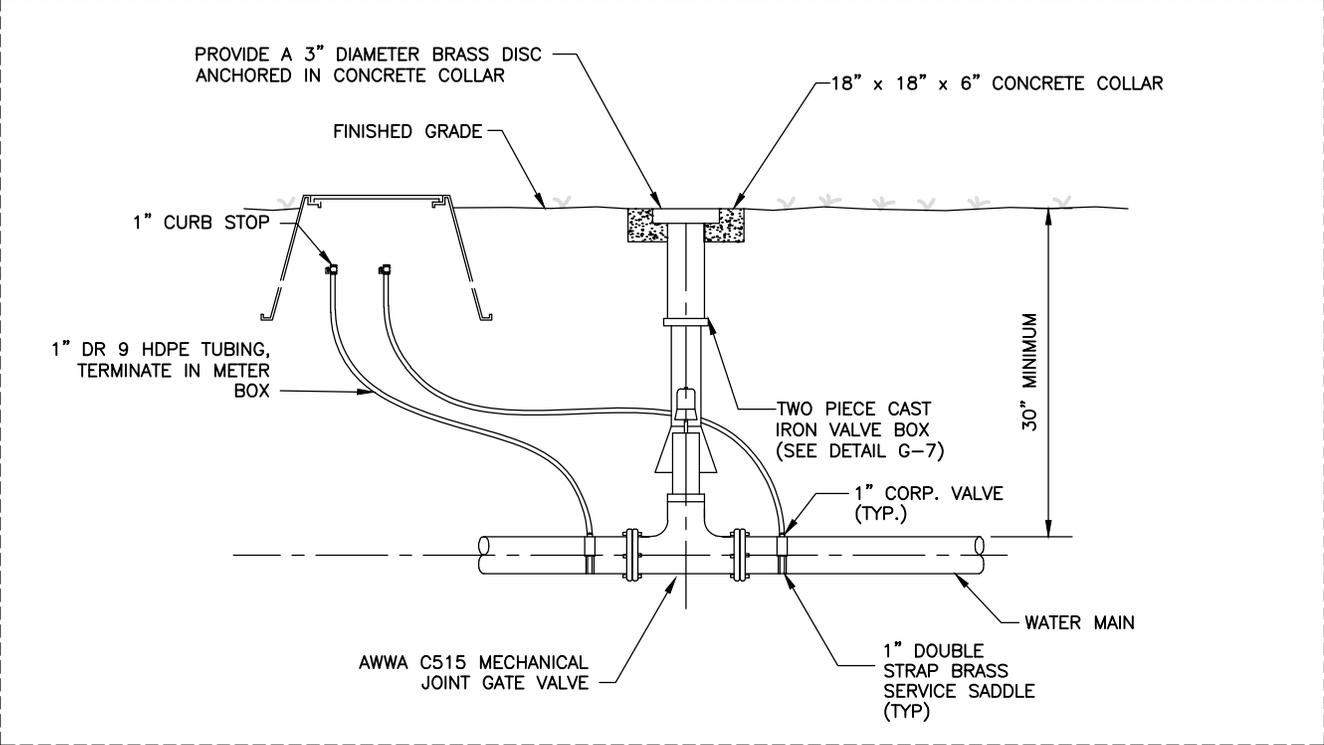


SHEET NO.
G-9

NTS



- NOTES:**
1. WHERE BI-DIRECTIONAL FLOW DOES NOT OCCUR PLACE LEAK DETECTION ASSEMBLY AT UPSTREAM VALVE LOCATION AS SHOWN.
 2. PLACE METER BOX AS FAR FROM NEARBY ROADWAY AS PRACTICABLE.



**SUBAQUEOUS WATER MAIN
VALVE DETAIL**

REVISION DATE:	JULY 2018



SHEET NO.
G-9A

NTS

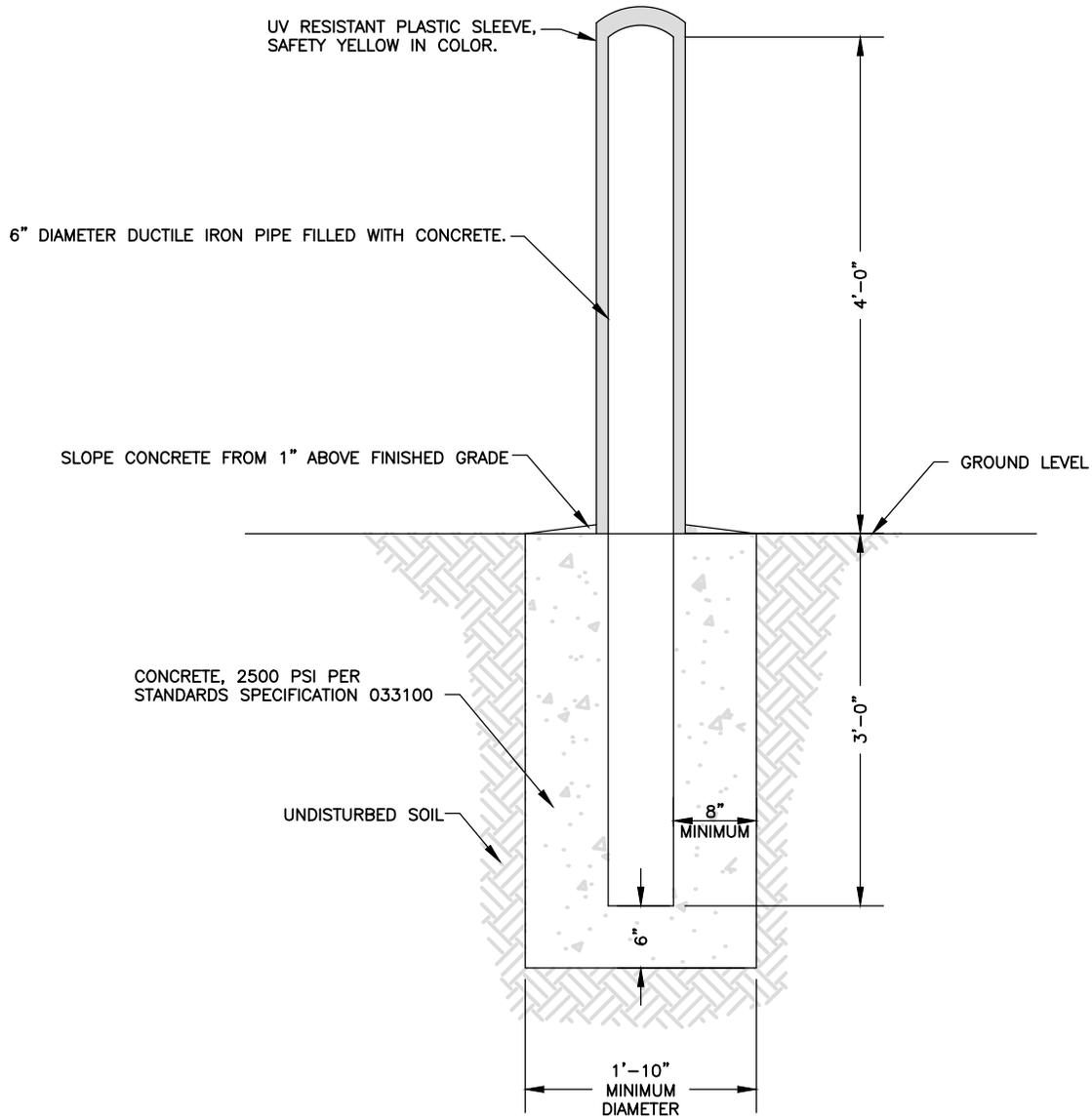
PIPE SIZE IN INCHES	RESTRAINED PIPE LENGTH IN FEET							
	VERTICAL BENDS							
	90°		45°		22-1/2°		11-1/4°	
	UPPER	LOWER	UPPER	LOWER	UPPER	LOWER	UPPER	LOWER
4	60	24	25	10	12	5	6	3
6	85	34	35	14	17	7	9	3
8	110	43	45	18	22	9	11	9
10	133	52	55	21	27	10	13	5
12	155	60	64	25	31	12	15	6
16	198	76	82	31	40	15	20	8
18	218	83	90	35	44	17	22	8
20	238	90	98	37	47	18	23	9
24	277	104	115	43	55	21	27	10
30	330	122	136	51	66	24	33	12
36	379	139	156	57	75	28	38	14

PIPE SIZE IN INCHES	RESTRAINED PIPE LENGTH IN FEET (1)	
	TEE (3)	REDUCER (4)
6 x 4	0	40
6 x 6	34	
8 x 4	0	72
8 x 8	55	
10 x 6	3	74
10 x 10	75	
12 x 4	0	122
12 x 8	31	75
12 x 12	95	
16 x 6	0	153
16 x 10	44	107
16 x 16	134	
18 x 8	0	157
18 x 12	68	108
18 x 18	152	
20 x 10	20	161
20 x 16	120	77
20 x 20	170	
24 x 12	37	187
24 x 18	132	109
24 x 24	204	
30 x 16	78	213
30 x 20	138	165
30 x 30	252	
36 x 18	84	259
36 x 24	170	191
36 x 36	298	

PIPE SIZE IN INCHES	RESTRAINED PIPE LENGTH IN FEET				
	HORIZONTAL BENDS				DEAD ENDS (2)
	90°	45°	22-1/2°	11-1/4°	
4	23	9	5	2	55
6	32	13	6	3	77
8	40	17	8	4	100
10	48	20	10	5	120
12	56	23	11	6	141
16	71	29	14	7	181
18	77	32	15	8	200
20	84	35	17	8	218
24	96	40	19	10	253
30	112	47	22	11	303
36	127	53	25	13	350

NOTES:

1. RESTRAIN ALL PIPE JOINTS WITHIN THE DISTANCE SHOWN ON THE TABLES MEASURED FROM THE POINT OF CONNECTION.
2. ISOLATION VALVES SHALL BE TREATED AS DEAD ENDS. WITH RESTRAINT ON BOTH SIDES OF THE VALVE.
3. RESTRAINT IS FOR BRANCH OF TEE. IF BRANCH SIZE IS NOT ON TABLE, USE NEXT LARGEST BRANCH.
4. RESTRAINT IS FOR LARGE DIAMETER SIDE OF REDUCER. IF REDUCER SIZE IS NOT ON TABLE, USE NEXT SMALLER REDUCER (SMALL END).
5. THIS SCHEDULE IS TO BE USED FOR DUCTILE IRON AND PVC PIPE.



VEHICULAR GUARD POST DETAIL

NTS

REVISION DATE:
JULY 2018

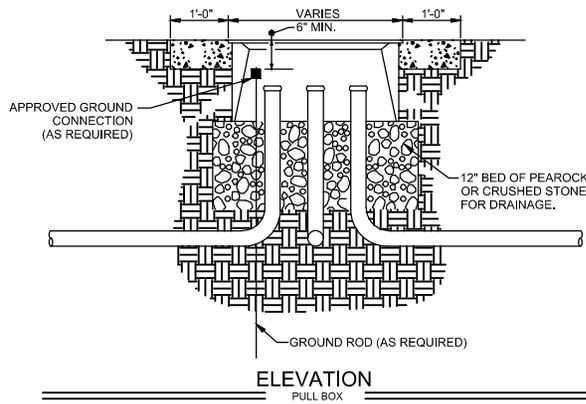
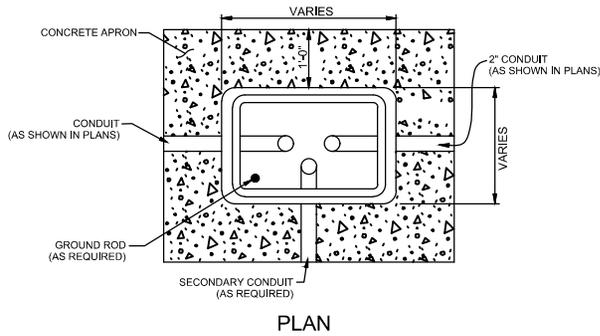


SHEET NO.
G-11

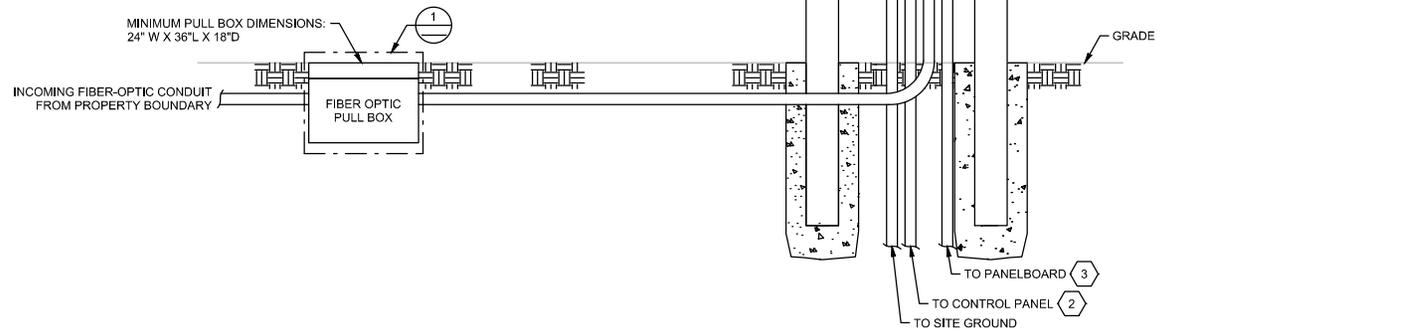
EQUIPMENT SPECIFICATIONS

MARK

- ① DRAWING NOT TO SCALE.
- ② CONTROL PANEL LOCATION AND CONFIGURATION VARIES. REFER TO COUNTY DETAILS WW-8, WW-8A, AND WW-8B FOR DETAILS.
- ③ 120VAC PANELBOARD LOCATED ON EQUIPMENT RACK WITH OTHER PANELS NOT SHOWN. REFER TO COUNTY DETAIL WW-9A FOR COMPLETE EQUIPMENT RACK LAYOUT AND ADDITIONAL PANELBOARD REQUIREMENTS.
- ④ ALL TELECOMMUNICATIONS CONDUIT ENTERING SITE FROM STATION SIDE HANDHOLE SHALL BE SCH 80 PVC UNLESS OTHERWISE NOTED.
- ⑤ REFER TO COUNTY SPECIFICATIONS FOR DETAILED REQUIREMENTS ON MATERIALS OF CONSTRUCTION AND INSTALLATION METHODS.



① DETAIL



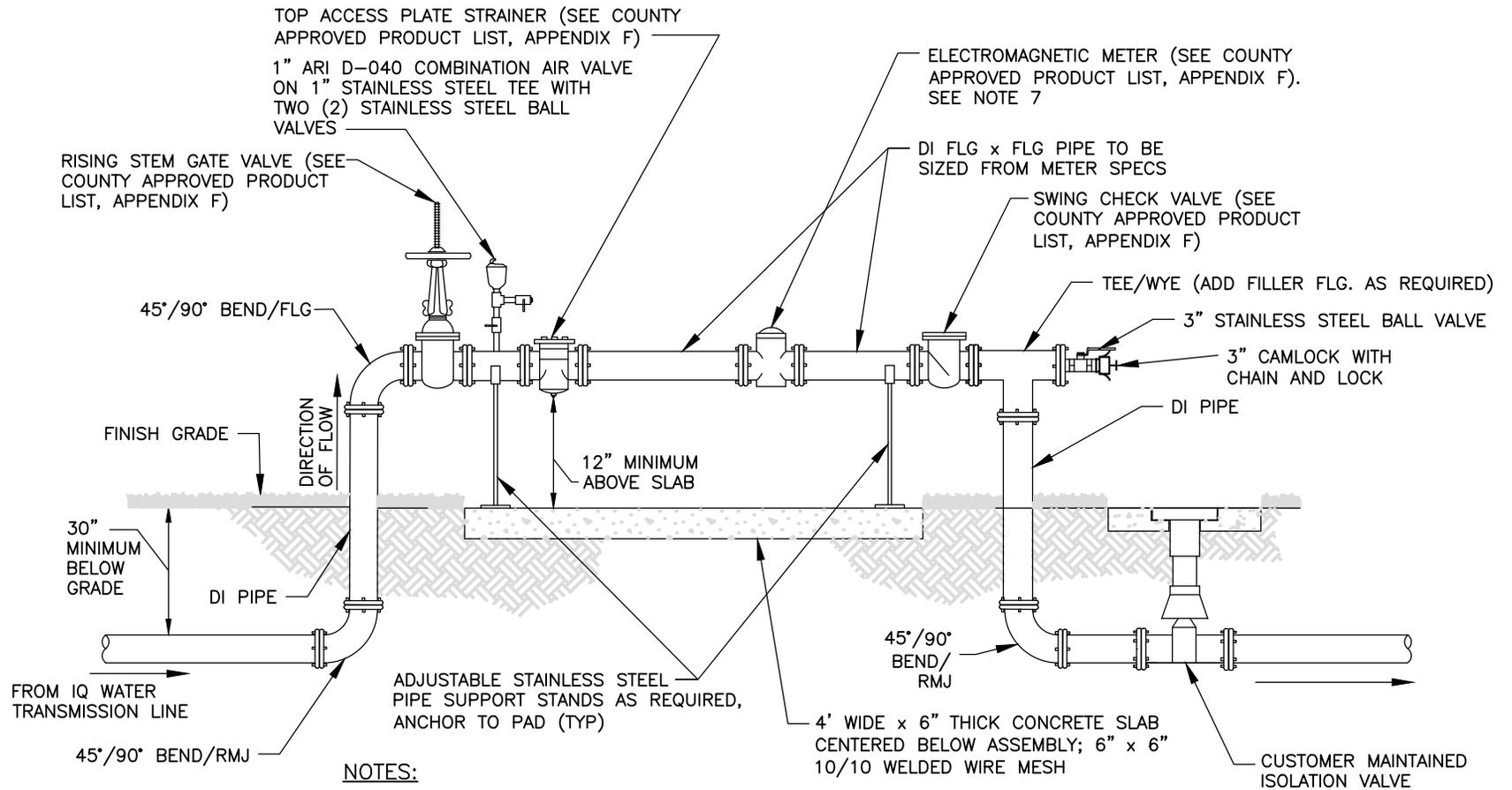
IT FIBER-OPTIC TELECOMMUNICATIONS DETAIL

REVISION DATE:
JANUARY 2025

NTS



SHEET NO.
G-12



NOTES:

1. ALL ABOVE GROUND PIPE SHALL BE PAINTED PANTONE PURPLE 522-C.
2. ALL ABOVE GROUND PIPES WILL BE FLANGED END. ALL NUTS & BOLTS SHALL BE STAINLESS STEEL.
3. (4) VEHICULAR GUARD POSTS TO BE INSTALLED AROUND METER. SUBMIT FOR REVIEW AND APPROVAL. CONFIGURATION TO BE ILLUSTRATED ON CONSTRUCTION DOCUMENTS.
4. ALL PLANTING SHALL BE A MINIMUM OF 3' FROM EDGE OF SLAB, AND SHALL PROVIDE A 3' ACCESS OPENING.
5. ALL PIPES UNDER 3" SHALL BE BRASS.
6. METER ASSEMBLY SHALL BE LOCATED WITHIN C.U.E.
7. USE 45-DEGREE BENDS WHERE POSSIBLE.

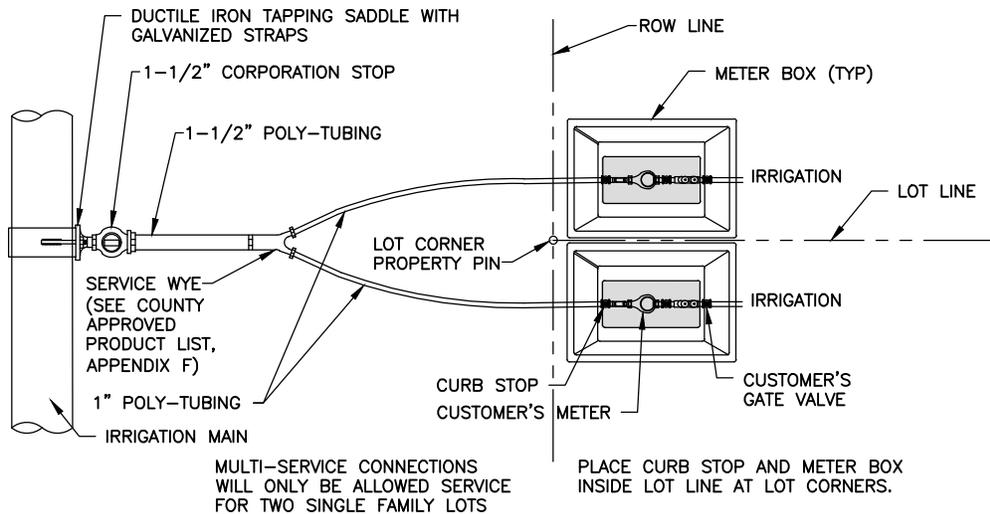
**STANDARD IRRIGATION WATER NON-TELEMETRY
METER ASSEMBLY 3" AND LARGER**

REVISION DATE:
JULY 2018

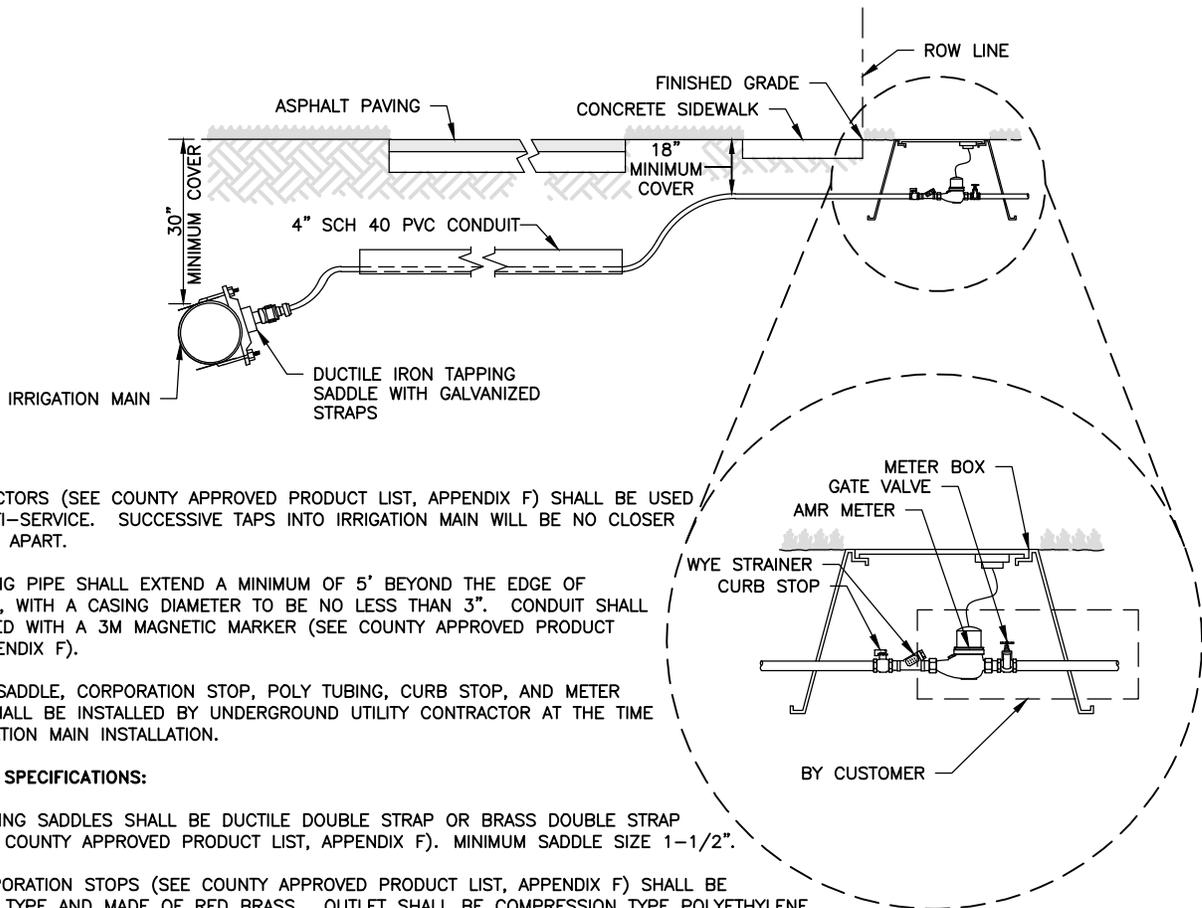


SHEET NO.
NP-1

NTS



MULTIPLE METER SERVICE CONNECTIONS



NOTES:

1. Y CONNECTORS (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) SHALL BE USED FOR MULTI-SERVICE. SUCCESSIVE TAPS INTO IRRIGATION MAIN WILL BE NO CLOSER THAN 24" APART.
2. ALL CASING PIPE SHALL EXTEND A MINIMUM OF 5' BEYOND THE EDGE OF PAVEMENT, WITH A CASING DIAMETER TO BE NO LESS THAN 3". CONDUIT SHALL BE MARKED WITH A 3M MAGNETIC MARKER (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F).
3. TAPPING SADDLE, CORPORATION STOP, POLY TUBING, CURB STOP, AND METER BOXES SHALL BE INSTALLED BY UNDERGROUND UTILITY CONTRACTOR AT THE TIME OF IRRIGATION MAIN INSTALLATION.
4. **MATERIAL SPECIFICATIONS:**
 - A. TAPPING SADDLES SHALL BE DUCTILE DOUBLE STRAP OR BRASS DOUBLE STRAP (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F). MINIMUM SADDLE SIZE 1-1/2".
 - B. CORPORATION STOPS (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) SHALL BE BALL TYPE AND MADE OF RED BRASS. OUTLET SHALL BE COMPRESSION TYPE POLYETHYLENE TUBE. COMPRESSION INSERT SHALL BE STAINLESS STEEL.
 - C. CURB STOPS (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) SHALL BE BALL TYPE AND MADE OF RED BRASS. INLET SHALL BE COMPRESSION JOINT. OUTLET SHALL BE SWIVEL NUT FOR METER CONNECTION.
 - D. AUTOMATIC METER READER (AMR) METER BOXES (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) SHALL HAVE CAST IRON READ LID.

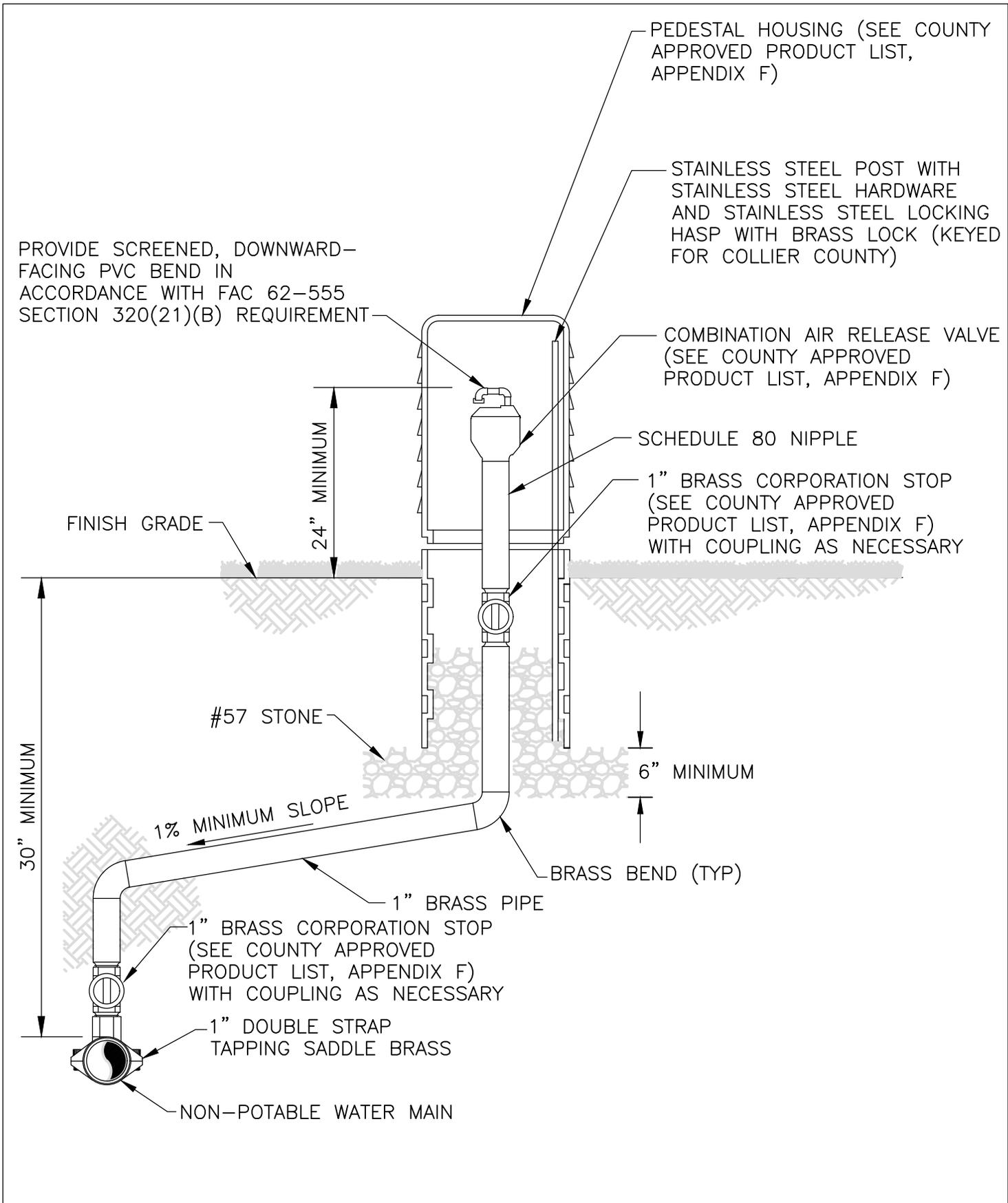
**TYPICAL IRRIGATION SERVICE
 METER SETTING DETAIL FOR
 CONNECTION TO IRRIGATION MAIN**

NTS

REVISION DATE:
 MAY 2009



SHEET NO.
 NP-2



**REUSE, RAW AND SUPPLEMENTAL
WATER AIR RELEASE VALVE DETAIL**

NTS	REVISION DATE:
	MAY 2009



SHEET NO.
NP-4

GENERAL NOTES:

1. ALL ABOVE GROUND PIPING SHALL BE PAINTED PANTONE PURPLE 522-C.
2. ALL ABOVE GROUND PIPES WILL BE FLANGED END. ALL HARDWARE NUTS AND BOLTS SHALL BE STAINLESS STEEL.
3. (4) VEHICULAR GUARD POSTS TO BE INSTALLED AROUND METER. CONFIGURATION TO BE ILLUSTRATED ON CONSTRUCTION DOCUMENTS SUBMITTED FOR REVIEW AND APPROVAL.
4. ALL PLANTING SHALL BE A MINIMUM OF 3' FROM EDGE OF SHALL SLAB AND PROVIDE A 3" ACCESS OPENING.
5. ALL PIPES UNDER 3" SHALL BE BRASS.
6. METER ASSEMBLY SHALL BE LOCATED WITHIN COUNTY UTILITY EASEMENT.
7. ALL BELOW GRADE GROUND CONNECTIONS TO BE VIA EXOTHERMIC WELD (CADWELD) UNLESS INDICATED OTHERWISE.

CONTROL/ELEMENTARY SYMBOLS

-  NORMALLY OPEN CONTACT
-  NORMALLY CLOSED CONTACT
-  ALARM RELAY
-  ALARM TIMER
-  CONTROL RELAY
-  FLOW INDICATOR TRANSMITTER (TOTALIZER)
-  LEVEL INDICATOR TRANSMITTER
-  PRESSURE GAUGE
-  TAMPER SWITCH
-  SURGE SUPPRESSION DEVICE
-  SOLENOID VALVE
-  ALARM INDICATING LIGHT
-  RUN INDICATING LIGHT
-  MOMENTARY CONTACT PUSHBUTTON
-  MOMENTARY BREAK PUSHBUTTON OR RESET
-  MAINTAINED CONTACT ON-OFF SWITCH
-  FUSE
-  MOLDED CASE CIRCUIT BREAKER
-  REMOTE TERMINAL BLOCK POINT
-  TSP TWISTED SHIELDED PAIRS

ELECTRICAL PLAN SYMBOLS

-  SYSTEMS CABINET AS NOTED OR MARKED
-  CONDUIT AND WIRE CONCEALED IN FLOOR SLAB OR UNDERGROUND
-  MOTOR OPERATED VALVE CONNECTION
-  SERVICE OR EQUIPMENT GROUND

REUSE SYSTEM STANDARD SERVICE CONNECTIONS
OPEN/CLOSE VALVE SINGLE CONTROL PANEL SITE
GENERAL NOTE AND KEYNOTES

NTS

REVISION DATE:
 APRIL 2006



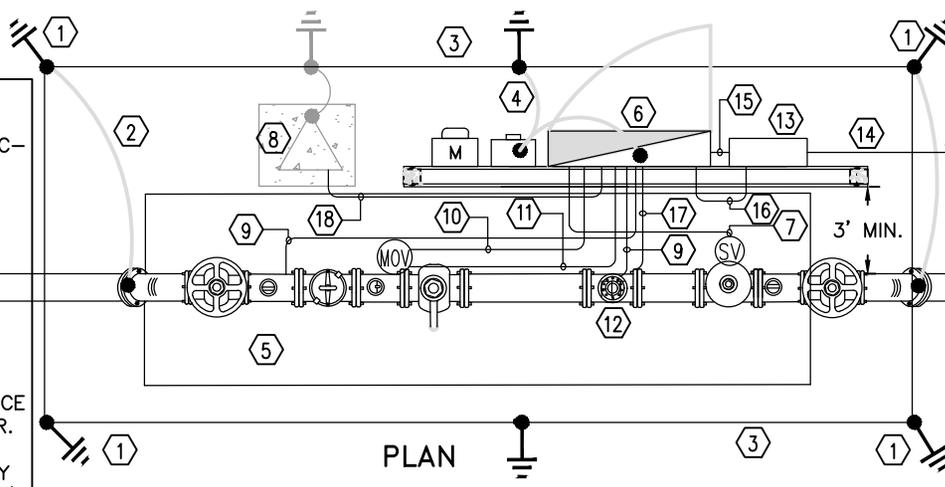
SHEET NO.
 NP-E1

KEYNOTES:

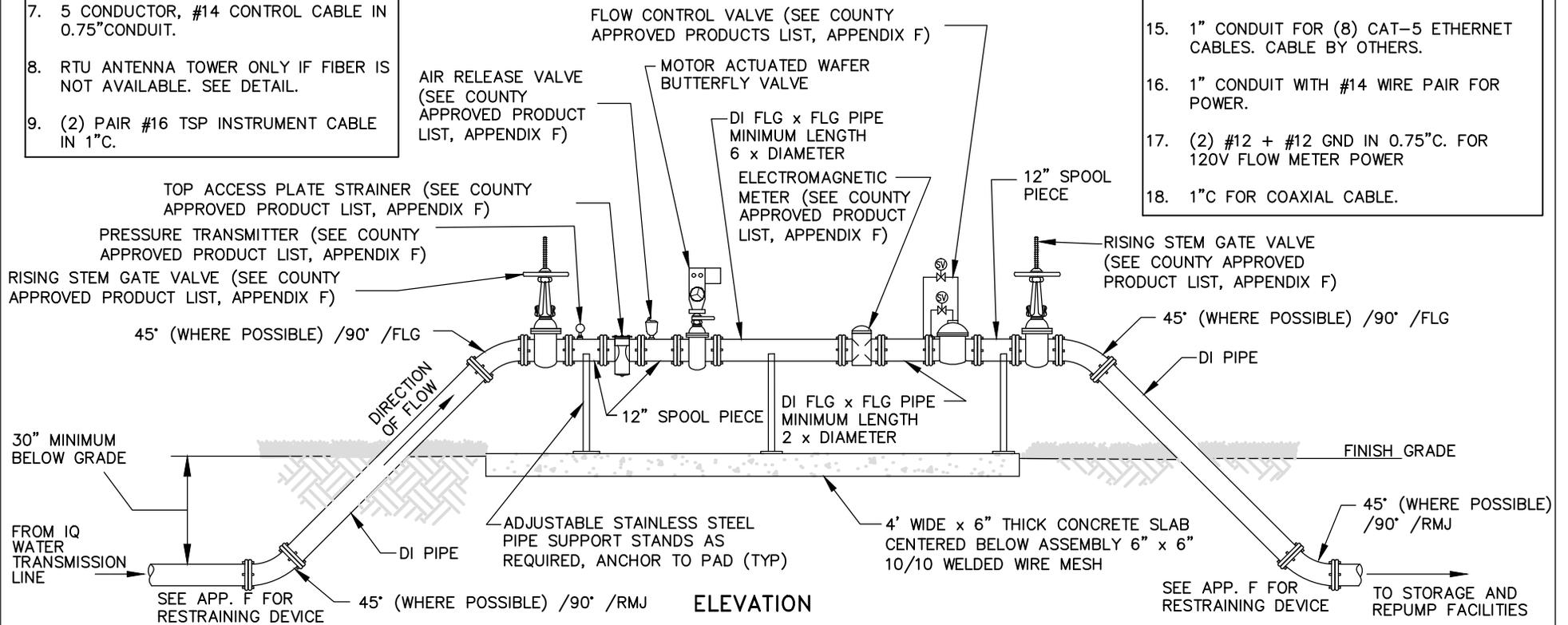
1. 20' DRIVEN GROUND ROD WITH INSPECTION TEST WELL (SEE DETAIL) (TYP).
2. #2 TINNED SOLID COPPER TO EQUIPMENT/CABINETS ETC (TYP).
3. #2 TINNED BARE COPPER COUNTERPOISE LOOP GROUND (TYP).
4. 60A, 240/120V, SINGLE PHASE SERVICE ENTRANCE RATED ENCLOSED BREAKER.
5. PRESSURE TRANSMITTER (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F).
6. VALVE CONTROL AND RTU PANEL (VCP).
7. 5 CONDUCTOR, #14 CONTROL CABLE IN 0.75" CONDUIT.
8. RTU ANTENNA TOWER ONLY IF FIBER IS NOT AVAILABLE. SEE DETAIL.
9. (2) PAIR #16 TSP INSTRUMENT CABLE IN 1" C.

KEYNOTES CONTINUED...

10. (2) #12 + #12 GND IN 0.75" C. FOR 120V MOV POWER
11. 14 CONDUCTOR #14 CONTROL CABLE IN 1.25" C.
12. ELECTROMAGNETIC FLOW METER WITH 4-20MA OUTPUT AND PULSE FLOW TOTALIZATION.
13. FIBER-OPTIC CONTROL ENCLOSURE, AMERICAN PRODUCTS PRODUCT #AM-462418-24RU.
14. 2" CONDUIT FOR FIBER-OPTIC CABLE. PROVIDE STUB-UP FOR SPLICE. CABLE BY OTHERS.
15. 1" CONDUIT FOR (8) CAT-5 ETHERNET CABLES. CABLE BY OTHERS.
16. 1" CONDUIT WITH #14 WIRE PAIR FOR POWER.
17. (2) #12 + #12 GND IN 0.75" C. FOR 120V FLOW METER POWER
18. 1" C FOR COAXIAL CABLE.



PLAN



ELEVATION

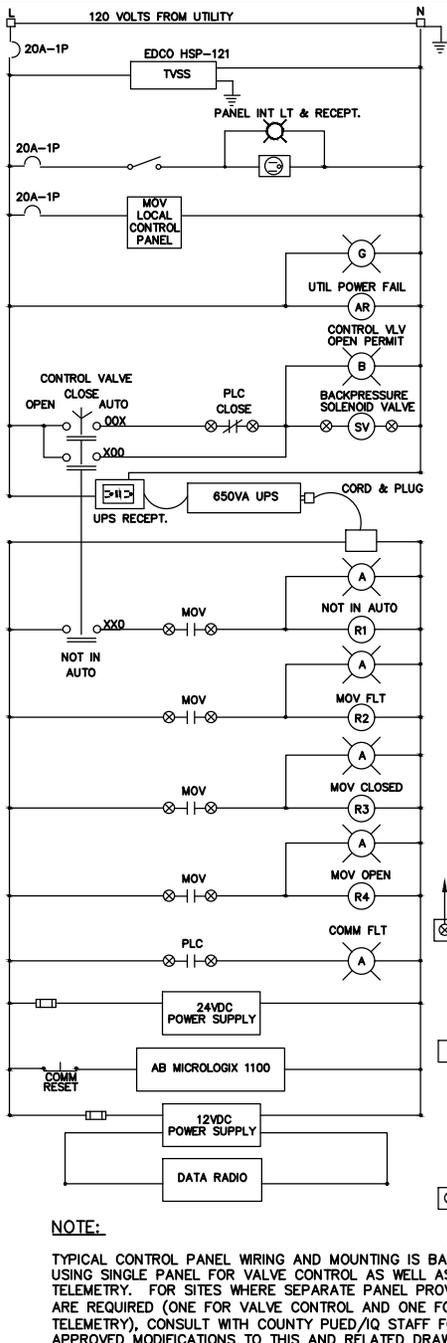
**STANDARD IRRIGATION WATER METER
ASSEMBLY 3" AND LARGER - TELEMTRY**

REVISION DATE:
JULY 2018



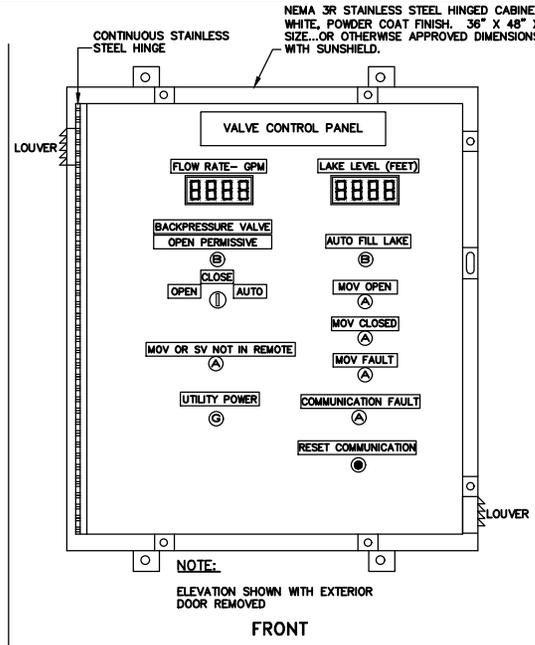
SHEET NO.
NP-E2

NTS



NOTE:
TYPICAL CONTROL PANEL WIRING AND MOUNTING IS BASED ON USING SINGLE PANEL FOR VALVE CONTROL AS WELL AS TELEMETRY. FOR SITES WHERE SEPARATE PANEL PROVISIONS ARE REQUIRED (ONE FOR VALVE CONTROL AND ONE FOR TELEMETRY), CONSULT WITH COUNTY PUED/IQ STAFF FOR APPROVED MODIFICATIONS TO THIS AND RELATED DRAWINGS.

VALVE CONTROL PANEL ELEMENTARY



FRONT

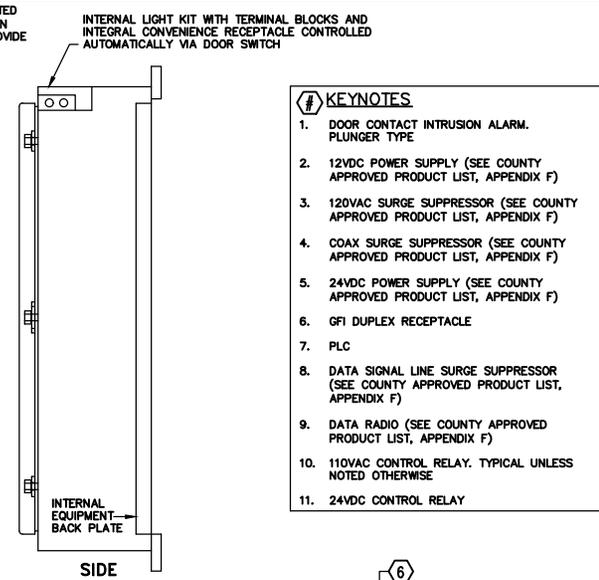
OPEN/CLOSE REUSE SERVICE CONNECTION RTU I/O POINT LIST
ANALOG IN

- 1) FLOW RATE
 - 2) LAKE LEVEL/TANK LEVEL
- DIGITAL IN
- 1) MOV OPEN
 - 2) MOV CLOSED
 - 3) MOV OR VCP NOT IN REMOTE
 - 4) MOV FAULT
 - 5) UTILITY POWER FAILURE
 - 6) RAIN GAUGE*
- * (REQUIRED ONLY AT SITES EQUIPPED WITH THE ISCO 674)
- 7) VALVE CONTROL PANEL NOT IN AUTO
 - 8) DOOR INTRUSION ALARM
 - 9) BACK PRESSURE SUSTAINING VALVE LIMIT SWITCH
 - 10) PULSED FLOW RATE (FOR TOTALIZATION)

DIGITAL OUT

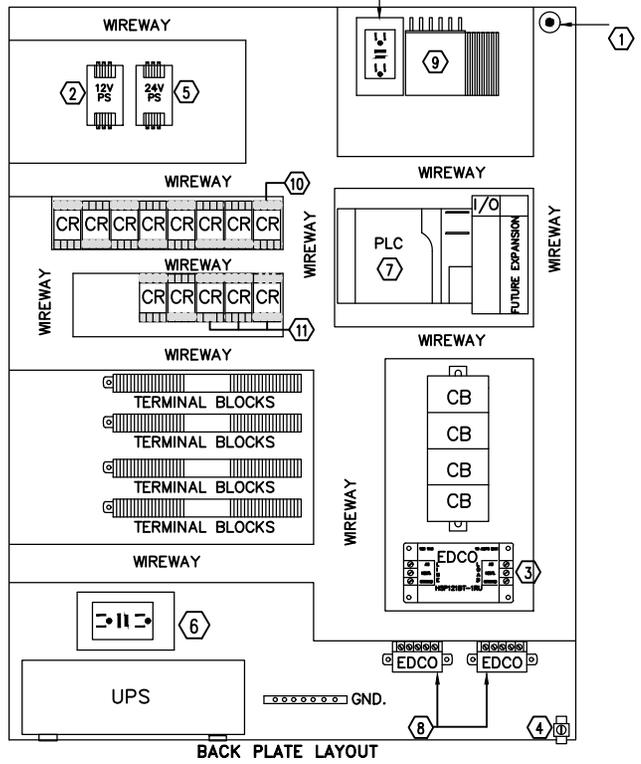
- 1) OPEN MOV
- 2) CLOSE MOV
- 3) BACK PRESSURE SUSTAINING VALVE SOLENOID

PLC
ALLEN BRADLEY MICROLOGIX 1100, P/N 1763-L16AWA WITH DUAL COMM PORTS (BUILT-IN ETHERNET/IP AND ISOLATED RS-232/RS-485COMBO); 4-PT ANALOG INPUT CARD, P/N 1762-IF4; AND EEPROM MEMORY MODULE; P/N 1763-MM1.



SIDE

- KEYNOTES**
1. DOOR CONTACT INTRUSION ALARM. PLUNGER TYPE
 2. 12VDC POWER SUPPLY (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F)
 3. 120VAC SURGE SUPPRESSOR (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F)
 4. COAX SURGE SUPPRESSOR (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F)
 5. 24VDC POWER SUPPLY (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F)
 6. GFI DUPLEX RECEPTACLE
 7. PLC
 8. DATA SIGNAL LINE SURGE SUPPRESSOR (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F)
 9. DATA RADIO (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F)
 10. 110VAC CONTROL RELAY. TYPICAL UNLESS NOTED OTHERWISE
 11. 24VDC CONTROL RELAY



BACK PLATE LAYOUT

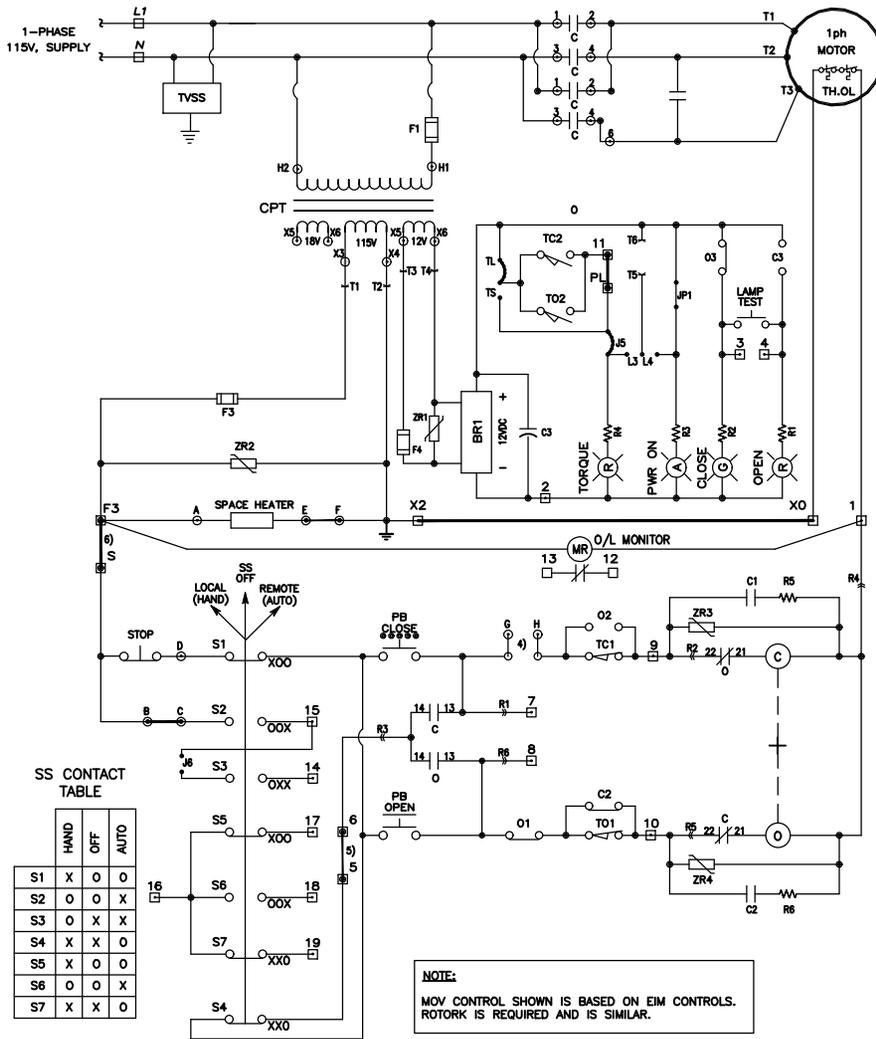
REUSE SYSTEM STANDARD SERVICE CONNECTIONS
OPEN/CLOSE VALVE SINGLE CONTROL PANEL SITE
LAYOUT & ELEMENTARY

NTS

REVISION DATE:	AUGUST 2008



SHEET NO.
NP-E3

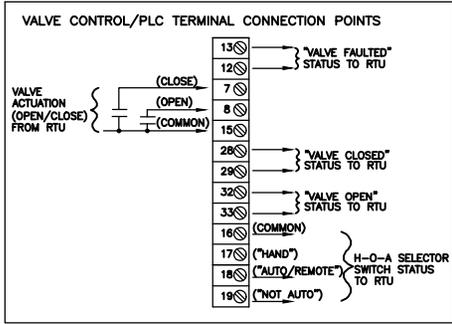


SS CONTACT TABLE

	HAND	OFF	AUTO
S1	X	O	O
S2	O	O	X
S3	O	X	X
S4	X	X	O
S5	X	O	O
S6	O	O	X
S7	X	X	O

NOTE:
MOV CONTROL SHOWN IS BASED ON EIM CONTROLS. ROTORK IS REQUIRED AND IS SIMILAR.

NOTE:
SET VALVE TO FAIL IN PLACE ON LOSS OF POWER.

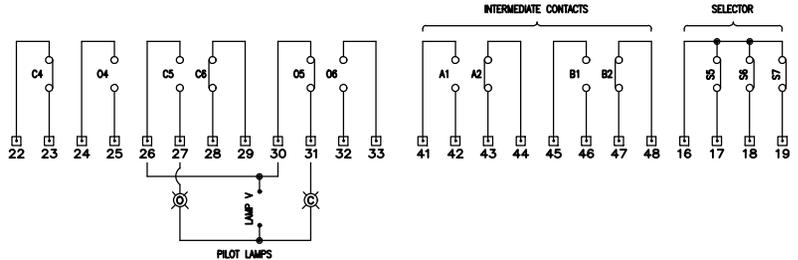
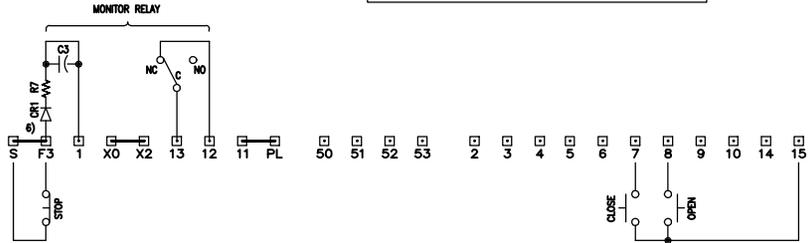


- LEGEND**
- O—OPEN CONTACT
 - C—CLOSE CONTACT
 - ⊖—OPENING COIL
 - ⊙—CLOSING COIL
 - +—MECHANICAL INTERLOCK
 - CPT—CONTROL POWER TRANSFORMER
 - TH.O.L—THERMAL OVERLOAD CONTACTS
 - SS—SELECTOR SWITCH (LOCAL—OFF—REMOTE)
 - PB—PUSHBUTTON
 - MR—MONITOR RELAY
 - ZR—ZENER DIODE
 - Ⓡ—RED INDICATING LIGHT
 - Ⓜ—AMBER INDICATING LIGHT
 - Ⓞ—GREEN INDICATING LIGHT

NOTES

- 1) CONTACTS SHOWN: VALVE CLOSED; VOLTAGE: OFF; S/S: HAND
- 2) CUSTOMER WIRES TO TERMINALS ON PWR AND TBM MODULES. M2CP INTERNAL TERMINAL INTERCONNECT WIRING POINTS FIELD CONNECTED WIRING BY OTHERS.
- 3) TORQUE SWITCH ("TC1" & "TO1" NC CONTACTS OPEN, AND "TC2" & "TO2" N.O. CONTACTS MAKE ON FIELD ADJUSTABLE MECHANICAL OVERLOAD IN (C) "CLOSE" OR IN (O) "OPEN" DIRECTION.
- 4) FOR TORQUE SEATED VALVE: INSTALL G TO H STRAP ON LSM.
- 5) FOR MAINTAINED PB CONTROL: REMOVE 5 TO 6 STRAP ON TBM.
- 6) FOR REMOTE STOP PB OR RELAY: REMOVE F3 TO S STRAP ON TBM.
- 7) O & C (22-31) REVERSING CONTACTOR NC INTERLOCK CONTACTS. O & C (14-13) MOMENTARY PUSHBUTTON N.O. SEAL-IN CONTACTS.
- 8) MOTOR THERMAL CONTACTS OPEN WITH EXCESSIVE TEMPERATURE.
- 9) POSITION INDICATOR PILOT LIGHTS: LED SOLID-STATE
 "OPEN" INDICATES: FULL OPEN (RED)
 "CLOSE" INDICATES: FULL CLOSED (GREEN)
 MID-POSITION: BOTH "OPEN" AND "CLOSE" ILLUMINATED.
 "PWR ON" AND "TORQUE" INDICATORS ARE ONLY VISIBLE WITH COVER OPEN FOR CONVENIENCE DURING MAINTENANCE PROCEDURES.

	VALVE POSITION	CONTACT FUNCTION	
			CLOSE
C CLOSE rotor	C1	↓ X X	CLOSE COIL
	C2	X O O	BYPASS TO1
	C3	O X X	OPEN LAMP
	C4	X O O	
	C5	O X X	
	C6	X O O	
A OPEN rotor	O1	X X ↓ O	OPEN COIL
	O2	O O O X	BYPASS TC1
	O3	X X O O	CLOSE LAMP
	O4	O O O X	
	O5	X X O O	
	O6	O O O X	
A SPARE	A1	O ↓ X	SPARE
	A2	X ↓ O	SPARE
B SPARE	B1	O ↓ X	SPARE
	B2	X ↓ O	SPARE



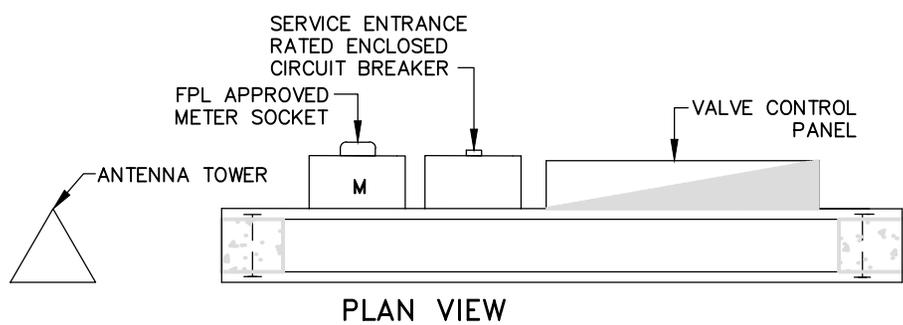
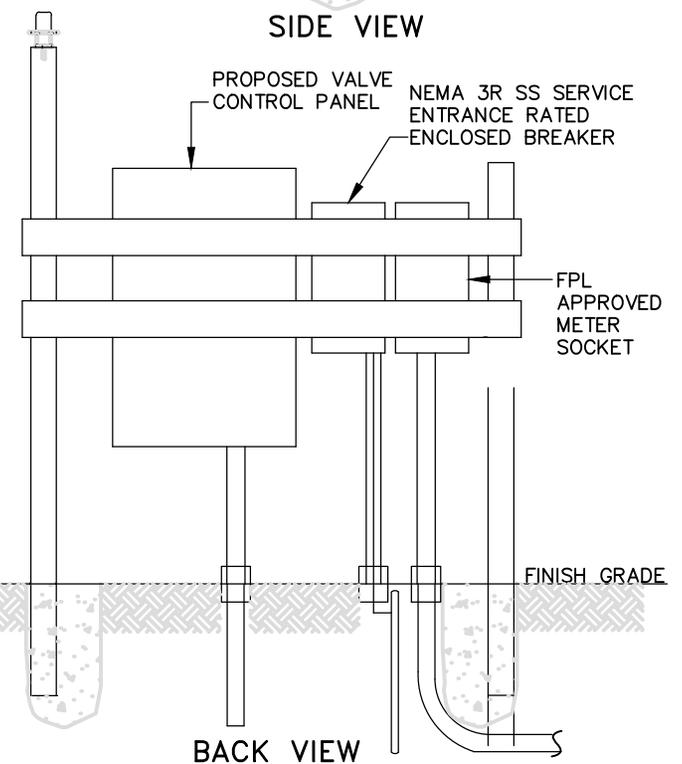
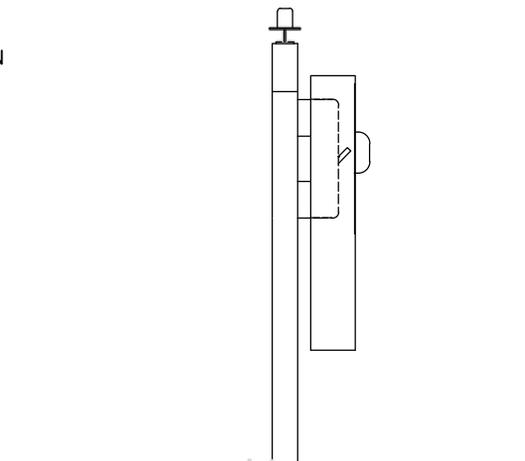
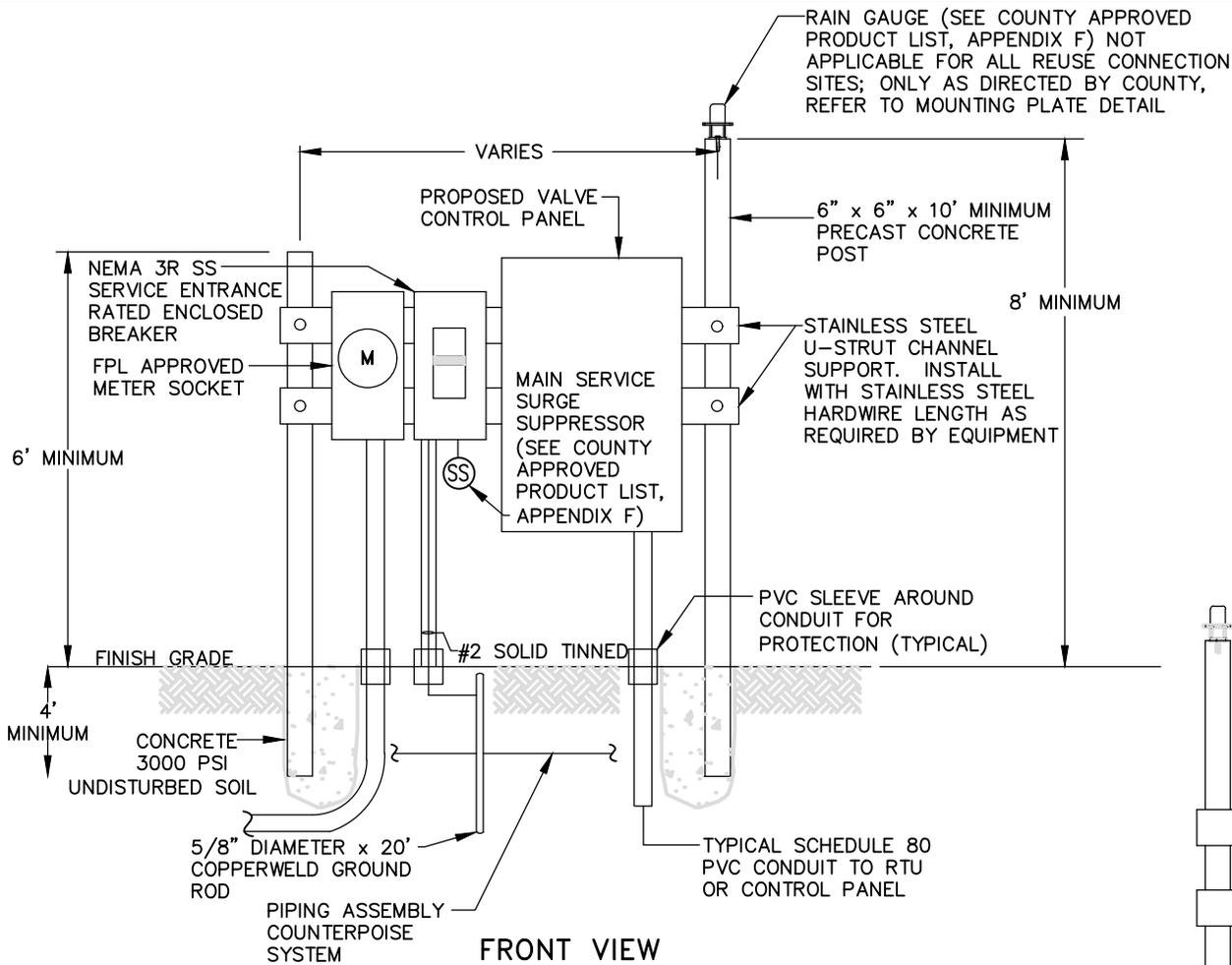
**REUSE SYSTEM STANDARD SERVICE CONNECTIONS
 OPEN/CLOSE VALVE SINGLE CONTROL PANEL SITE
 OPEN/CLOSED MOV CONTROL DIAGRAM**

REVISION DATE:
 APRIL 2006



SHEET NO.
 NP-E4

NTS



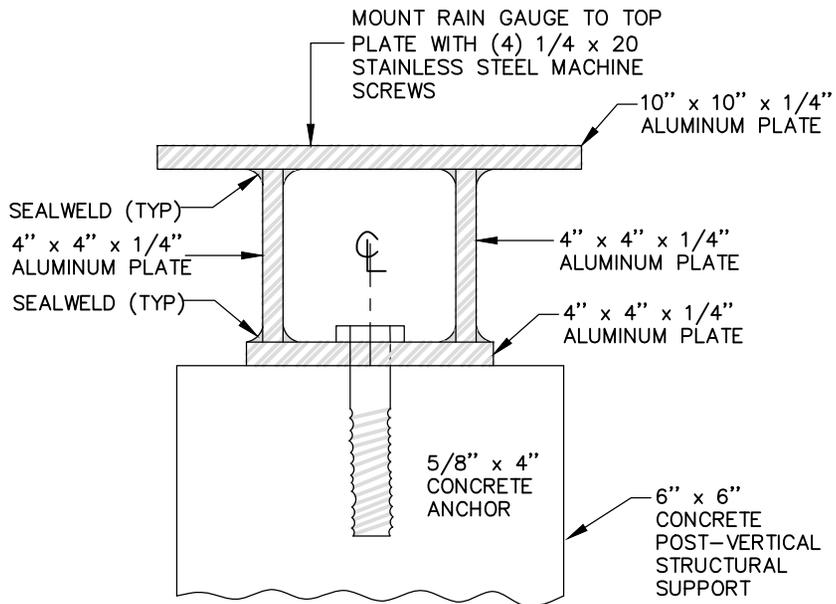
**REUSE SYSTEM STANDARD SERVICE CONNECTIONS
OPEN/CLOSE VALVE SINGLE CONTROL PANEL SITE
ELECTRICAL EQUIPMENT ELEVATIONS**

REVISION DATE:
AUGUST 2008

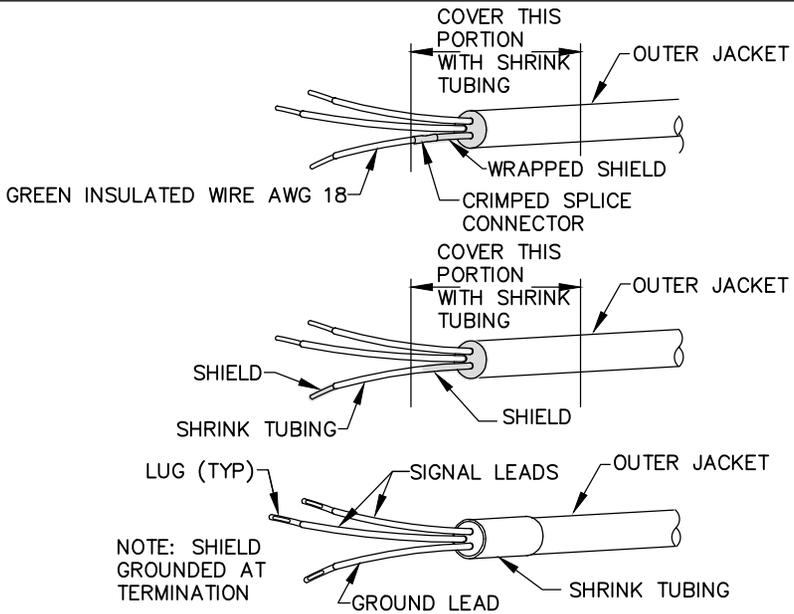


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NP-E5

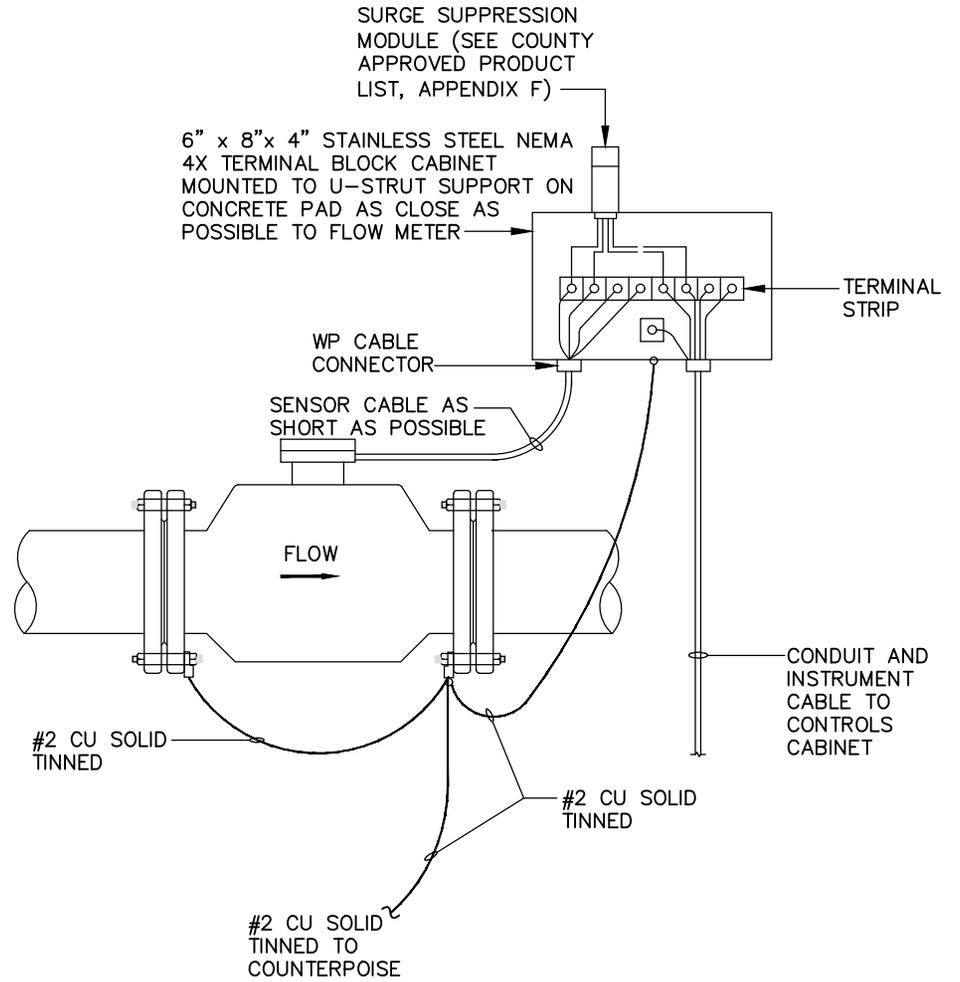
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RAIN GAUGE MOUNTING PLATE



TERMINATION OF SHIELDED INSTRUMENT AND CONTROL CABLE



FLOW METER TRANSMITTER INSTALLATION DETAIL

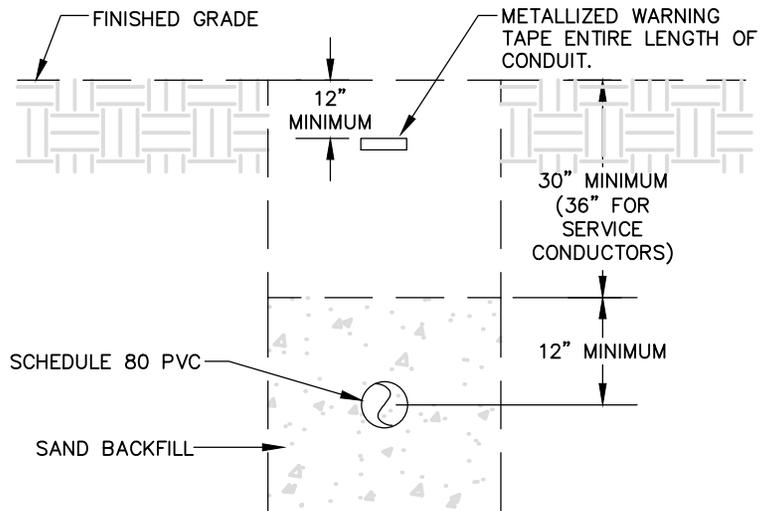
REUSE SYSTEM STANDARD SERVICE CONNECTIONS
OPEN/CLOSE VALVE
SINGLE CONTROL PANEL SITE
ELECTRICAL DETAILS

REVISION DATE:
AUGUST 2008

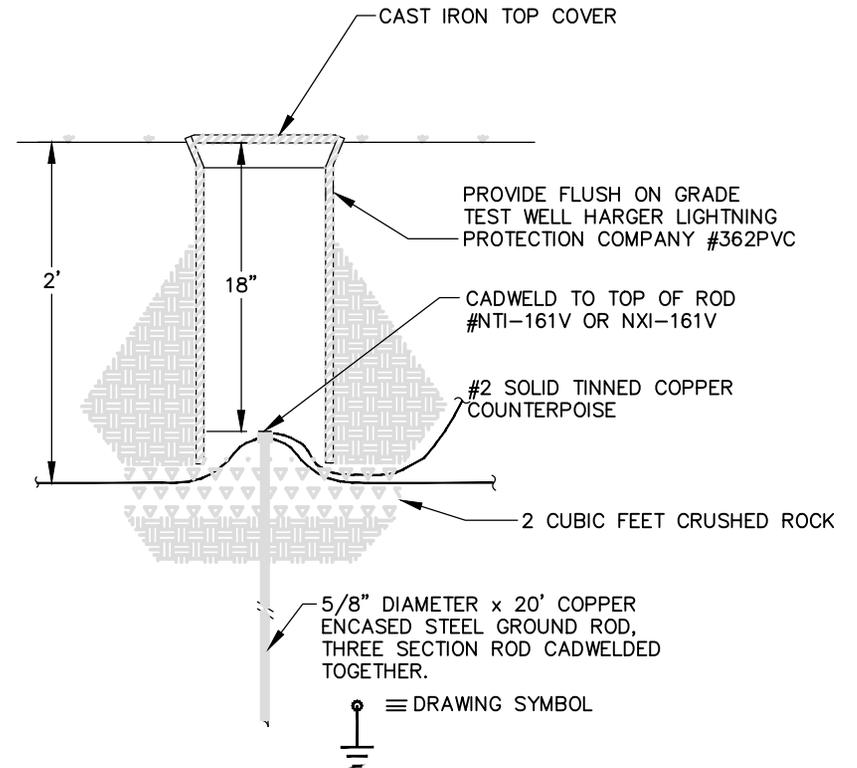


SHEET NO.
NP-E7

NTS



UNDERGROUND CONDUIT INSTALLATION



TYPICAL GROUND ROD INSTALLATION DETAIL

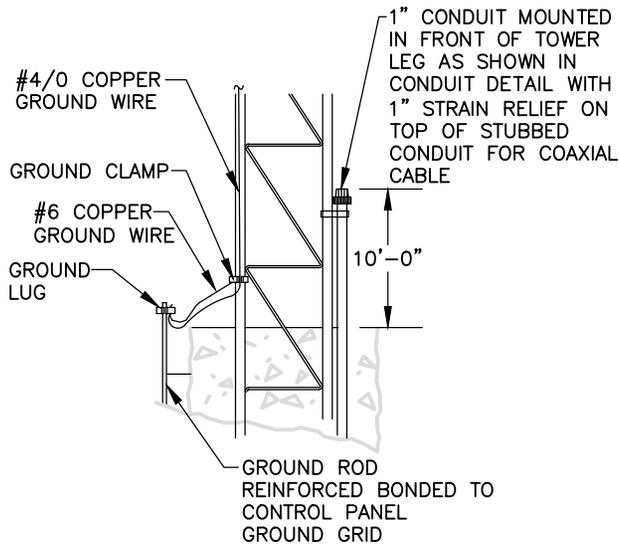
**REUSE SYSTEM STANDARD SERVICE CONNECTIONS
OPEN/CLOSE VALVE SINGLE CONTROL PANEL SITE
ELECTRICAL DETAILS**

NTS

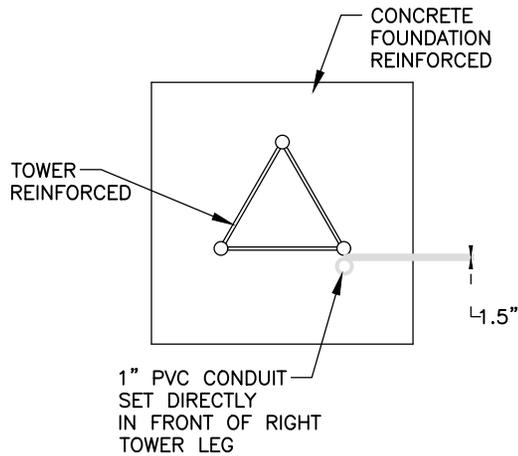
REVISION DATE:
APRIL 2006



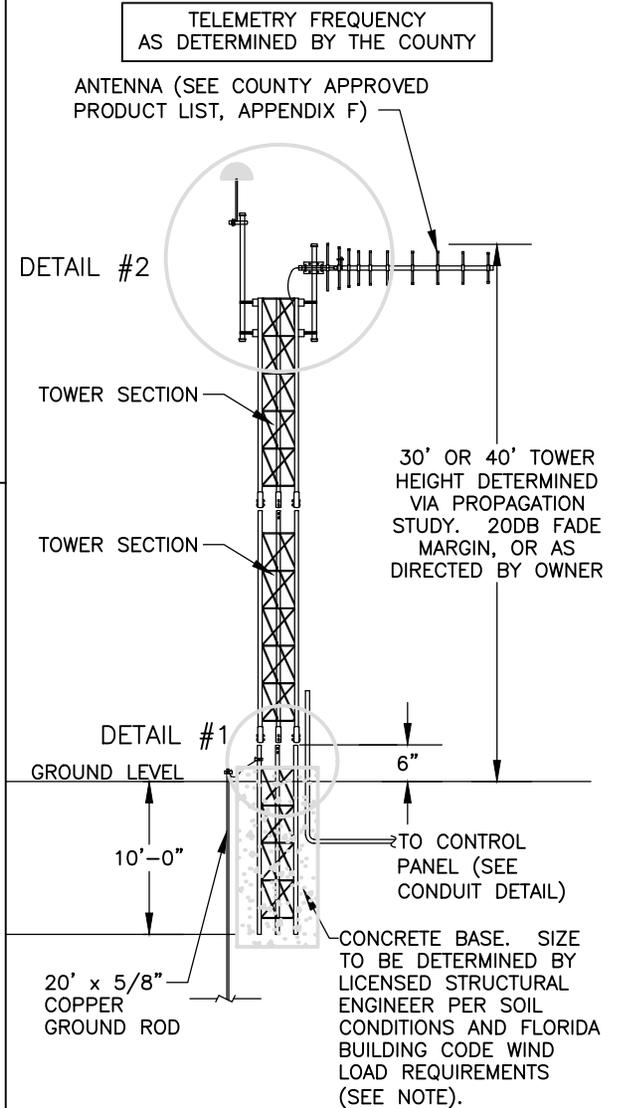
SHEET NO.
NP-E8



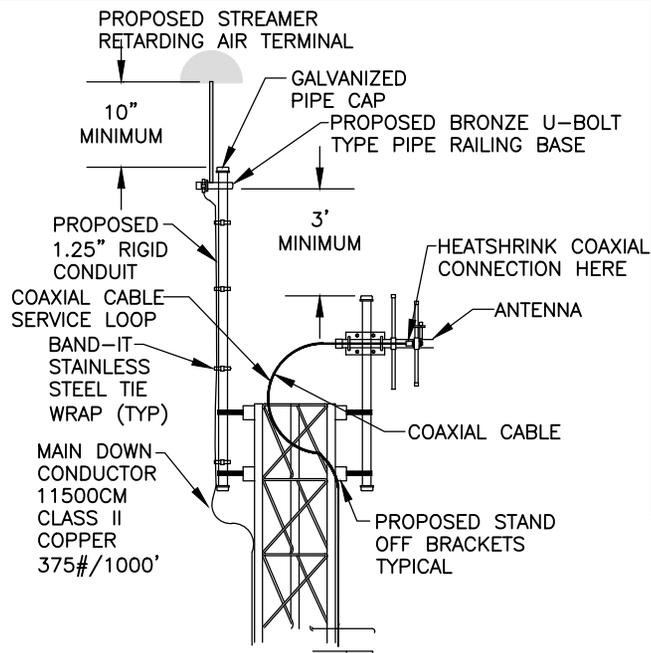
DETAIL #1 GROUNDING DETAIL



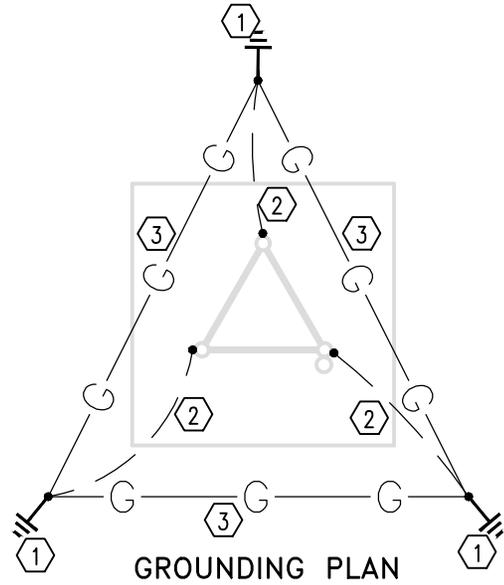
CONDUIT DETAIL TOP VIEW



TYPICAL POLE DETAIL



DETAIL #2 TOWER TOP DETAIL



GROUNDING PLAN

- KEYNOTES:**
1. 20' DRIVEN GROUND ROD WITH INSPECTION TEST WELL (SEE DETAIL) (TYP).
 2. #2 TINNED SOLID COPPER TO TOWER LEG (TYP).
 3. #2 TINNED BARE COPPER COUNTERPOISE LOOP GROUND (TYP).

NOTE:
 TOWER/ANTENNA ASSEMBLY AND FOUNDATION CONSTRUCTION MUST MEET CURRENT EDITION FLORIDA BUILDING CODE WIND LOAD REQUIREMENTS FOR 140 MPH WIND ZONE. PROVIDE STRUCTURAL CERTIFICATION BY FLORIDA REGISTERED LICENSED PROFESSIONAL ENGINEER.

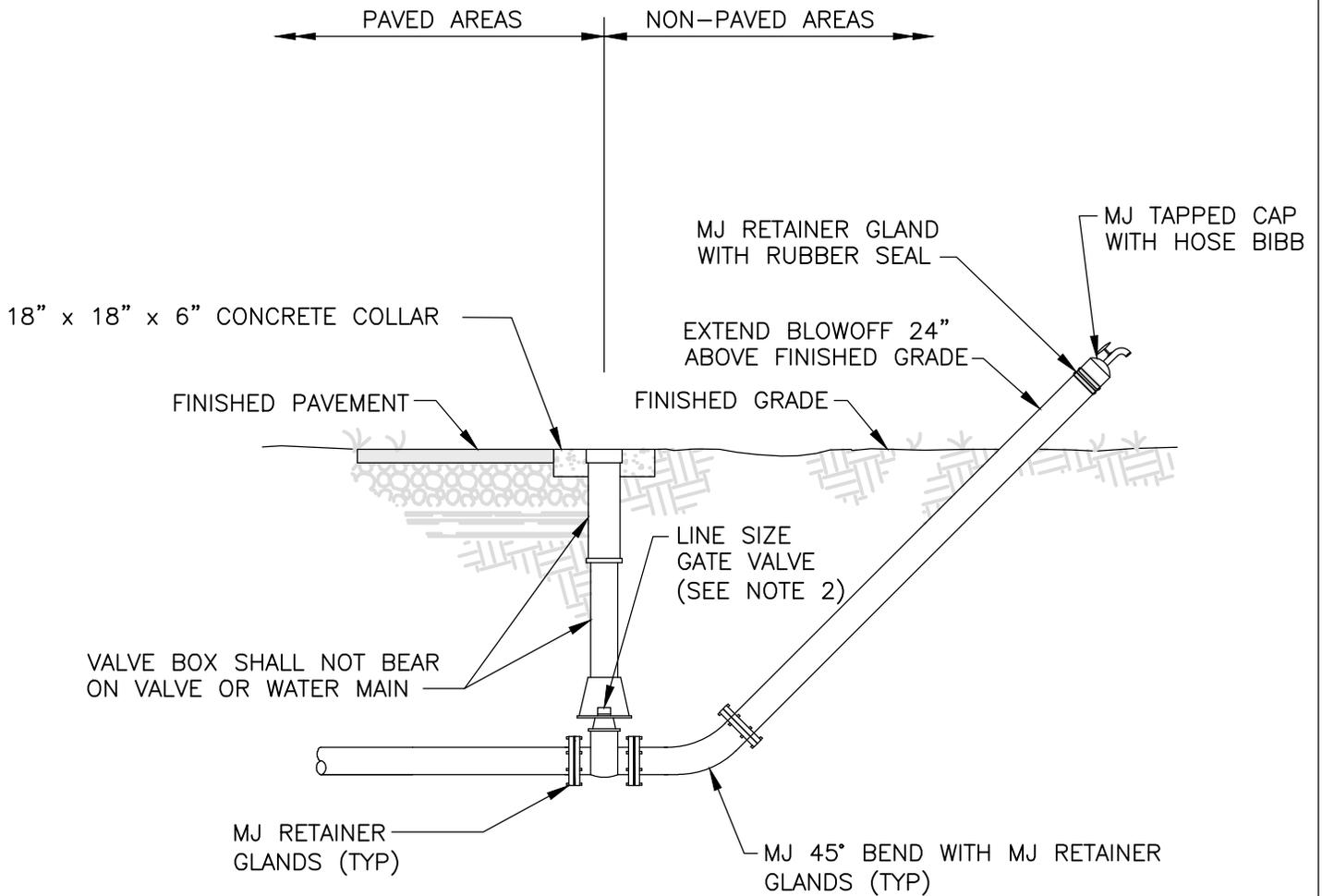
**REUSE SYSTEM STANDARD SERVICE CONNECTIONS
 OPEN/CLOSE VALVE SINGLE CONTROL PANEL SITE
 TYPICAL RTU ANTENNA TOWER DETAILS**

REVISION DATE:
 AUGUST 2008



SHEET NO.
 NP-E9

NTS



SIDE VIEW

NOTES:

1. MJ TAPPED CAP WITH HOSE BIBB IS TO BE REMOVED AFTER INITIAL BACTERIOLOGICAL CLEARANCE AND PRIOR TO WATER MAIN ACCEPTANCE.
2. SEE TECHNICAL SPECIFICATIONS SECTION 331200 FOR GATE VALVE AND VALVE BOX REQUIREMENTS.
3. ALL COMPONENTS THAT COME INTO CONTACT WITH DRINKING WATER SHALL CONFORM TO NSF STANDARD 61.

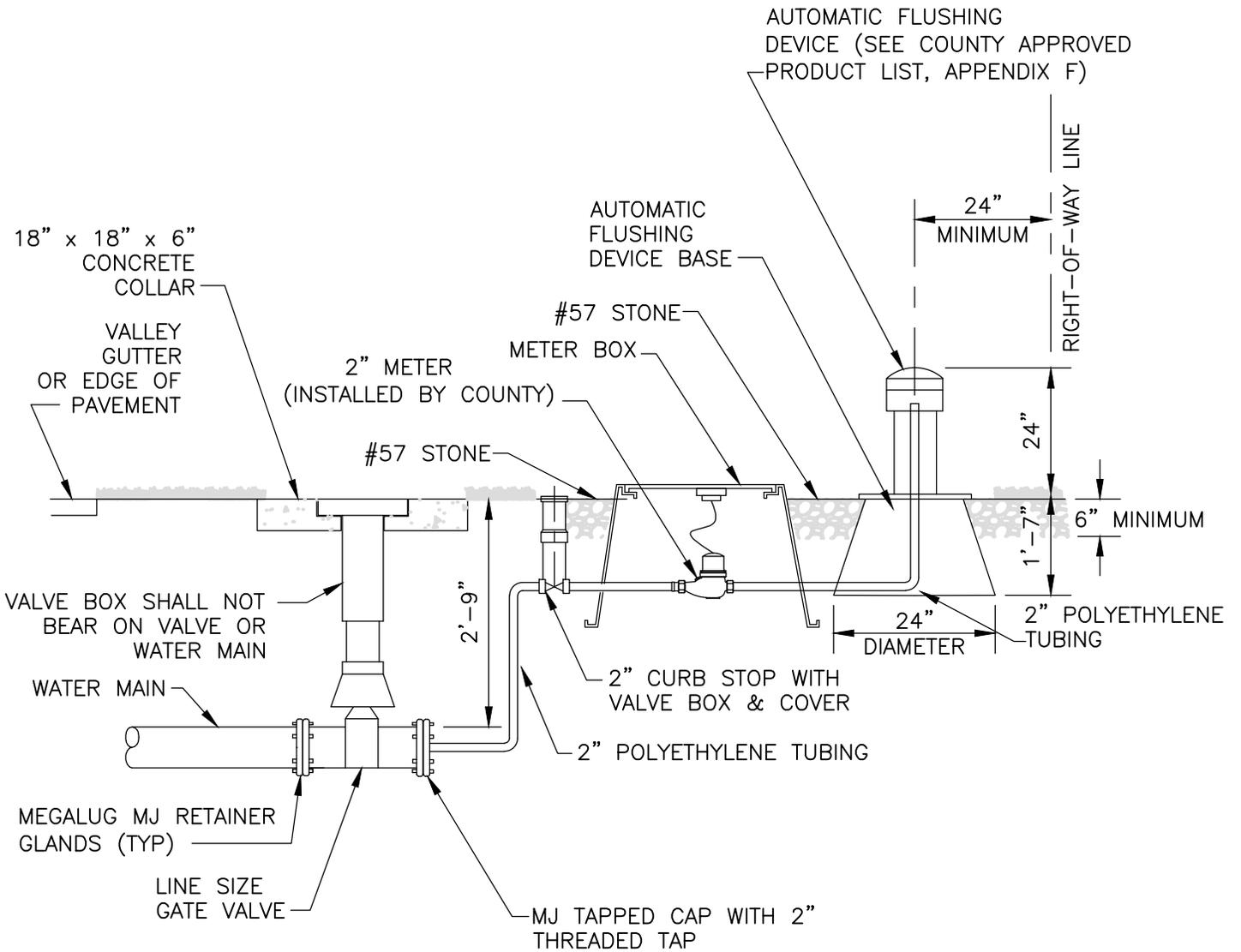
**TEMPORARY BLOWOFF
ASSEMBLY WITH BACTERIAL
SAMPLING POINT DETAIL**

NTS

REVISION DATE:
JANUARY 2014



SHEET NO.
W-1



NOTES:

1. PIPING SHALL BE INSTALLED UP TO 2" CURB STOP WITH VALVE BOX AND COVER AT TIME OF MAIN INSTALLATION.
2. AUTOMATIC FLUSHING DEVICE SHALL BE SHUT OFF UNTIL MAIN LINE HAS BEEN BACTERIOLOGICALLY TESTED.
3. SEE TECHNICAL SPECIFICATIONS SECTION 331200 FOR GATE VALVE AND VALVE BOX REQUIREMENTS.
4. AT TIME OF ACCEPTANCE, WATER DEPARTMENT WILL INSTALL 2" METER.
5. ALL COMPONENTS THAT COME INTO CONTACT WITH DRINKING WATER SHALL CONFORM TO NSF STANDARD 61.

**AUTOMATIC WATER MAIN
FLUSHING DEVICE DETAIL**

NTS

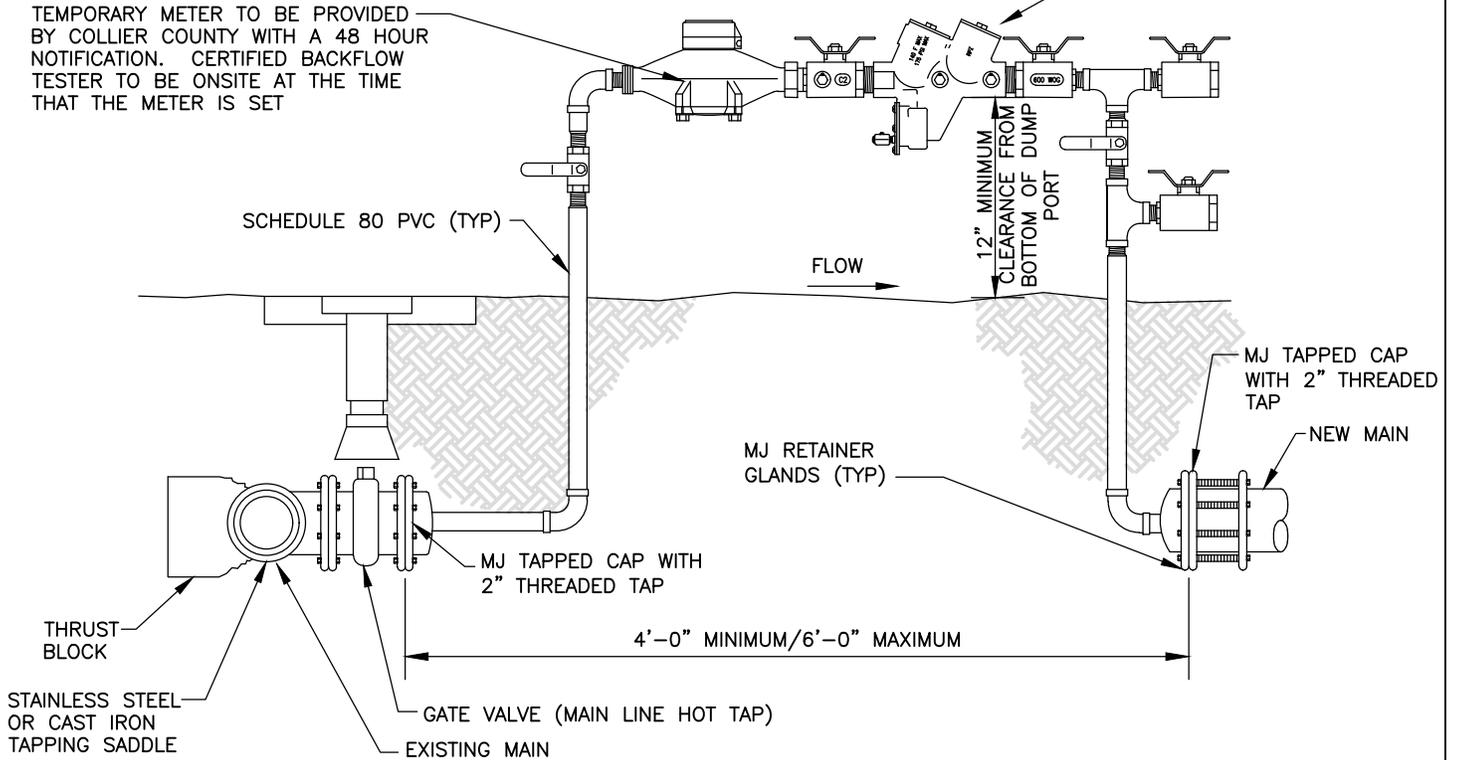
REVISION DATE:
JANUARY 2014



SHEET NO.
W-2

REDUCED PRESSURE PRINCIPLE BACKFLOW PREVENTER ASSEMBLY (PROVIDED BY CONTRACTOR) SUPPLIED WITH AMMONIA AND CHLORINE RESISTANT SEATS AND SILICONE RUBBER SEALS. INSTALLATION AS REQUIRED BY COUNTY ORDINANCE AND AWWA M-14 STANDARDS (SEE APPROVED BACKFLOW DEVICES, APPENDIX G)

TEMPORARY METER TO BE PROVIDED BY COLLIER COUNTY WITH A 48 HOUR NOTIFICATION. CERTIFIED BACKFLOW TESTER TO BE ONSITE AT THE TIME THAT THE METER IS SET



NOTES:

1. FINAL CONNECTION TO BE WITNESSED BY COLLIER COUNTY WATER DISTRIBUTION.
2. MJ TAPPED CAPS TO BE PROPERLY RESTRAINED.
3. INSTALL JUMPER TAP SYSTEM FOR TEMPORARY METER DOWNSTREAM OF BLIND FLANGE FOR CONSTRUCTION WATER.
4. TAPPING SADDLES MAY BE EITHER STAINLESS STEEL OR DUCTILE IRON. ALL TAPPING SADDLES FOR ASBESTOS CEMENT PIPE SHALL BE STAINLESS STEEL.
5. JUMPER ASSEMBLY MUST BE MINIMUM OF 18" ABOVE FINISHED GRADE.
6. BACKFLOW ASSEMBLY REQUIRES INITIAL CERTIFICATION BY CERTIFIED BACKFLOW TESTER.
7. THIS ASSEMBLY SHALL ONLY BE USED IF NO COMBUSTIBLES WILL BE ON SITE. IF COMBUSTIBLES ARE BROUGHT ON SITE, THEN THE TEMPORARY BACKFLOW PREVENTERS AND FIRE PROTECTION METER TIE-IN ASSEMBLY SHALL BE USED.
8. THIS ASSEMBLY IS NOT APPROVED TO PROVIDE FIRE PROTECTION WATER TO THE SITE DURING CONSTRUCTION. ASSEMBLY NOT TO BE REMOVED AND SPOOL PIECE INSTALLED FOR FINAL CONNECTION UNTIL AFTER TESTING, BACTERIAL CLEARANCE, FINAL INSPECTION AND COUNTY ACCEPTANCE.
9. GAP CONFIGURATION TO BE INSTALLED WITHIN 24 HOURS OR LESS AT THE DISCRETION OF THE WATER DISTRIBUTION DEPARTMENT.
10. ALL COMPONENTS THAT COME INTO CONTACT WITH DRINKING WATER SHALL CONFORM TO NSF STANDARD 61.
11. FOR INSTALLATIONS WHERE LESS THAN 20' OF NEW WATER MAIN IS BEING CONSTRUCTED BETWEEN THE PERMANENT BACKFLOW ASSEMBLY AND THE EXISTING MAIN, NO TEMPORARY JUMPER IS REQUIRED.

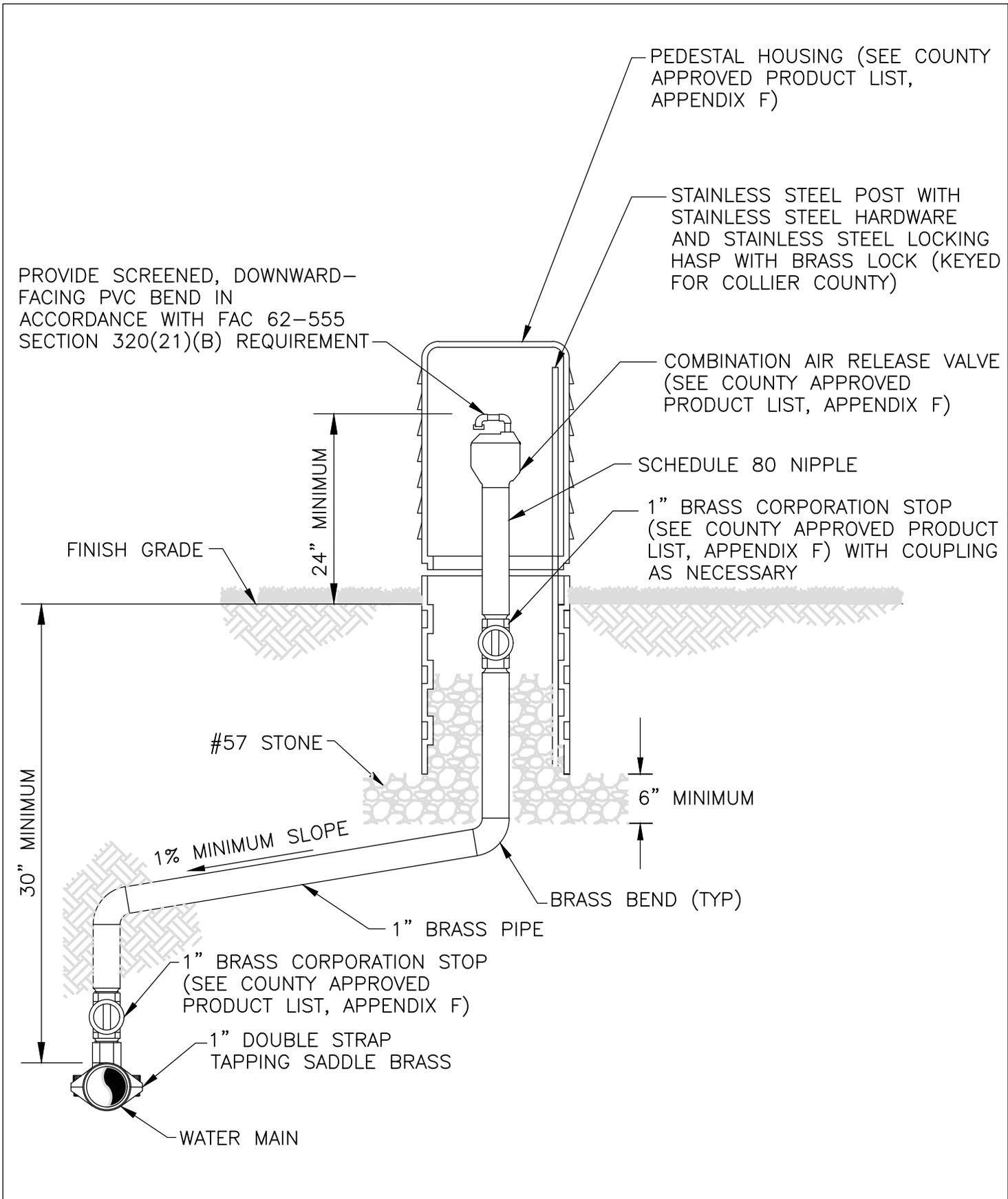
**CONNECTION TO EXISTING WATER MAIN
DETAIL
(GAP CONFIGURATION)**

NTS

REVISION DATE: JULY 2018



SHEET NO.
W-4



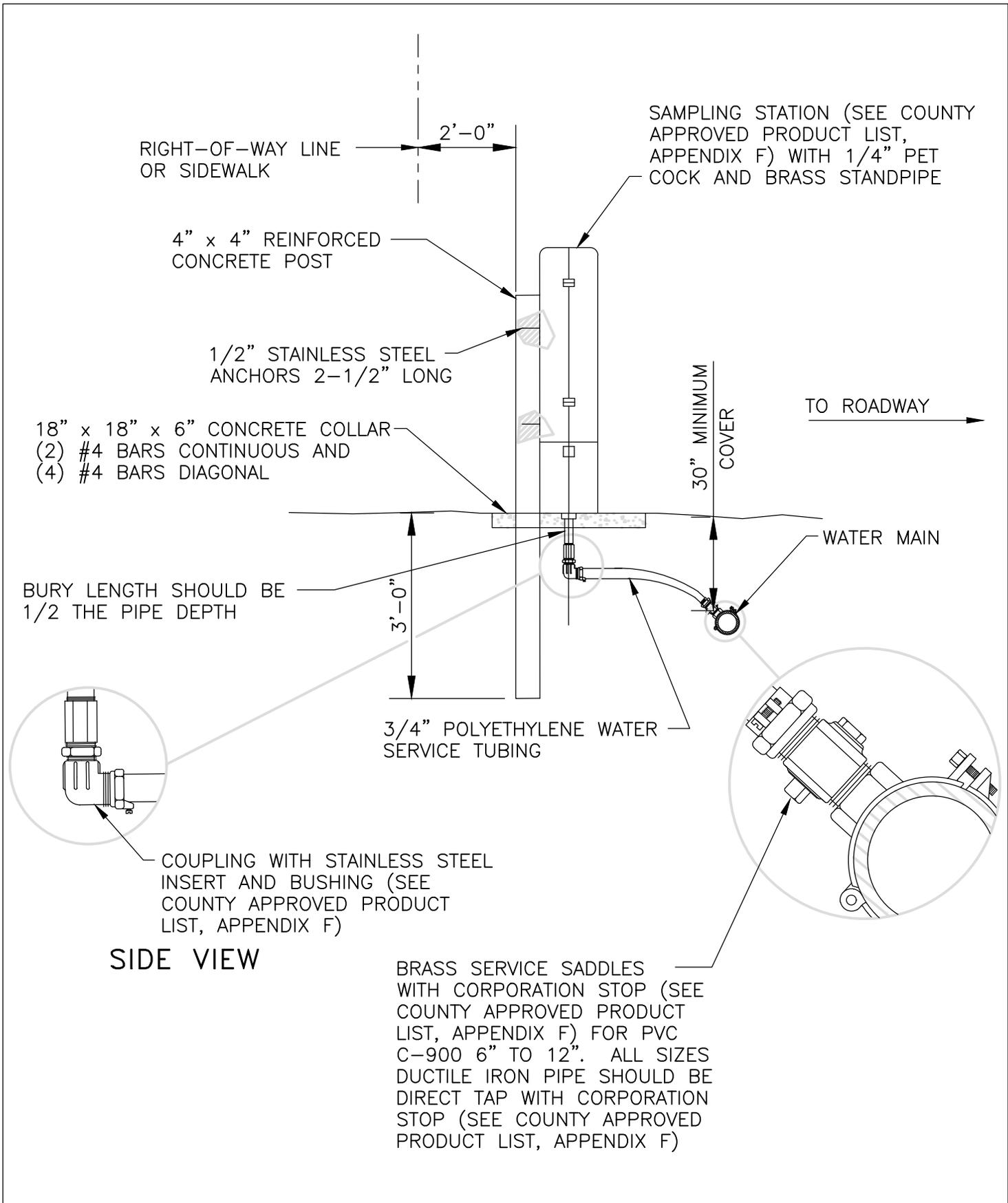
**POTABLE WATER
AIR RELEASE VALVE DETAIL**

NTS

REVISION DATE:
AUGUST 2008



SHEET NO.
W-5



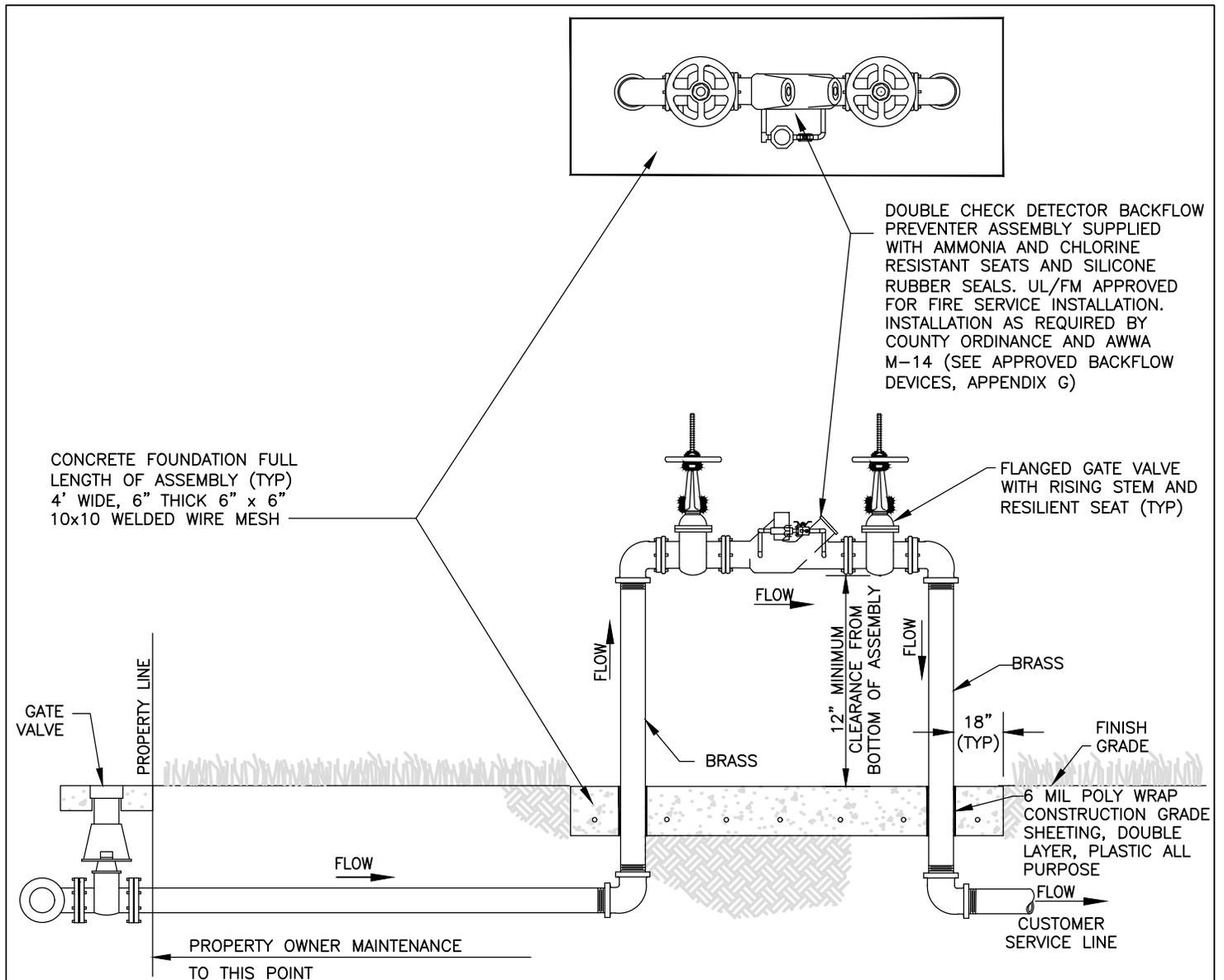
**PERMANENT BACTERIAL
SAMPLE POINT DETAIL**

NTS

REVISION DATE:
JANUARY 2025



SHEET NO.
W-6



NOTES:

1. ASSEMBLY WILL BE OWNED AND MAINTAINED BY PROPERTY OWNER, STARTING AFTER THE INLINE GATE VALVE AT THE PROPERTY LINE OR RIGHT-OF-WAY LINE.
2. COUNTY WILL REQUIRE DEDICATION OF MATERIAL UP TO AND INCLUDING THE INLINE GATE VALVE FROM THE COUNTY'S WATER MAIN.
3. BACKFLOW DEVICE REQUIRES INITIAL CERTIFICATION BY AN APPROVED CERTIFIED TESTER WITH RESULTS AND ANNUAL TEST RESULTS SUBMITTED TO THE COUNTY WATER DEPARTMENT.
4. ALL PLANTING SHALL BE A MINIMUM OF 3' FROM EDGE OF SLAB, AND SHALL PROVIDE A 3' ACCESS OPENING.
5. THIS ASSEMBLY SHALL BE PAINTED WITH RED EPOXY PAINT.
6. ALL COMPONENTS THAT COME INTO CONTACT WITH DRINKING WATER SHALL CONFORM TO NSF STANDARD 61.
7. A REDUCED PRESSURE DETECTOR BACKFLOW ASSEMBLY SHALL BE USED WHEN HIGH HAZARDS, AS DEFINED BY AWWA M-14 (e.g., RISK OF CHEMICAL ADDITION, MEDICAL FACILITIES, INDUSTRIAL FACILITIES, PROPERTIES USING RECLAIMED WATER, ETC.), EXIST.
8. ALL ABOVE GROUND PIPING SHALL BE BRASS.

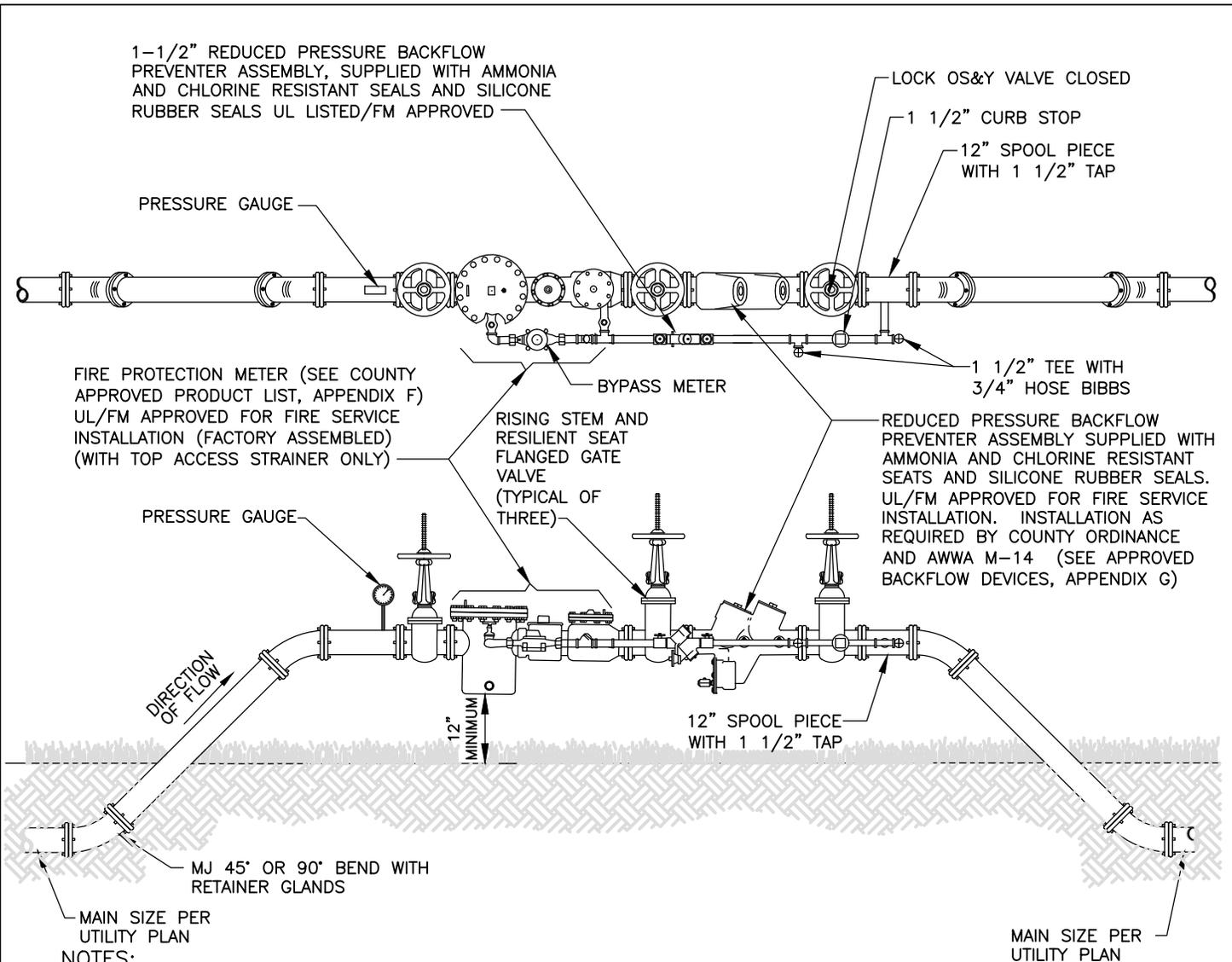
**2-1/2" AND SMALLER FIRE SYSTEM
DETECTOR CHECK ASSEMBLY DETAIL**

NTS

REVISION DATE:
JULY 2018



SHEET NO.
W-8



NOTES:

1. ALL ABOVE GROUND PIPE SHALL BE FLANGED END DUCTILE IRON PIPE, PRESSURE CLASS 350. ALL NUTS AND BOLTS SHALL BE STAINLESS STEEL.
2. WATER MAIN EXTENSION AND ASSEMBLY IS REQUIRED TO BE FLUSHED, CHLORINATED AND GIVEN BACTERIAL CLEARANCE BY THE WATER DEPARTMENT LAB BEFORE PLACEMENT IN SERVICE.
3. BACKFLOW UNIT AND METER REQUIRES INITIAL CERTIFICATION FOR OPERATION AND ACCURACY WITH RESULTS AND ANNUAL TESTS SUBMITTED TO THE COLLIER COUNTY WATER DEPARTMENT FOR RECERTIFICATION.
4. INSPECTIONS ARE REQUIRED FOR SYSTEM TIE-IN AND ASSEMBLY CONNECTION.
5. ALL PLANTINGS SHALL BE A MINIMUM OF 1.5' FROM THE EDGE OF SLAB, AND SHALL PROVIDE A 3' ACCESS OPENING.
6. ALL COMPONENTS THAT COME INTO CONTACT WITH DRINKING WATER SHALL CONFORM TO NSF STANDARD 61.
7. THIS ASSEMBLY SHALL BE PAINTED WITH RED EPOXY PAINT.
8. A 4'X8' SIGN WITH 3" LETTERS OR BIGGER SHALL READ: IN CASE OF FIRE OPEN VALVE.

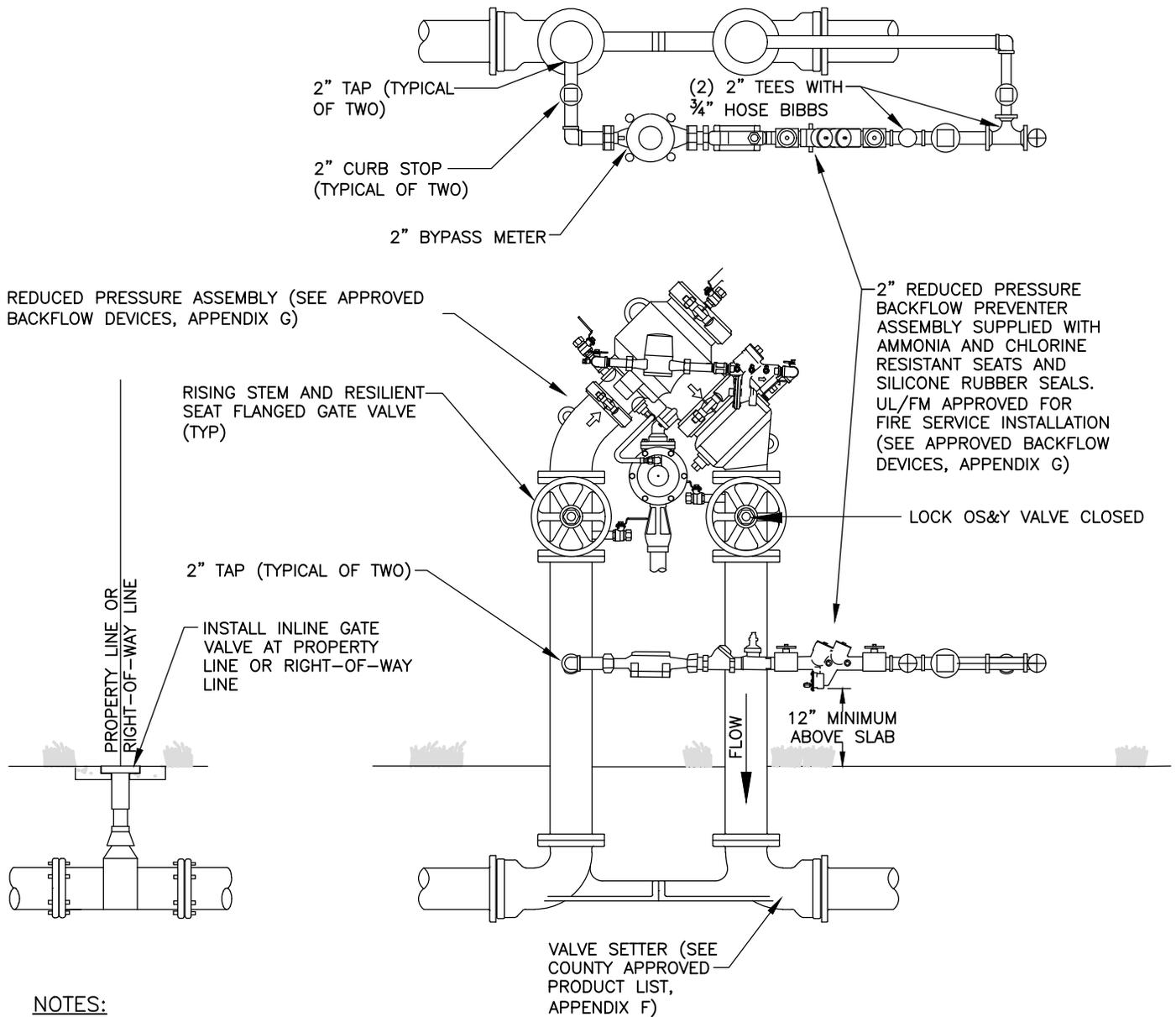
**TEMPORARY BACKFLOW PREVENTER
AND FIRE PROTECTION METER
TIE-IN ASSEMBLY**

NTS

REVISION DATE: JANUARY 2009



SHEET NO.
W-9



NOTES:

1. ALL ABOVE GROUND PIPE SHALL BE FLANGED END DUCTILE IRON PIPE, PRESSURE CLASS 350. ALL NUTS AND BOLTS SHALL BE STAINLESS STEEL.
2. WATER MAIN EXTENSION AND ASSEMBLY IS REQUIRED TO BE FLUSHED, CHLORINATED AND GIVEN BACTERIAL CLEARANCE BY THE WATER DEPARTMENT LAB BEFORE PLACEMENT IN SERVICE.
3. BACKFLOW UNIT AND METER REQUIRES INITIAL CERTIFICATION FOR OPERATION AND ACCURACY WITH RESULTS AND ANNUAL TESTS SUBMITTED TO THE COLLIER COUNTY WATER DEPARTMENT FOR RECERTIFICATION.
4. INSPECTIONS ARE REQUIRED FOR SYSTEM TIE-IN AND ASSEMBLY CONNECTION.
5. ALL PLANTINGS SHALL BE A MINIMUM OF 1.5' FROM THE EDGE OF SLAB, AND SHALL PROVIDE A 3' ACCESS OPENING.
6. ALL COMPONENTS THAT COME INTO CONTACT WITH DRINKING WATER SHALL CONFORM TO NSF STANDARD 61.
7. A 4'X8' SIGN WITH 3" LETTERS OR BIGGER SHALL READ: IN CASE OF FIRE OPEN VALVE.

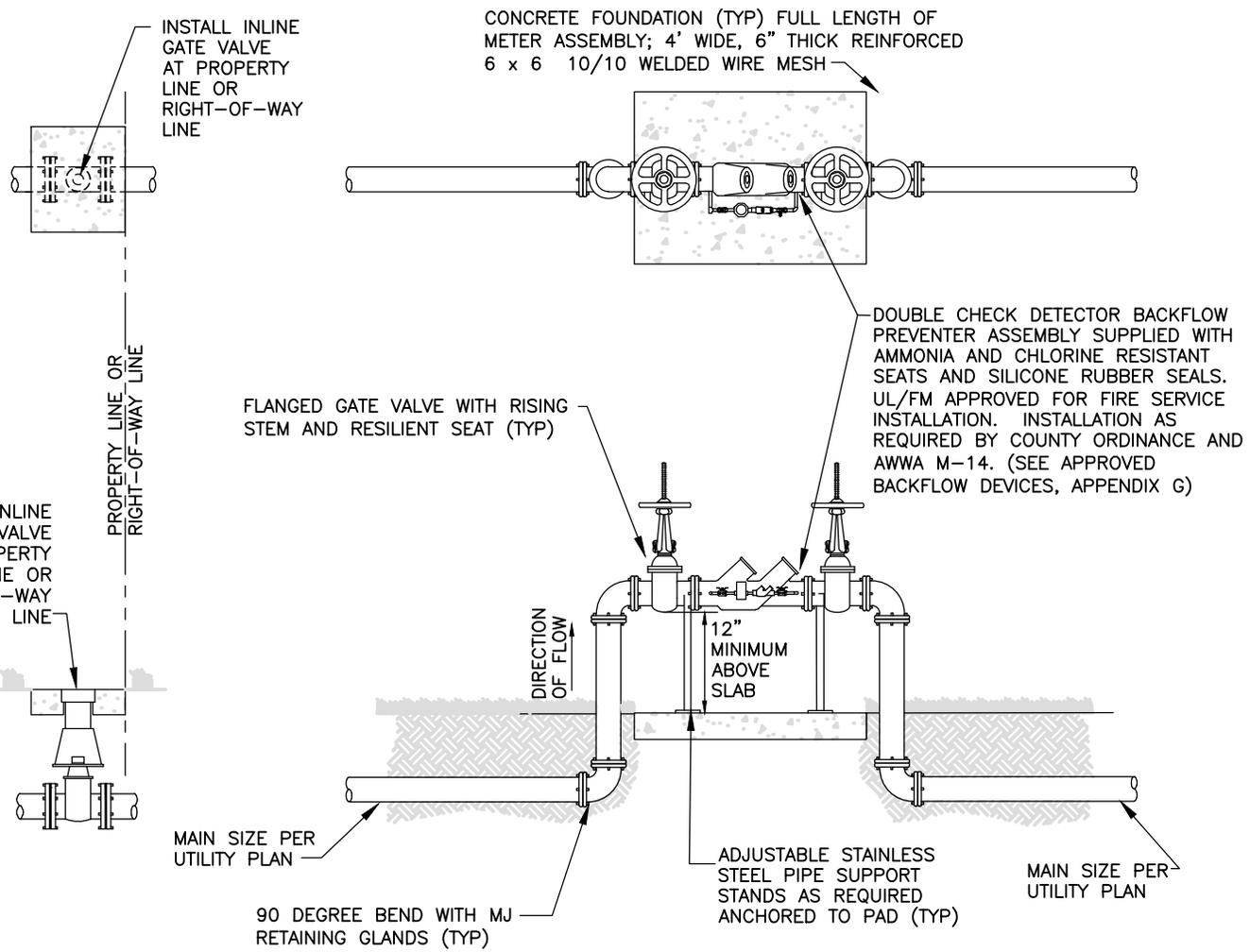
ALTERNATE TEMPORARY BACKFLOW PREVENTER AND FIRE PROTECTION METER TIE-IN ASSEMBLY

NTS

REVISION DATE:
JANUARY 2009



SHEET NO.
W-9A



NOTES:

1. ALL ABOVE GROUND PIPE WILL HAVE FLANGED END DUCTILE IRON PIPE, PRESSURE CLASS 350. ALL NUTS AND BOLTS SHALL BE STAINLESS STEEL.
2. (4) VEHICULAR GUARD POSTS TO BE INSTALLED AROUND ASSEMBLY.
3. AS THIS UNIT WILL REQUIRE PERIODIC TESTING, FACILITIES REQUIRING CONTINUOUS WATER SERVICE MAY WISH TO INSTALL PARALLEL UNITS TO PREVENT SERVICE INTERRUPTIONS.
4. ASSEMBLY WILL BE OWNED AND MAINTAINED BY PROPERTY OWNER, STARTING AFTER THE INLINE GATE VALVE AT THE PROPERTY LINE OR RIGHT-OF-WAY LINE.
5. COUNTY WILL REQUIRE DEDICATION OF MATERIAL UP TO AND INCLUDING THE INLINE GATE VALVE FROM THE FROM THE COUNTY'S WATER MAIN.
6. BACKFLOW DEVICE REQUIRES INITIAL CERTIFICATION BY AN APPROVED CERTIFIED TESTER WITH RESULTS AND ANNUAL TEST RESULTS SUBMITTED TO THE COUNTY WATER DEPARTMENT.
7. ALL PLANTING SHALL BE A MINIMUM OF 3' FROM THE EDGE OF SLAB, AND SHALL PROVIDE A 3' ACCESS OPENING.
8. THIS ASSEMBLY SHALL BE PAINTED WITH RED EPOXY PAINT.
9. ALL COMPONENTS THAT COME INTO CONTACT WITH DRINKING WATER SHALL CONFORM TO NSF STANDARD 61.
10. A REDUCED PRESSURE DETECTOR BACKFLOW ASSEMBLY SHALL BE USED WHEN HIGH HAZARDS, AS DEFINED BY AWWA M-14 (e.g., RISK OF CHEMICAL ADDITION, MEDICAL FACILITIES, INDUSTRIAL FACILITIES, PROPERTIES USING RECLAIMED WATER, ETC.), EXIST.

**3" AND LARGER FIRE
SYSTEM DETECTOR CHECK
ASSEMBLY DETAIL**

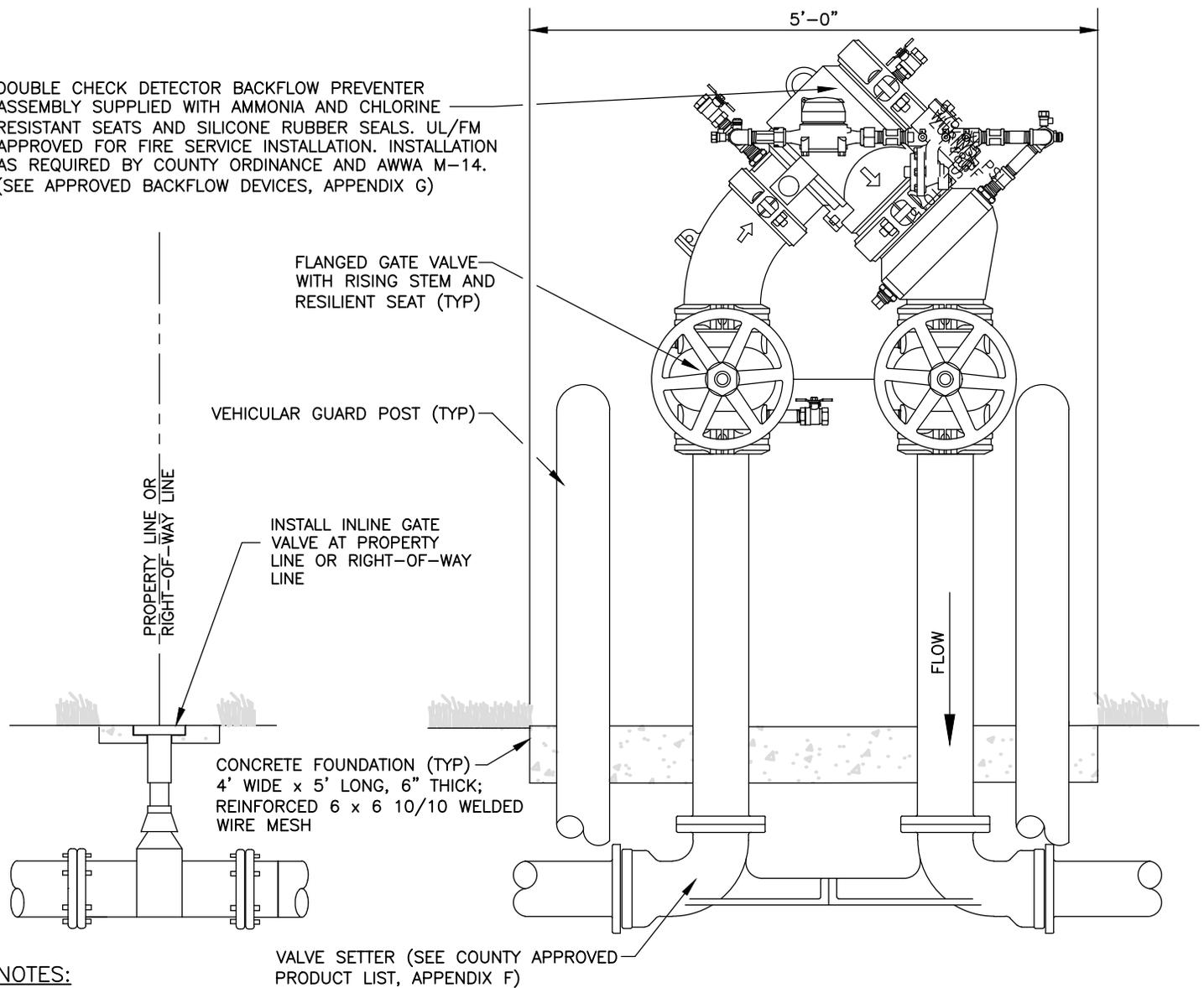
NTS

REVISION DATE:
JULY 2018



SHEET NO.
W-11

DOUBLE CHECK DETECTOR BACKFLOW PREVENTER ASSEMBLY SUPPLIED WITH AMMONIA AND CHLORINE RESISTANT SEATS AND SILICONE RUBBER SEALS. UL/FM APPROVED FOR FIRE SERVICE INSTALLATION. INSTALLATION AS REQUIRED BY COUNTY ORDINANCE AND AWWA M-14. (SEE APPROVED BACKFLOW DEVICES, APPENDIX G)



NOTES:

1. ALL ABOVE GROUND PIPE WILL HAVE FLANGED END DUCTILE IRON PIPE, PRESSURE CLASS 350. ALL NUTS AND BOLTS SHALL BE STAINLESS STEEL.
2. (4) VEHICULAR GUARD POSTS TO BE INSTALLED AROUND ASSEMBLY. CONFIGURATION TO BE ILLUSTRATED ON CONSTRUCTION DOCUMENTS SUBMITTED FOR REVIEW AND APPROVAL.
3. AS THIS UNIT WILL REQUIRE PERIODIC TESTING, FACILITIES REQUIRING CONTINUOUS WATER SERVICE MAY WISH TO INSTALL PARALLEL UNITS TO PREVENT SERVICE INTERRUPTIONS.
4. ASSEMBLY WILL BE OWNED AND MAINTAINED BY PROPERTY OWNER, STARTING AFTER THE INLINE GATE AT THE PROPERTY LINE OR RIGHT-OF-WAY LINE.
5. COUNTY WILL REQUIRE DEDICATION OF MATERIAL UP TO AND INCLUDING THE INLINE GATE VALVE FROM THE COUNTY'S WATER MAIN.
6. BACKFLOW DEVICE REQUIRES INITIAL CERTIFICATION BY AN APPROVED CERTIFIED TESTER WITH RESULTS AND ANNUAL TEST RESULTS SUBMITTED TO THE COUNTY WATER DEPARTMENT.
7. ALL PLANTING SHALL BE A MINIMUM OF 1.5' FROM THE EDGE OF SLAB, AND SHALL PROVIDE A 3' ACCESS OPENING.
8. THIS ASSEMBLY SHALL BE PAINTED WITH RED EPOXY PAINT.
9. ALL COMPONENTS THAT COME INTO CONTACT WITH DRINKING WATER SHALL CONFORM TO NSF STANDARD 61.
10. A REDUCED PRESSURE DETECTOR BACKFLOW ASSEMBLY SHALL BE USED WHEN HIGH HAZARDS, AS DEFINED BY AWWA M-14 (e.g., RISK OF CHEMICAL ADDITION, MEDICAL FACILITIES, INDUSTRIAL FACILITIES, PROPERTIES USING RECLAIMED WATER, ETC.), EXIST.

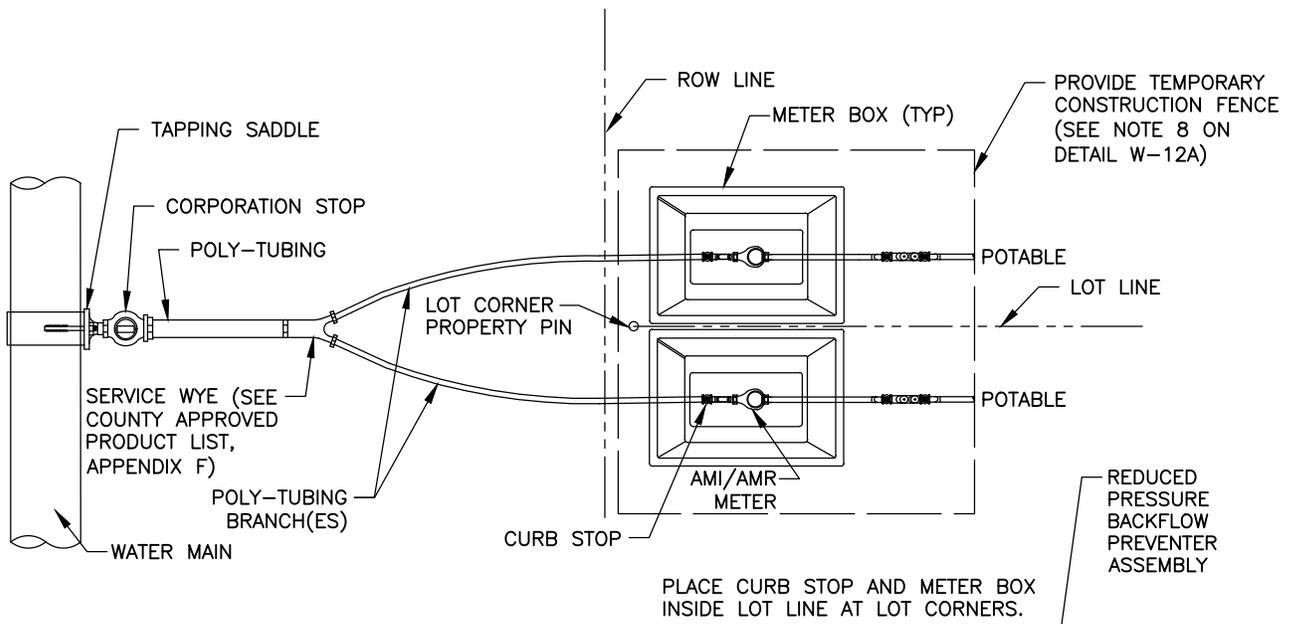
**4" THROUGH 10" ONLY COMPACT
FIRE SYSTEM DETECTOR CHECK
ASSEMBLY DETAIL**

NTS

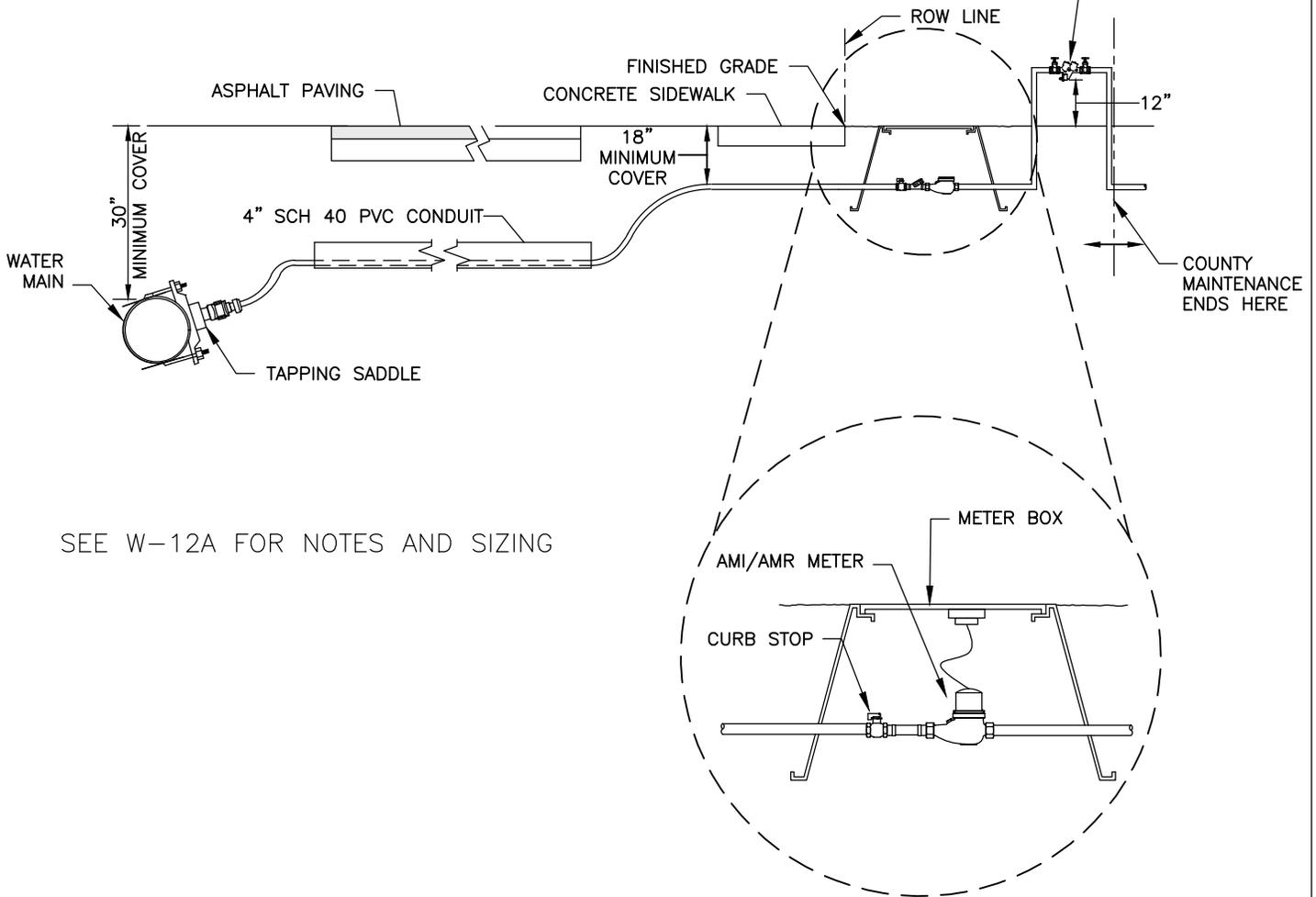
REVISION DATE:
JULY 2011



SHEET NO.
W-11A



PLACE CURB STOP AND METER BOX INSIDE LOT LINE AT LOT CORNERS.



SEE W-12A FOR NOTES AND SIZING

TYPICAL SHORT AND LONG SIDE WATER SERVICE METER SETTING DETAIL FOR CONNECTION TO WATER MAIN

NTS

REVISION DATE:
JANUARY 2025



SHEET NO.
W-12

SERVICE CONNECTION SIZING CHART

SINGLE SERVICE	CONNECTION TO MAIN	DOUBLE SERVICE	CONNECTION TO MAIN	BRANCH SIZE
¾" METER	1-½"	(2) ¾" METERS	1-½"	1"
1" METER	1-½"	(2) 1" METERS	1-½"	1"
1-½" METER	1-½"			
2" METER	2"			

NOTES:

1. 1-½" AND LARGER METERS SHALL BE SERVED BY SINGLE SERVICES ONLY.
2. WYE CONNECTORS (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) SHALL BE USED FOR MULTI-SERVICE. SUCCESSIVE TAPS INTO WATER MAIN WILL BE NO CLOSER THAN 24" APART.
3. ALL CASING PIPE SHALL EXTEND A MINIMUM OF 5' BEYOND THE EDGE OF PAVEMENT, WITH A CASING DIAMETER TO BE NO LESS THAN 4". CONDUIT SHALL BE MARKED WITH A ELECTRONIC MARKER (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F).
4. TAPPING SADDLE, CORPORATION STOP, POLY TUBING, CURB STOP, AND METER BOXES SHALL BE INSTALLED BY UNDERGROUND UTILITY CONTRACTOR AT THE TIME OF WATER MAIN INSTALLATION.
5. MATERIAL SPECIFICATIONS:
 - A. TAPPING SADDLES SHALL BE DOUBLE STRAP BRASS OR DUCTILE IRON (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F).
 - B. CORPORATION STOPS (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) SHALL BE BALL TYPE AND MADE OF RED BRASS. OUTLET SHALL BE COMPRESSION TYPE POLYETHYLENE TUBE. COMPRESSION INSERT SHALL BE STAINLESS STEEL.
 - C. CURB STOPS (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) SHALL BE BALL TYPE AND MADE OF RED BRASS. INLET SHALL BE COMPRESSION JOINT. OUTLET SHALL BE SWIVEL NUT FOR METER CONNECTION.
 - D. TUBING SHALL BE POLYETHYLENE, PE4710, (AWWA C-901, DR 9) AND BLUE IN COLOR.
6. ALL PLANTINGS SHALL BE A MINIMUM 3' FROM METER BOX, AND SHALL PROVIDE A 3' ACCESS OPENING.
7. ALL COMPONENTS THAT COME INTO CONTACT WITH DRINKING WATER SHALL CONFORM TO NSF STANDARD 61 AND THE REDUCTION OF LEAD IN DRINKING WATER ACT AMENDING THE SAFE DRINKING WATER ACT.
8. A TEMPORARY CONSTRUCTION FENCE SHALL BE INSTALLED AT WATER METER SETTINGS UNTIL BUILDING CERTIFICATE OF OCCUPANCY OR INSTALLATION OF SOD. THE EXISTING TEMPORARY CONSTRUCTION FENCE SHALL BE MODIFIED AS NECESSITATED BY LOT DEVELOPMENT. FENCE TO BE 3' IN HEIGHT AND OFFSET 3' FROM ASSEMBLY.

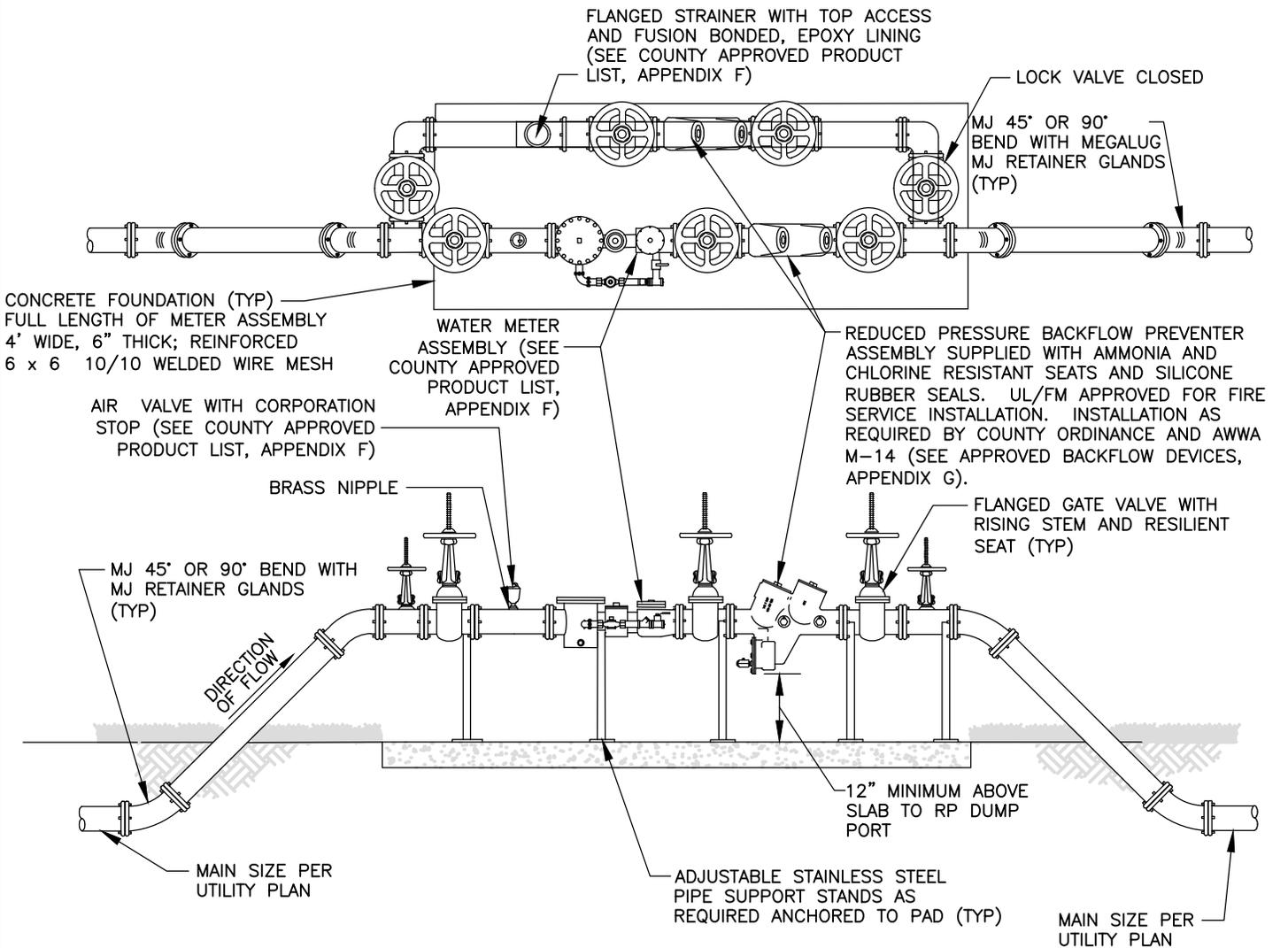
**SERVICE CONNECTION SIZING CHART
AND NOTES**

NTS

REVISION DATE:
JANUARY 2025



SHEET NO.
W-12A



NOTES:

1. ALL ABOVE GROUND PIPES WILL BE FLANGED END DUCTILE IRON PIPE, PRESSURE CLASS 350. ALL NUTS AND BOLTS SHALL BE STAINLESS STEEL.
2. (4) VEHICULAR GUARD POSTS TO BE INSTALLED AROUND METER. LOCATION TO BE FIELD DETERMINED BY THE ENGINEER OR HIS DESIGNEE.
3. THIS ASSEMBLY IS PERMITTED FOR POTABLE SERVICE ONLY.
4. A FULL SIZE BYPASS SHALL BE INSTALLED TO PREVENT A REDUCTION IN FLOW DURING PERIODIC TESTING.
5. BACKFLOW UNITS SHALL BE TESTED BY CERTIFIED BACKFLOW TECHNICIAN WITH TEST RESULTS SUBMITTED TO THE COUNTY WATER DEPARTMENT FOR CERTIFICATION AND APPROVAL.
6. COUNTY WILL REQUIRE DEDICATION OF ALL MATERIALS AND EQUIPMENT FROM THE METER ASSEMBLY BACK TO THE COUNTY WATER MAIN.
7. ALL PLANTINGS SHALL BE A MINIMUM OF 1.5' FROM EDGE OF SLAB, AND SHALL PROVIDE A 3' ACCESS OPENING.
8. ALL COMPONENTS THAT COME INTO CONTACT WITH DRINKING WATER SHALL CONFORM TO NSF STANDARD 61.
9. MAINTENANCE ACCESS SHALL BE INCLUDED IN COUNTY UTILITY EASEMENT OR RIGHT OF WAY (SEE DETAIL W-14A FOR CORRECT DRIVEWAY ORIENTATION).

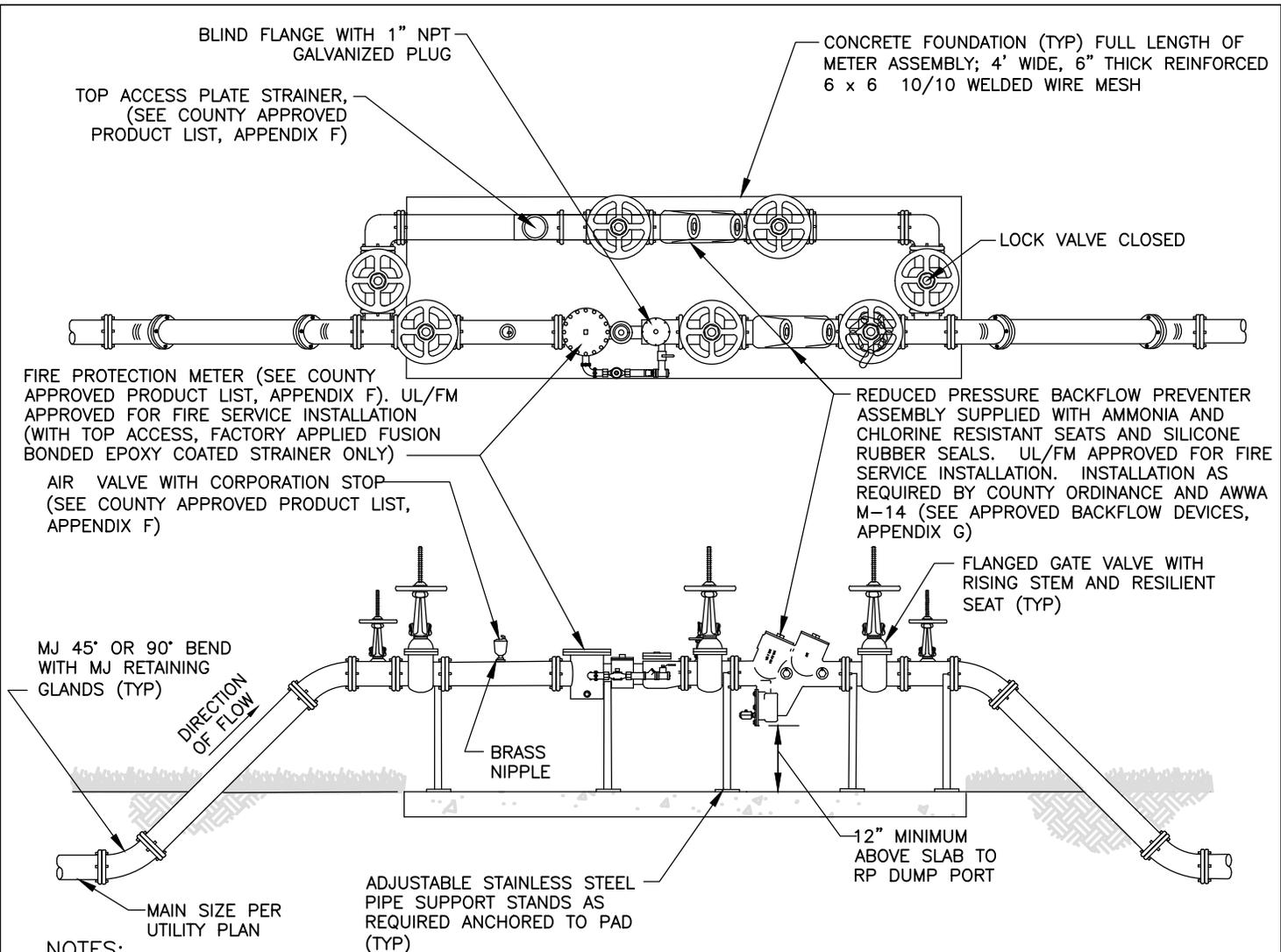
**3" AND OVER POTABLE WATER METER
ASSEMBLY DETAIL**

NTS

REVISION DATE:
JANUARY 2025



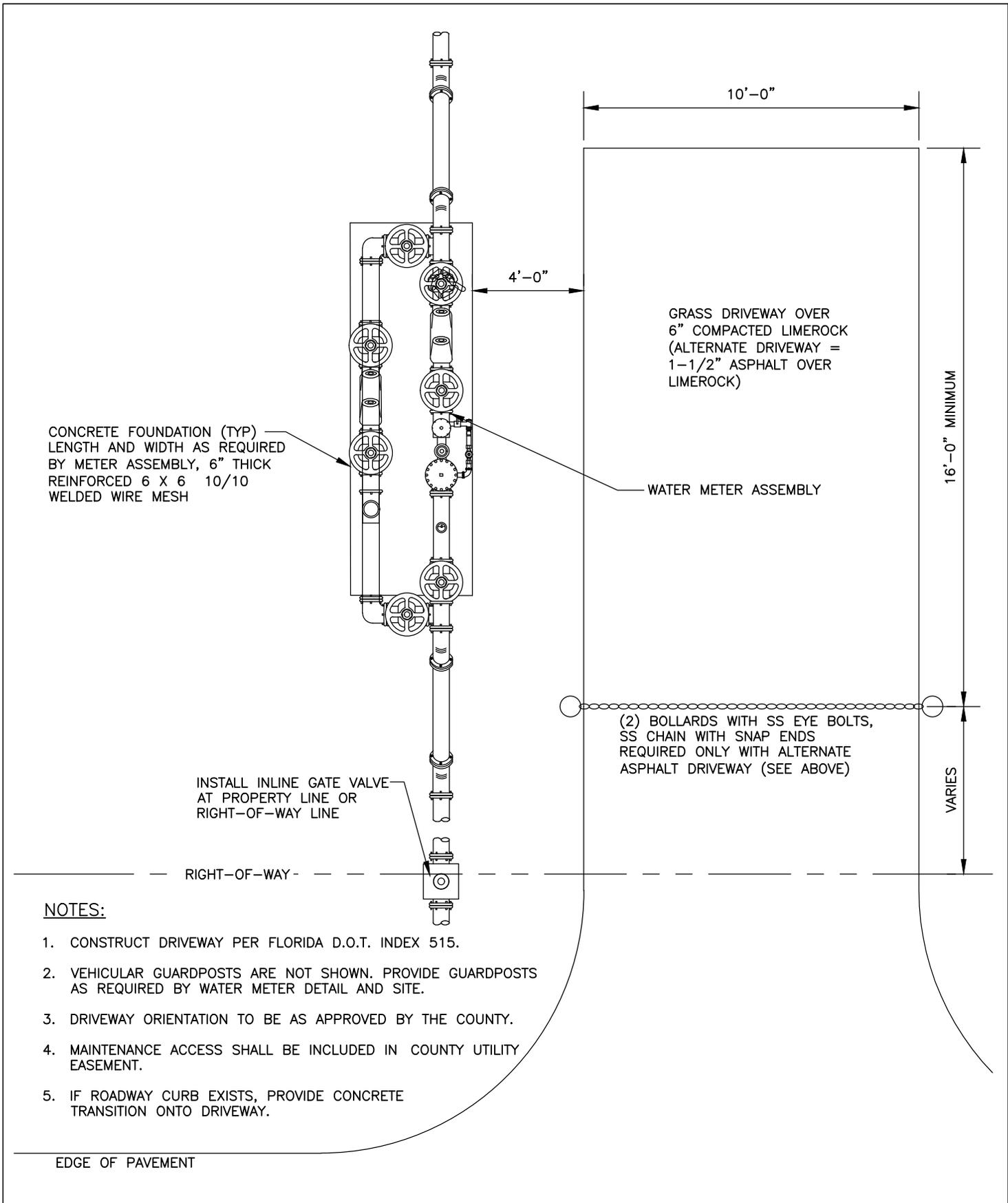
SHEET NO.
W-13



NOTES:

1. ALL ABOVE GROUND PIPE WILL HAVE FLANGED END DUCTILE IRON PIPE, PRESSURE CLASS 350. ALL NUTS AND BOLTS SHALL BE STAINLESS STEEL.
2. (4) VEHICULAR GUARD POSTS TO BE INSTALLED AROUND METER. CONFIGURATION TO BE ILLUSTRATED ON CONSTRUCTION DOCUMENTS SUBMITTED FOR REVIEW AND APPROVAL.
3. THIS ASSEMBLY IS PERMITTED FOR COMBINATION FIRE AND POTABLE WATER SERVICE.
4. A FULL SIZE BYPASS SHALL BE INSTALLED TO PREVENT A REDUCTION IN FLOW DURING PERIODIC TESTING.
5. BACKFLOW DEVICE REQUIRES INITIAL CERTIFICATION BY AN APPROVED CERTIFIED TESTER WITH RESULTS SUBMITTED TO THE COUNTY WATER DEPARTMENT.
6. COUNTY REQUIRES DEDICATION OF ALL ABOVE GROUND MATERIAL AND EQUIPMENT FROM THE METER ASSEMBLY BACK TO THE COUNTY MAIN.
7. ALL PLANTING SHALL BE A MINIMUM OF 1.5' FROM THE EDGE OF SLAB, AND SHALL PROVIDE A 3' ACCESS OPENING.
8. STRAINER SHALL HAVE FUSION-BONDED EPOXY COATING.
9. ALL COMPONENTS THAT COME INTO CONTACT WITH DRINKING WATER SHALL CONFORM TO NSF STANDARD 61.
10. MAINTENANCE ACCESS SHALL BE INCLUDED IN COUNTY UTILITY EASEMENT OR RIGHT OR RIGHT OF WAY (SEE DETAIL W-14A FOR CORRECT DRIVEWAY ORIENTATION),

<p>4" AND OVER POTABLE-WATER FIRE AND DOMESTIC METER ASSEMBLY DETAIL</p>	<p>REVISION DATE: JANUARY 2025</p>		<p>SHEET NO. W-14</p>
	<p>NTS</p>		



CONCRETE FOUNDATION (TYP)
 LENGTH AND WIDTH AS REQUIRED
 BY METER ASSEMBLY, 6" THICK
 REINFORCED 6 X 6 10/10
 WELDED WIRE MESH

GRASS DRIVEWAY OVER
 6" COMPACTED LIMEROCK
 (ALTERNATE DRIVEWAY =
 1-1/2" ASPHALT OVER
 LIMEROCK)

WATER METER ASSEMBLY

INSTALL INLINE GATE VALVE
 AT PROPERTY LINE OR
 RIGHT-OF-WAY LINE

(2) BOLLARDS WITH SS EYE BOLTS,
 SS CHAIN WITH SNAP ENDS
 REQUIRED ONLY WITH ALTERNATE
 ASPHALT DRIVEWAY (SEE ABOVE)

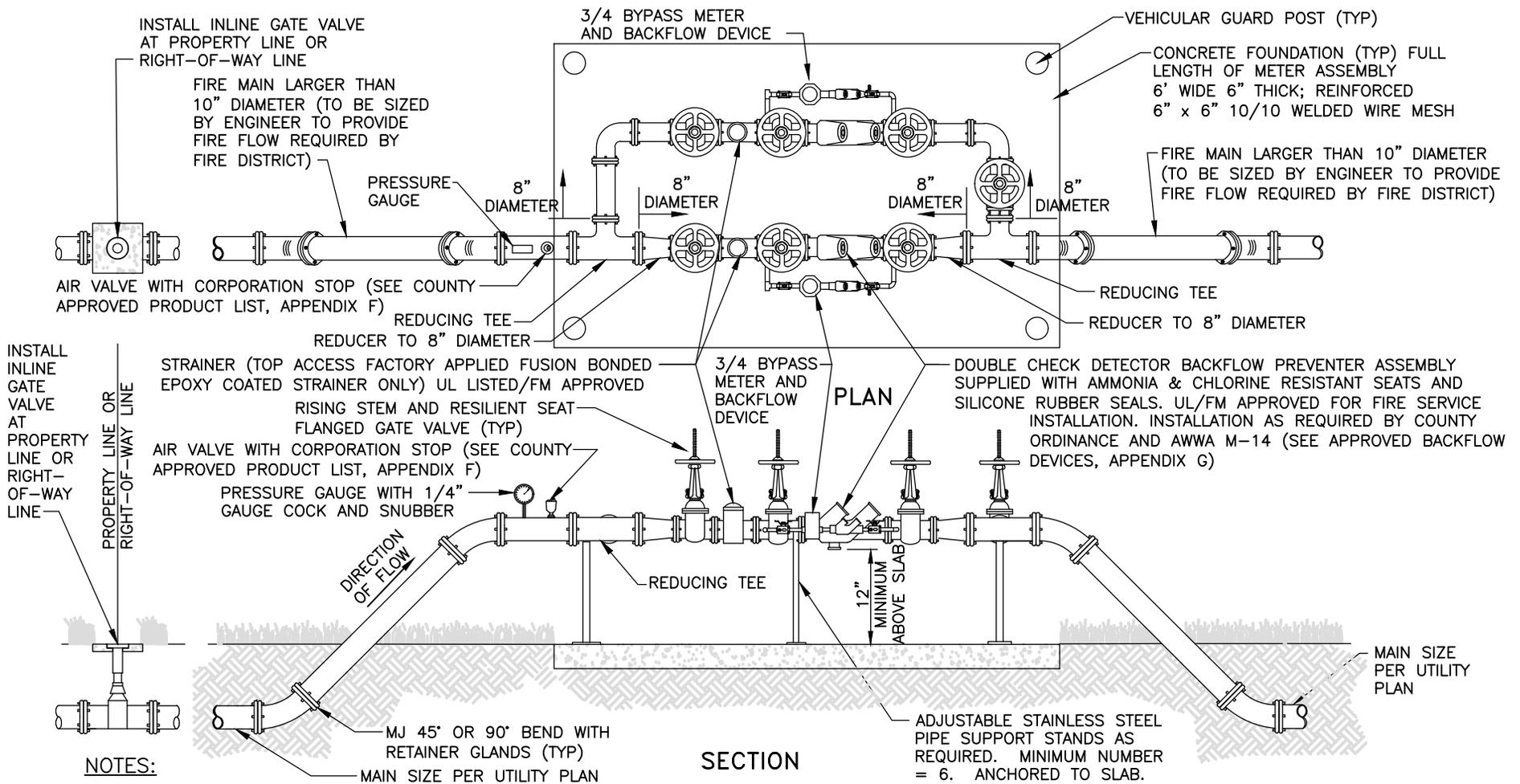
RIGHT-OF-WAY

NOTES:

1. CONSTRUCT DRIVEWAY PER FLORIDA D.O.T. INDEX 515.
2. VEHICULAR GUARDPOSTS ARE NOT SHOWN. PROVIDE GUARDPOSTS AS REQUIRED BY WATER METER DETAIL AND SITE.
3. DRIVEWAY ORIENTATION TO BE AS APPROVED BY THE COUNTY.
4. MAINTENANCE ACCESS SHALL BE INCLUDED IN COUNTY UTILITY EASEMENT.
5. IF ROADWAY CURB EXISTS, PROVIDE CONCRETE TRANSITION ONTO DRIVEWAY.

EDGE OF PAVEMENT

<p>MAINTENANCE DRIVEWAY FOR WATER METERS 3" AND LARGER</p>	<p>REVISION DATE: JULY 2018</p>	<p>Collier County</p>	<p>SHEET NO. W-14A</p>
	<p>NTS</p>		



NOTES:

1. ALL ABOVE GROUND PIPE WILL HAVE FLANGED END DUCTILE IRON PIPE PRESSURE CLASS 350, ALL NUTS & BOLTS SHALL BE STAINLESS STEEL.
2. (4) VEHICULAR GUARD POSTS TO BE INSTALLED AROUND ASSEMBLY. CONFIGURATION TO BE ILLUSTRATED ON CONSTRUCTION DOCUMENTS SUBMITTED FOR REVIEW AND APPROVAL.
3. ASSEMBLY WILL BE OWNED AND MAINTAINED BY PROPERTY OWNER, STARTING AFTER THE INLINE GATE VALVE AT THE PROPERTY LINE OR RIGHT-OF-WAY LINE.
4. COUNTY WILL REQUIRE DEDICATION OF MATERIAL UP TO AND INCLUDING THE INLINE GATE VALVE FROM THE COUNTY'S WATER MAIN.
5. BACKFLOW DEVICE REQUIRES INITIAL CERTIFICATION BY AN APPROVED CERTIFIED TESTER WITH RESULTS AND ANNUAL TEST RESULTS SUBMITTED TO THE COUNTY WATER DEPARTMENT.
6. ALL PLANTING SHALL BE A MINIMUM OF 1.5' FROM THE EDGE OF SLAB, AND SHALL PROVIDE A 3' ACCESS OPENING.
7. THIS ASSEMBLY SHALL BE PAINTED WITH RED EPOXY PAINT.
8. ALL COMPONENTS THAT COME INTO CONTACT WITH DRINKING WATER SHALL CONFORM TO NSF STANDARD 61.
9. A REDUCED PRESSURE DETECTOR BACKFLOW ASSEMBLY SHALL BE USED WHEN HIGH HAZARDS, AS DEFINED BY AWWA M-14 (e.g., RISK OF CHEMICAL ADDITION, MEDICAL FACILITIES, INDUSTRIAL FACILITIES, PROPERTIES USING RECLAIMED WATER, ETC.), EXIST.

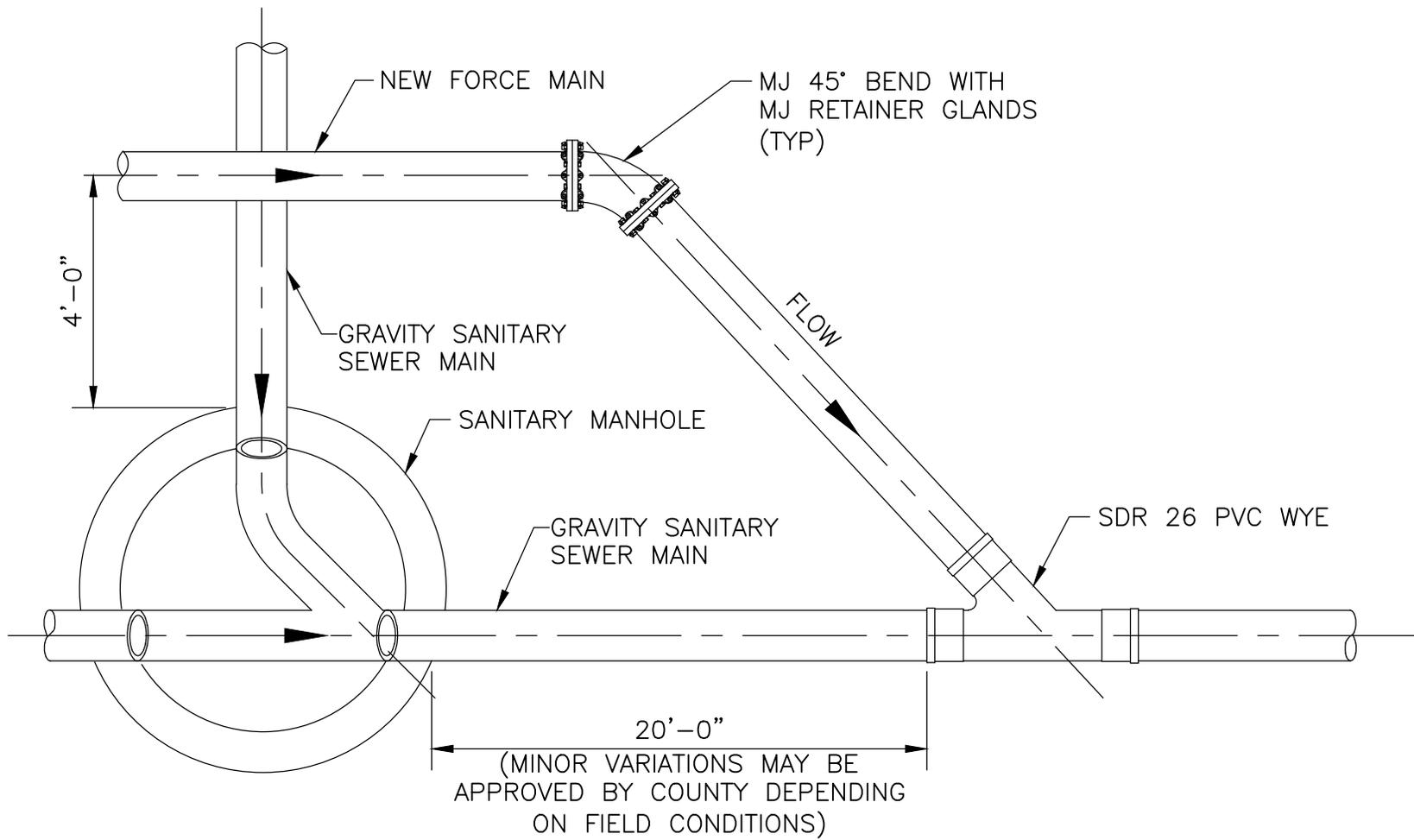
**FIRE SERVICE DUAL DETECTOR CHECK ASSEMBLY
OVER 10" FIRE MAIN DETAIL (DUAL 8" ASSEMBLIES)**

REVISION DATE:	JULY 2011



SHEET NO.
W-16

NTS



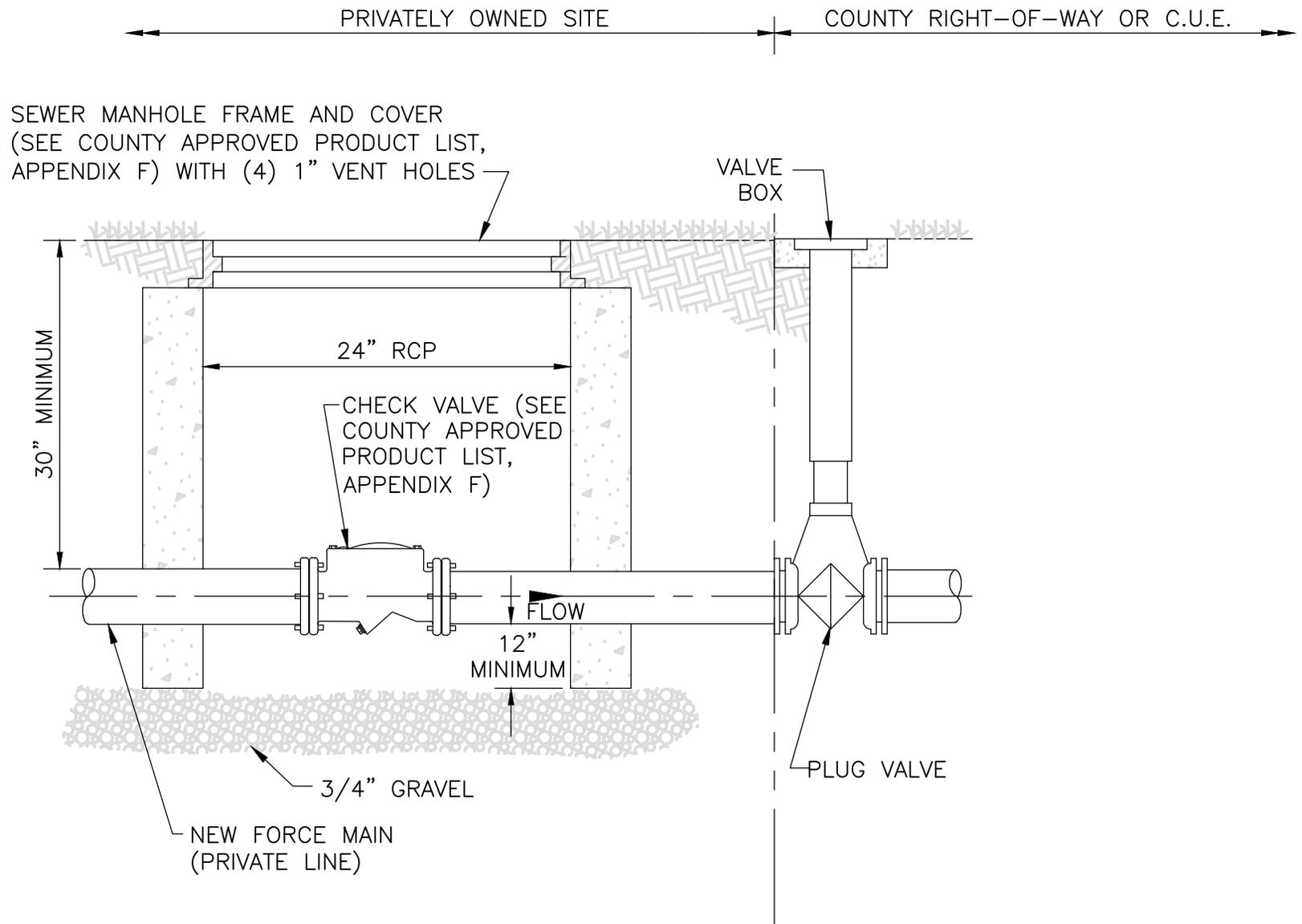
**FORCE MAIN CONNECTION TO
GRAVITY SANITARY SEWER DETAIL**

NTS

REVISION DATE:
APRIL 2006



SHEET NO.
WW-1



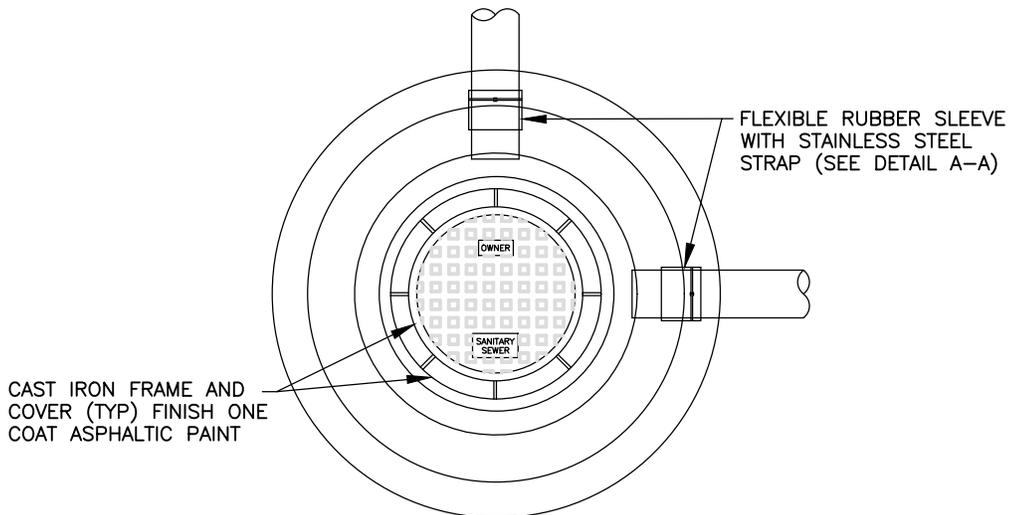
**PRIVATE FORCE MAIN CONNECTION
TO COUNTY FORCE MAIN DETAIL**

REVISION DATE:
JULY 2018

NTS



SHEET NO.
WW-2

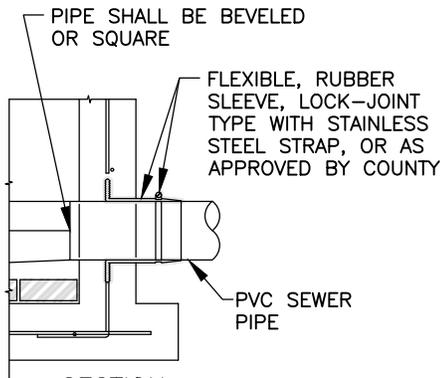


PLAN

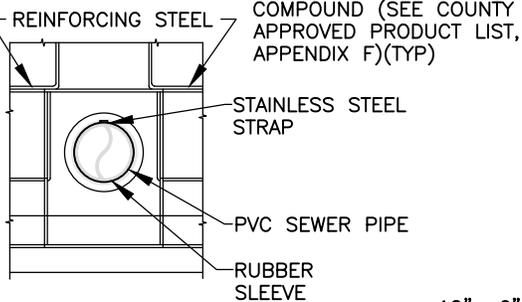
WATERTIGHT SEWER MANHOLE FRAME AND COVER (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) FLUSH WITH GRADE (24" MINIMUM DIAMETER)

PAVEMENT OR EQUIVALENTLY STABILIZED SURFACE

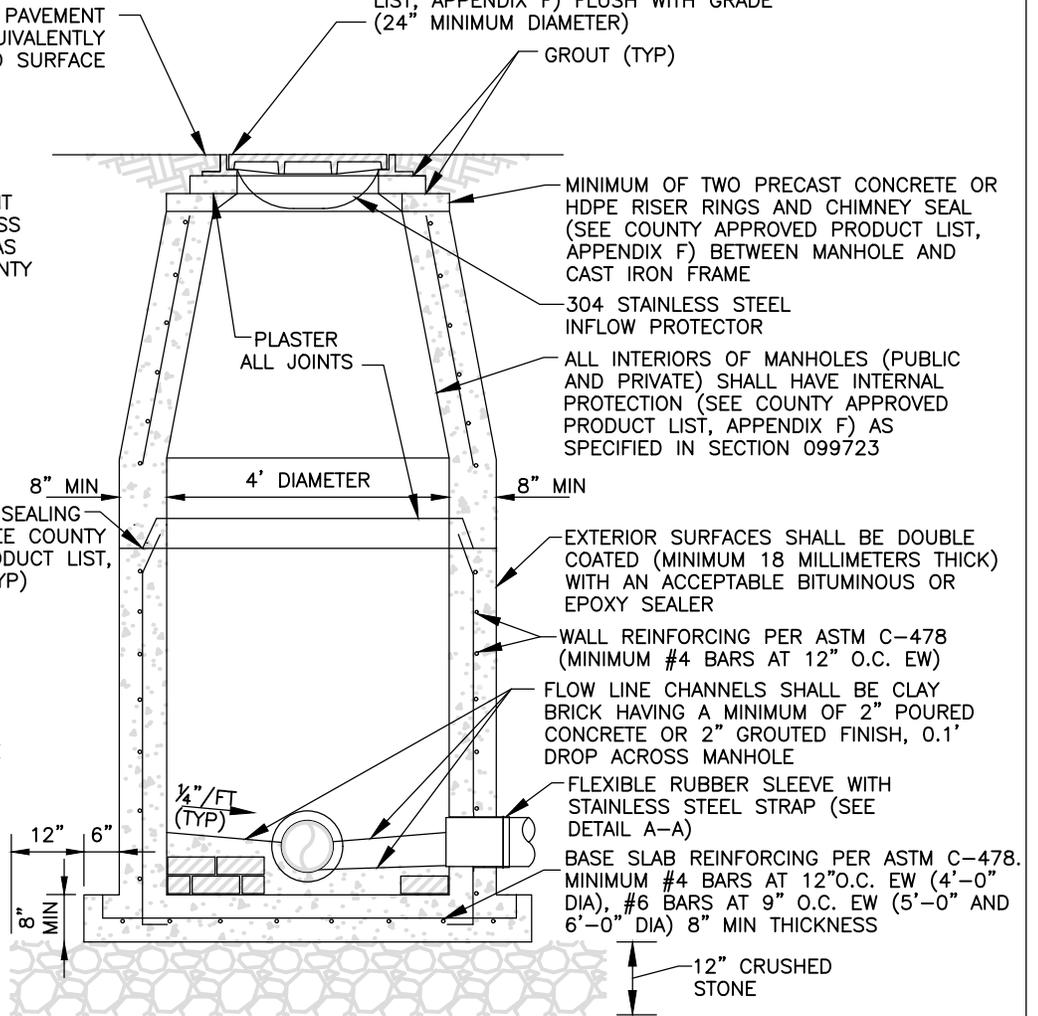
GROUT (TYP)



SECTION



ELEVATION DETAIL A-A



SECTION

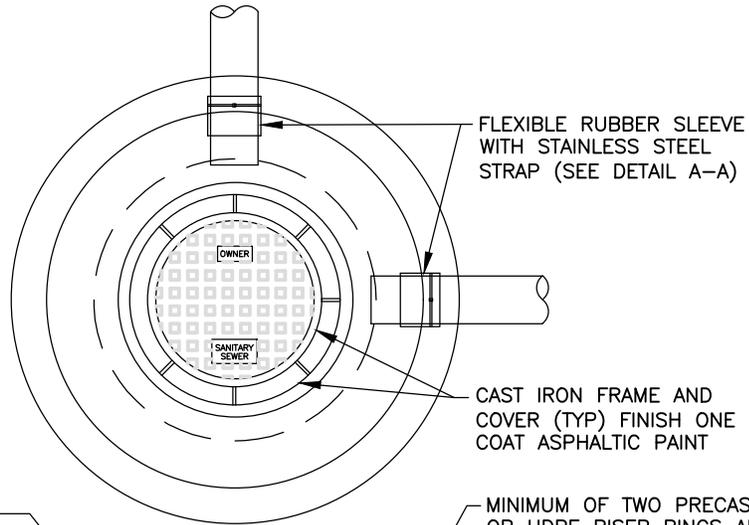
**PRECAST REINFORCED
CONCRETE MANHOLE DETAIL**

REVISION DATE:
JANUARY 2025



SHEET NO.
WW-3

NTS



PLAN

WATERTIGHT SEWER MANHOLE FRAME AND COVER (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) FLUSH WITH GRADE (24" MINIMUM DIAMETER)

FLEXIBLE RUBBER SLEEVE WITH STAINLESS STEEL STRAP (SEE DETAIL A-A)

CAST IRON FRAME AND COVER (TYP) FINISH ONE COAT ASPHALTIC PAINT

MINIMUM OF TWO PRECAST CONCRETE OR HDPE RISER RINGS AND CHIMNEY SEAL (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) BETWEEN MANHOLE AND CAST IRON FRAME

PAVEMENT
304 STAINLESS STEEL INFLOW PROTECTORS
TOP SLAB REINFORCING PER ASTM C-478 (MIN #4 BARS AT 12" O.C. EW). MIN 8" THICK.

GROUT (TYP)
PLASTIC JOINT SEALING COMPOUND (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) KEYED (TYP)

ALL INTERIORS OF MANHOLES (PUBLIC AND PRIVATE) SHALL HAVE INTERNAL PROTECTION (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) AS SPECIFIED IN SECTION 099723

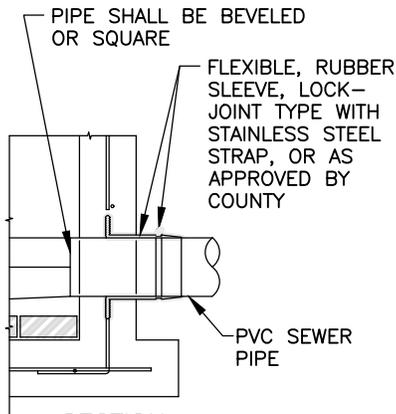
EXTERIOR SURFACES SHALL BE DOUBLE COATED (MINIMUM 18 MILLIMETERS THICK) WITH AN ACCEPTABLE BITUMINOUS OR EPOXY SEALER

WALL REINFORCING PER ASTM C-478

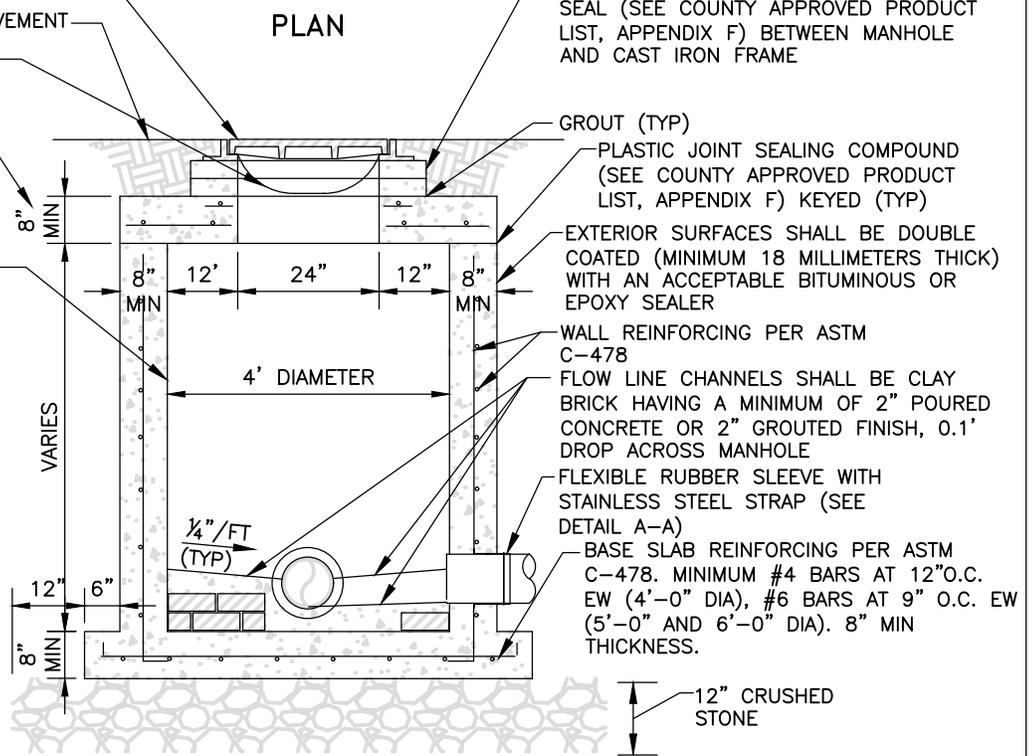
FLOW LINE CHANNELS SHALL BE CLAY BRICK HAVING A MINIMUM OF 2" POURED CONCRETE OR 2" GROUTED FINISH, 0.1' DROP ACROSS MANHOLE

FLEXIBLE RUBBER SLEEVE WITH STAINLESS STEEL STRAP (SEE DETAIL A-A)

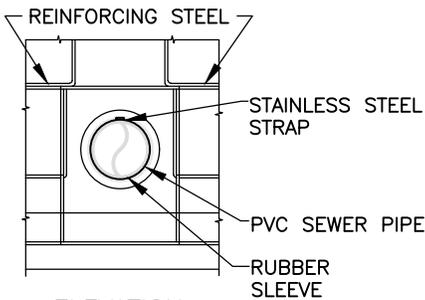
BASE SLAB REINFORCING PER ASTM C-478. MINIMUM #4 BARS AT 12" O.C. EW (4'-0" DIA), #6 BARS AT 9" O.C. EW (5'-0" AND 6'-0" DIA). 8" MIN THICKNESS.



SECTION



SECTION



ELEVATION
DETAIL A-A

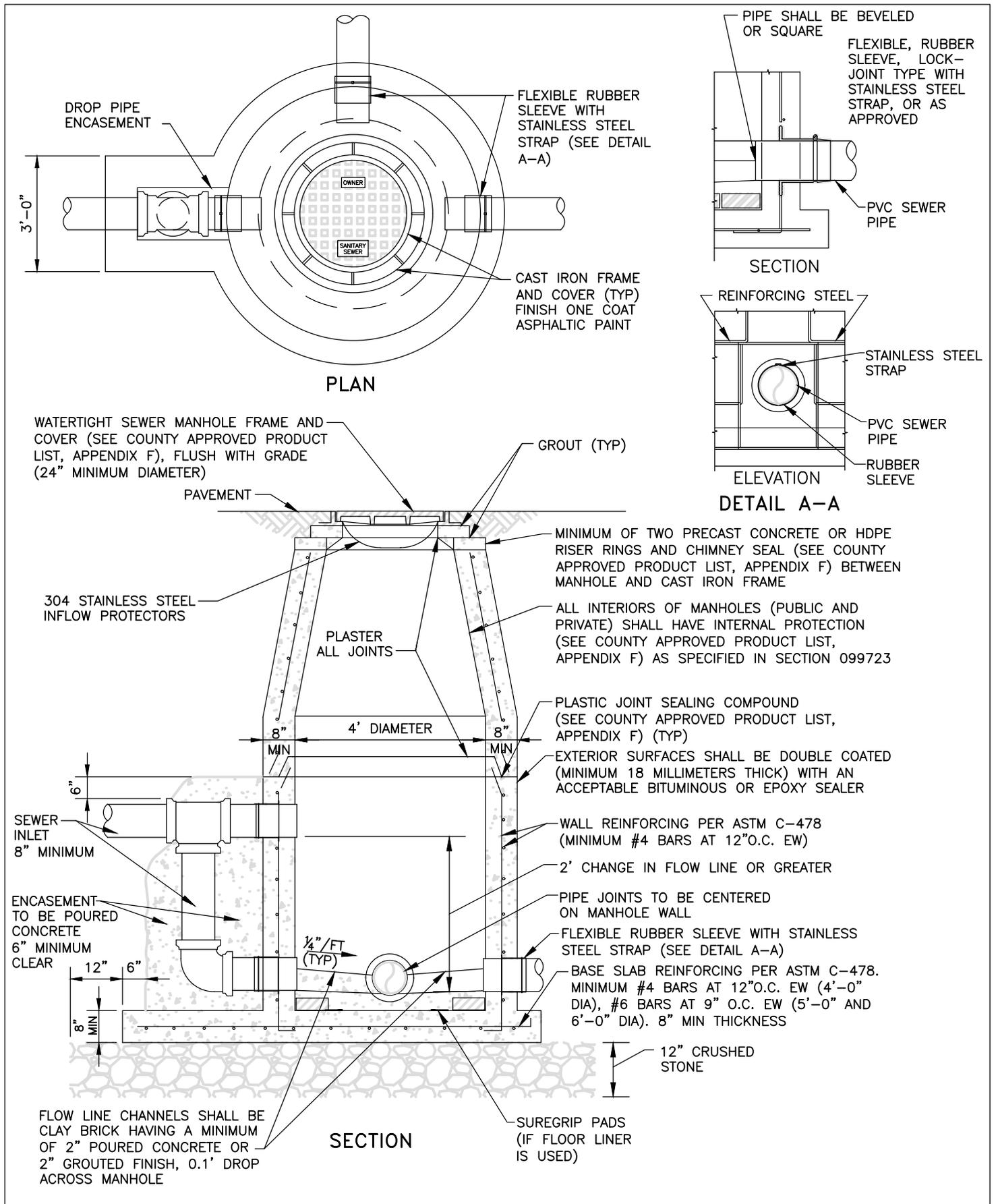
SHALLOW MANHOLE DETAIL

REVISION DATE:
JANUARY 2025



SHEET NO.
WW-4

NTS



DROP MANHOLE DETAIL

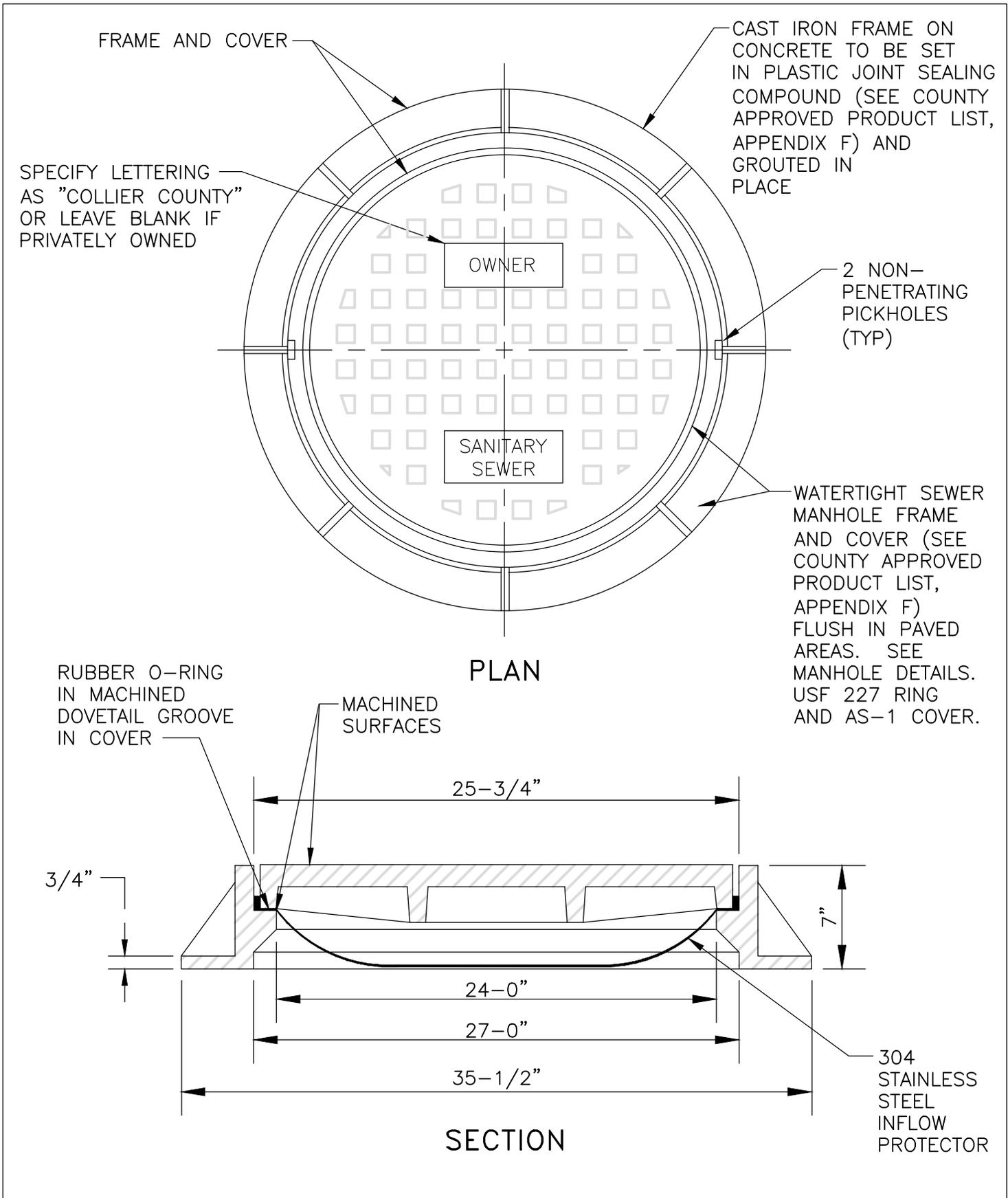
REVISION DATE:
JANUARY 2025



SHEET NO.

WW-5

NTS



MANHOLE RING AND COVER DETAIL	REVISION DATE:		SHEET NO.
	JANUARY 2025		WW-6
NTS			

DIMENSION TABLE

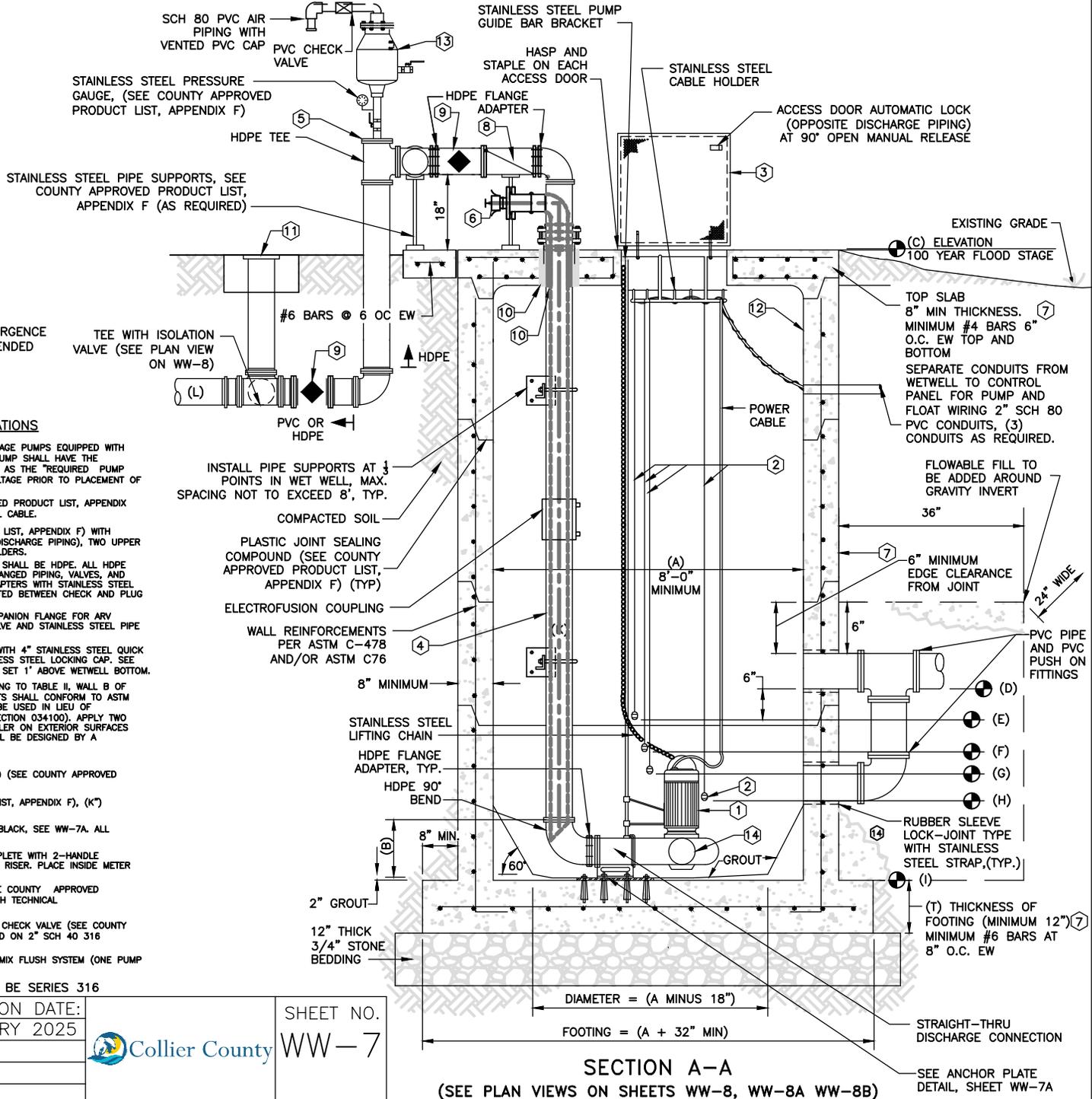
(A)	WETWELL INSIDE DIAMETER
(B)	DISTANCE B/W WETWELL FLOOR AND TOP OF DISCH. CONNECTION
(C)	TOP OF WETWELL ELEVATION
(D)	INFLUENT PIPE ELEV.
(E)	HIGH WATER ALARM ELEV.
(F)	LAG PUMP ON ELEV.
(G)	LEAD PUMP ON ELEVATION
(H)	ALL PUMPS OFF ELEVATION*
(I)	TOP OF WETWELL FOOTING
(K)	DIAMETER OF DISCHARGE RISER
(L)	DIAMETER OF DISCHARGE FORCE MAIN
(T)	THICKNESS OF FOOTING (MINIMUM 12")

*SET ELEVATION H SO THAT THE MINIMUM SUBMERGENCE OF THE PUMPS IS 18", OR THE DEPTH RECOMMENDED BY THE MANUFACTURER, WHICHEVER IS GREATER

EQUIPMENT SPECIFICATIONS

- MARK
- ① DUPLEX ____ INCH DISCHARGE SUBMERSIBLE SEWAGE PUMPS EQUIPPED WITH 230/480 VOLT OR 480 VOLT MOTORS. EACH PUMP SHALL HAVE THE CAPACITY AND RANGE SET FORTH ON THIS SHEET AS THE "REQUIRED PUMP PERFORMANCE CURVE". VERIFY PUMP LOCAL VOLTAGE PRIOR TO PLACEMENT OF PUMP ORDER.
 - ② LIQUID LEVEL REGULATORS (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F), EACH PROVIDED WITH 60 FEET OF ELECTRICAL CABLE.
 - ③ ACCESS DOOR (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) WITH HINGED AND HASP EQUIPPED COVER (OPPOSITE DISCHARGE PIPING), TWO UPPER GUIDE HOLDERS, CHAIN HOLDERS AND CABLE HOLDERS.
 - ④ ALL PIPING IN THE WET WELL AND ABOVE GRADE SHALL BE HDPE. ALL HDPE FITTINGS SHALL BE WELDED. CONNECTIONS TO FLANGED PIPING, VALVES, AND FITTINGS SHALL BE MADE WITH HDPE FLANGE ADAPTERS WITH STAINLESS STEEL BOLTING RINGS AND BOLTS. NO SPACERS PERMITTED BETWEEN CHECK AND PLUG VALVES. SEE SPECIFICATIONS SECTION 330502.
 - ⑤ TAPPED STAINLESS STEEL BLIND FLANGE OR COMPANION FLANGE FOR ARV CONNECTION. PROVIDE STAINLESS STEEL BALL VALVE AND STAINLESS STEEL PIPE NIPPLES TO CONNECT TO ARV.
 - ⑥ COMBINATION SUCTION PIPE AND WETWELL VENT WITH 4" STAINLESS STEEL QUICK CONNECT COUPLING UNIT WITH 2-HANDLE STAINLESS STEEL LOCKING CAP. SEE SHEET WW-7A FOR DETAIL. SUCTION PIPE TO BE SET 1" ABOVE WETWELL BOTTOM.
 - ⑦ WETWELL, REINFORCED CONCRETE PIPE CONFORMING TO TABLE II, WALL B OF ASTM C-76 AND/OR ASTM C-478. O-RING JOINTS SHALL CONFORM TO ASTM C-443 WETWELL CONSTRUCTION. RAM-NEK MAY BE USED IN LIEU OF O-RING RUBBER GASKETS (SEE SPECIFICATION SECTION 034100). APPLY TWO COATS OF APPROVED BITUMINOUS OR EPOXY SEALER ON EXTERIOR SURFACES OF THE WETWELL. PUMP STATION WET WELL SHALL BE DESIGNED BY A FLORIDA PROFESSIONAL ENGINEER.
 - ⑧ CHECK VALVE WITH EXTERNAL WEIGHT/LEVER, (K) (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F).
 - ⑨ PLUG VALVE (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F), (K) COMPLETE WITH WRENCH.
 - ⑩ STAINLESS STEEL WALL PENETRATION ASSEMBLY, BLACK, SEE WW-7A. ALL PENETRATIONS SHALL BE CORED IN THE FIELD.
 - ⑪ 4" STAINLESS STEEL QUICK-COUPLING UNIT COMPLETE WITH 2-HANDLE STAINLESS STEEL LOCKING CAP ON DUCTILE IRON RISER. PLACE INSIDE METER BOX FLUSH WITH FINISHED GRADE.
 - ⑫ INTERIOR SHALL HAVE INTERNAL PROTECTION (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F), IN ACCORDANCE WITH TECHNICAL SPECIFICATION SECTION 099723.
 - ⑬ 2" AIR RELEASE VALVE EQUIPPED WITH ONE WAY CHECK VALVE (SEE COUNTY APPROVED PRODUCTS LIST, APPENDIX F) MOUNTED ON 2" SCH 40 316 STAINLESS STEEL PIPING.
 - ⑭ VOLUTE PORT WITH BOLTED COVER FOR FUTURE MIX FLUSH SYSTEM (ONE PUMP ONLY).

NOTE: ALL STAINLESS STEEL SHALL BE SERIES 316



**PUMP STATION
DETAIL - PROFILE**

NTS

REVISION DATE:
JANUARY 2025

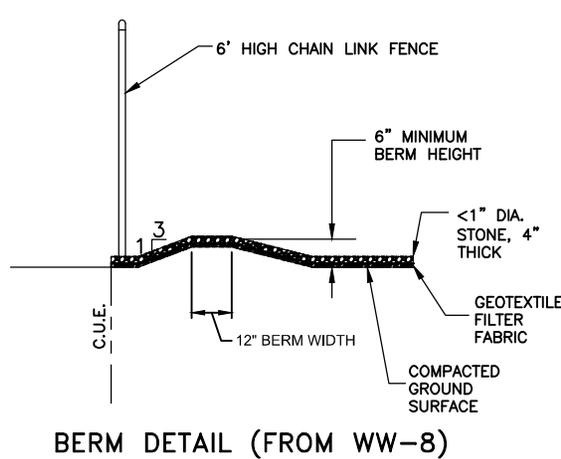


SHEET NO.
WW-7

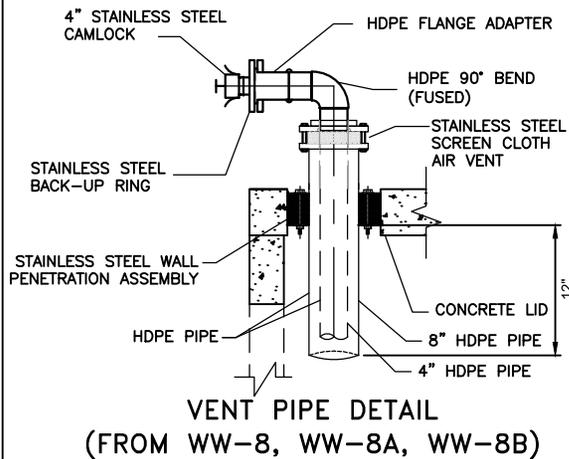
SECTION A-A
(SEE PLAN VIEWS ON SHEETS WW-8, WW-8A WW-8B)

DIAMETER = (A MINUS 18")

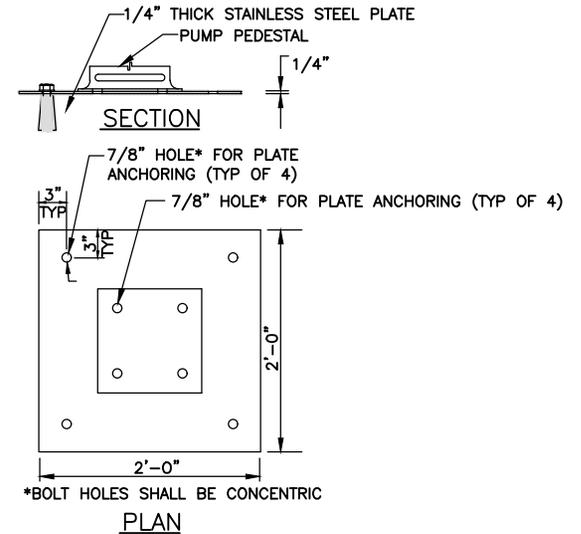
FOOTING = (A + 32" MIN)



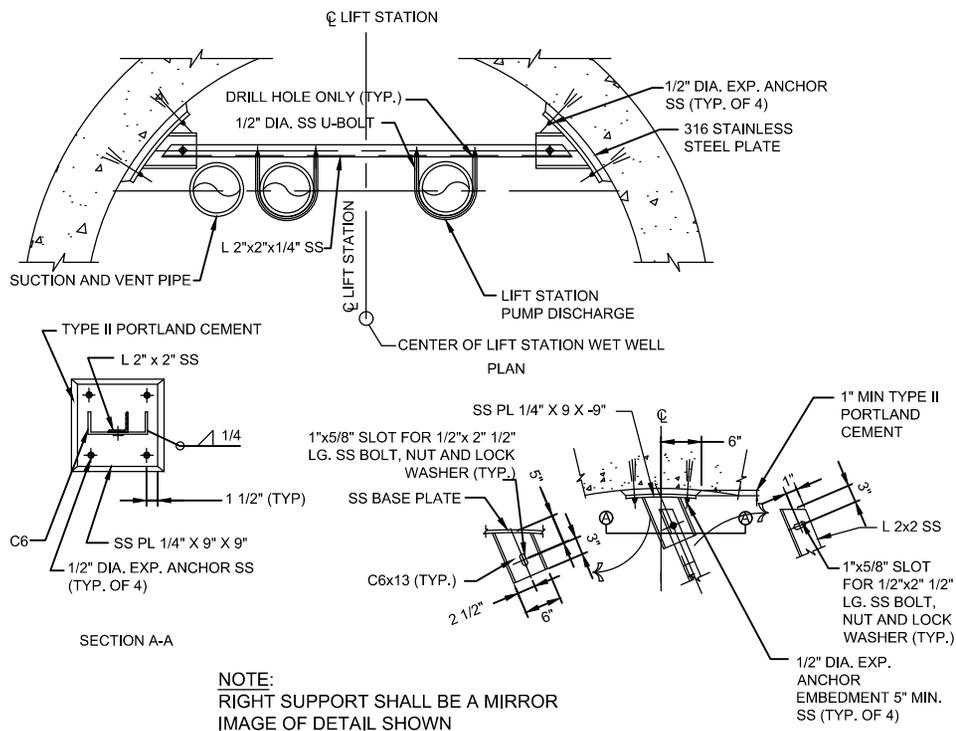
BERM DETAIL (FROM WW-8)



VENT PIPE DETAIL (FROM WW-8, WW-8A, WW-8B)

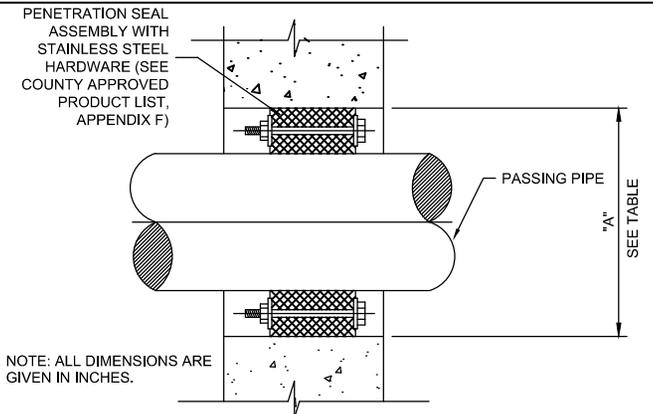


ANCHOR PLATE DETAIL (FROM WW-7)



NOTE:
RIGHT SUPPORT SHALL BE A MIRROR
IMAGE OF DETAIL SHOWN

DISCHARGE PIPE SUPPORT DETAIL (FROM WW-7)



NOTE: ALL DIMENSIONS ARE
GIVEN IN INCHES.

PIPE SIZE	"A"	PIPE SIZE	"A"
2	4	14	18
4	8	16	20
6	10	18	24
8	12	20	26
10	14	24	28
12	16		

WALL PENETRATION DETAIL (FROM WW-7)

PUMP STATION AND WASTEWATER DETAILS

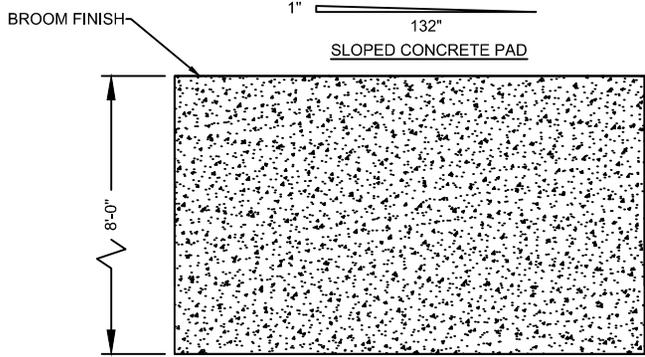
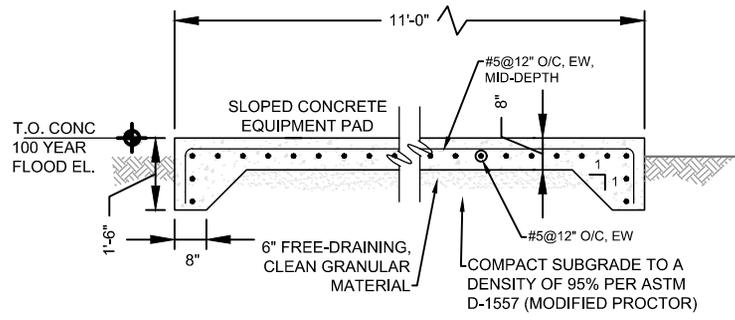
REVISION DATE:
JAN. 2015

NTS

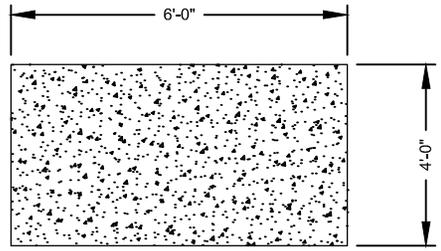


Collier County

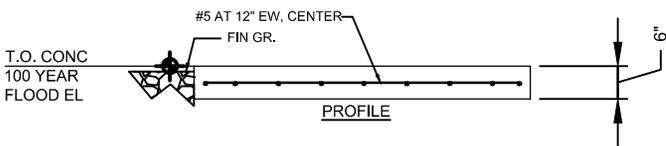
SHEET NO.
WW-7A



ODOR CONTROL PAD (TYPICAL)
N.T.S



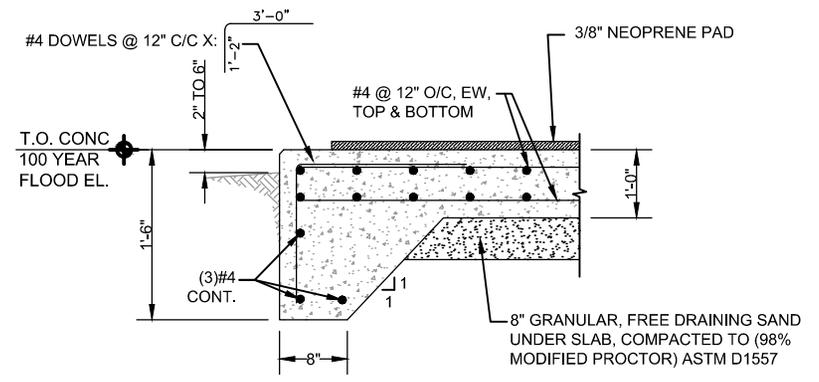
PLAN



PROFILE

PUMP CONTROL PANEL PAD (TYPICAL) - N.T.S

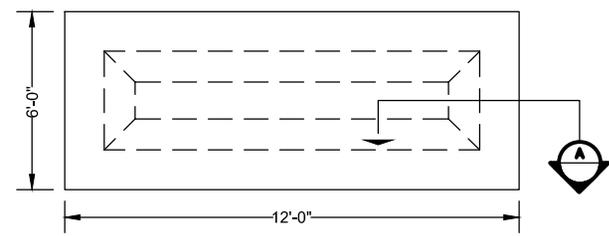
PUMP STATION CONCRETE DETAILS



SECTION
SCALE: N.T.S.

GENERATOR (SLAB/REINF.)

NOTE: CONTRACTOR SHALL PROVIDE A 3/8" CLOSED CELL NEOPRENE PAD ON THE SLAB TO MATCH THE BASE FOOTPRINT OF THE GENERATOR OR THE DIESEL PUMP.



STAND-BY GENERATOR OR DIESEL PUMP CONCRETE SLAB
DETAIL (TYP.) - N.T.S.

STRUCTURAL NOTES:

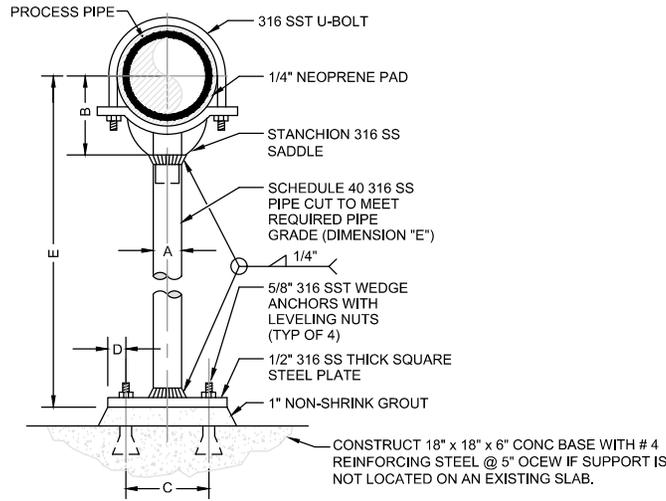
1. ALL CONCRETE SHALL BE 4000 PSI MINIMUM COMPRESSIVE STRENGTH; W/C = 0.45, AIR CONTENT 6% (±) 1%; SLUMP = 4" BEFORE ADDING WATER REDUCING AGENT.
2. ALL STEEL SHALL BE ASTM A615, GR 60.
3. ALL DIMENSIONS SHOWN ARE TYPICAL ONLY. CONTRACTOR TO VERIFY OVERALL SLAB SIZE WITH EQUIPMENT MANUFACTURER AND ENGINEER PRIOR TO CONSTRUCTION.
4. ALL SLABS SHALL HAVE TOOLED EDGES ON ALL SIDES

REVISION DATE:	JAN. 2015

NTS



SHEET NO.
WW-7B



PIPE SIZE	A	B	C	D	E	
					MIN	MAX
4	3	4 3/16	7	1	18	30
5	3	4 13/16	7	1	18	30
6	3	5 7/16	7	1	18	30
8	3	6 15/16	7	1	18	30
10	3	8 7/16	7	1	18	30
12	3	9 15/16	7	1	18	30

* ALL DIMENSIONS IN INCHES.

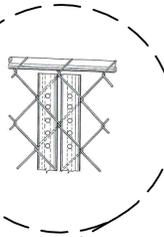
NOTES:

1. PIPE SUPPORT HEIGHT TO BE ADJUSTABLE.
2. SEE PLANS AND SECTIONS FOR PIPE GRADE REQUIREMENT (DIMENSION "E").
3. PIPE SUPPORT TO BE COMPATIBLE WITH HDPE PIPE.
4. ALL MATERIALS AND HARDWARE TO BE 316 SS.

PIPE SUPPORT DETAIL

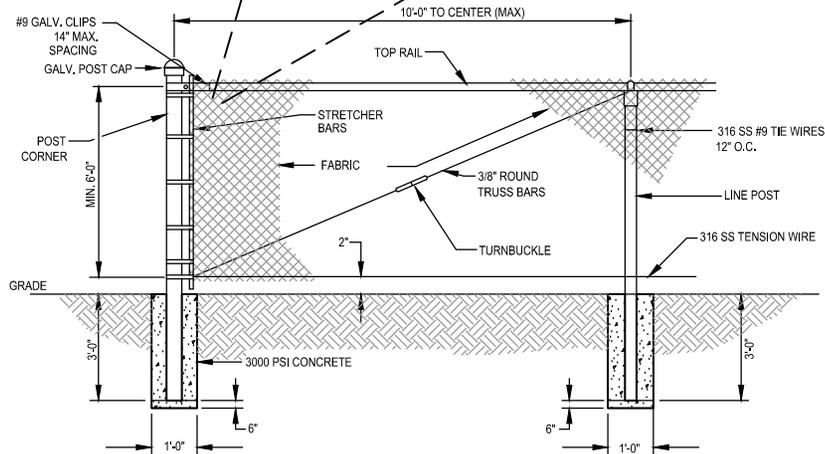
NOTES:

1. ALL FENCING COMPONENTS SHALL BE VINYL COATED GREEN OR BLACK AS APPLICABLE.

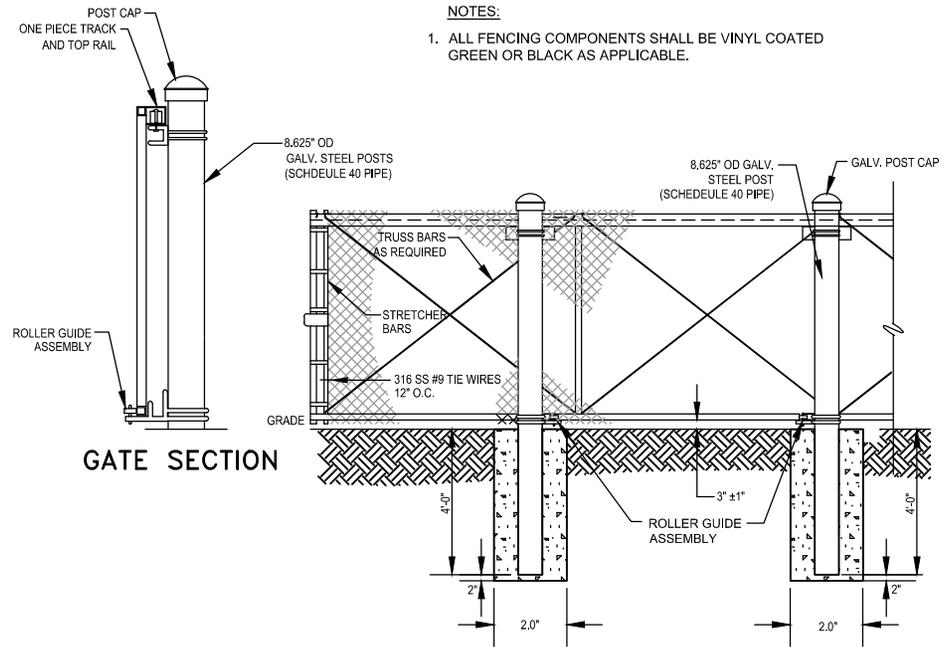


SLATS DETAIL

NOTE: COLOR OF THE SLATS SHALL BE GREEN OR BLACK TO MATCH VINYL COATED PARTS



CHAIN LINK FENCE DETAIL



NOTES:

1. ALL FENCING COMPONENTS SHALL BE VINYL COATED GREEN OR BLACK AS APPLICABLE.

GATE SECTION

CHAIN LINK FENCE GATE DETAIL

PUMP STATION AND WASTEWATER DETAILS

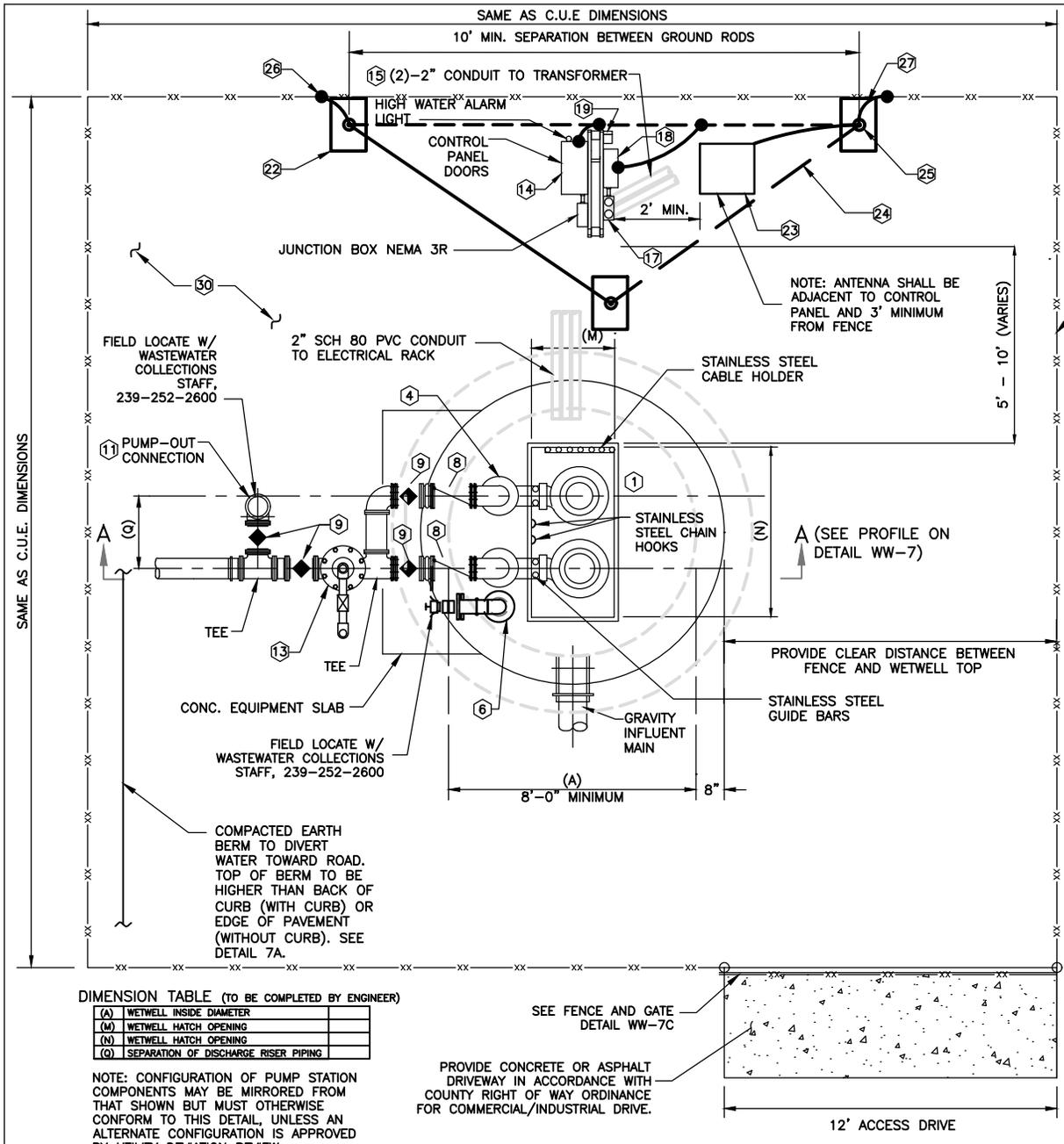
REVISION DATE:
JULY 2018



Collier County

SHEET NO.
WW-7C

NTS



EQUIPMENT SPECIFICATIONS

- MARK
- (1) ACCESS DOOR (SEE COUNTY APPROVED LIST, APPENDIX F) TO BE SIZED BY ENGINEER OF RECORD. FOR PUMPS IN ACCORDANCE WITH PUMP MANUFACTURERS REQUIREMENTS. FOR PUMP SIZE, MINIMUM SEPARATION AND GUIDE BARS. SIZE TO BE PROVIDED IN DATA BOX.
 - (2) NOT USED
 - (3) NOT USED
 - (4) ALL PIPING IN THE WET WELL AND ABOVE GRADE SHALL BE HDPE. ALL HDPE FITTINGS SHALL BE MOLDED. CONNECTIONS TO FLANGED PIPING, VALVES, AND FITTINGS SHALL BE MADE WITH HDPE FLANGE ADAPTERS WITH STAINLESS STEEL BOLTING RINGS AND BOLTS. NO SPACER PERMITTED BETWEEN CHECK AND PLUG VALVES. SEE SPECIFICATIONS SECTION 330502.
 - (5) TAPPED STAINLESS STEEL BLIND FLANGE OR COMPANION FLANGE FOR ARV CONNECTION. PROVIDE STAINLESS STEEL BALL VALVE AND PIPE NIPPLES TO CONNECT TO ARV.
 - (6) COMBINATION SUCTION PIPE AND WETWELL VENT WITH 4" STAINLESS STEEL QUICK-COONNECT COUPLING UNIT WITH 2-HANDLE STAINLESS STEEL LOCKING CAP. SEE SHEET WW-7A FOR DETAIL.
 - (7) NOT USED
 - (8) CHECK VALVE WITH EXTERNAL WEIGHT/LEVER, (K") (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F)
 - (9) PLUG VALVE (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F), COMPLETE WITH WRENCH
 - (10) NOT USED
 - (11) 4" QUICK-COONNECT UNIT COMPLETE WITH 2-HANDLE STAINLESS STEEL LOCKING CAP ON DUCTILE IRON RISER. PLACE INSIDE METER BOX FLUSH WITH FINISHED GRADE.
 - (12) NOT USED
 - (13) 2" AIR RELEASE VALVE EQUIPPED WITH ONE WAY CHECK VALVE (SEE COUNTY APPROVED PRODUCTS LIST, APPENDIX F) MOUNTED ON 2" STAINLESS STEEL PIPING.
 - (14) PUMP CONTROL PANEL: SEE TECHNICAL SPECIFICATIONS SECTION 333200, 2.1.H. AND DETAIL WW-9. SINGLE DOOR PANELS TO OPEN AWAY FROM WETWELL.
 - (15) ALL ELECTRICAL SERVICE TRANSFORMERS SHALL BE INSTALLED OUTSIDE OF PUMP STATION FENCE LINE
 - (16) 6" HIGH CHAIN LINK FENCE AS PER COUNTY STANDARDS. FENCE SHALL HAVE GREEN SLATS TO SCREEN PUMP STATION FROM VIEW.
 - (17) POWER METER
 - (18) SERVICE ENTRANCE RATED CIRCUIT BREAKER DISCONNECT WITH PADLOCKABLE HINGE
 - (19) GENERATOR RECEPTACLE TO BE FIELD LOCATED w/ WASTEWATER COLLECTION STAFF AT (239)-252-2600. SEE DETAIL WW-9.
 - (20) NOT USED
 - (21) NOT USED
 - (22) SEE GROUND TEST WELL DETAIL ON SHEET WW-9C FOR ADDITIONAL REQUIREMENTS (TYP.)
 - (23) TELEMETRY ANTENNA. SEE WW-17. PROVIDE NEW ANTENNA LIGHTNING ROD, CONDUIT, AND DOWN CONDUCTOR PER DETAIL ON WW-17. ROUTE LIGHTNING ROD DOWN CONDUCTOR TO GROUND ROD AT BOTTOM OF TOWER. BOND GROUND ROD TO STATION GROUND MAT.
 - (24) #4/0 BARE COPPER. SEE GROUND MAT DETAIL ON SHEET WW-9C FOR ADDITIONAL REQUIREMENTS (TYP.)
 - (25) 3/4" X 20' COPPER-CLAD GROUND ROD (TYP.)
 - (26) EXOTHERMICALLY WELDED CONNECTION (TYP.)
 - (27) #2 SOLID TINNED COPPER JUMPER (TYP.)
 - (28) NOT USED
 - (29) NOT USED
 - (30) GROUND SURFACE WITHIN PUMP STATION FENCE SHALL CONSIST OF <1" DIA STONE, 4" THICK, WITH GEOTEXTILE FILTER FABRIC
 - (31) NOT USED

DIMENSION TABLE (TO BE COMPLETED BY ENGINEER)

(A)	WETWELL INSIDE DIAMETER	
(M)	WETWELL HATCH OPENING	
(N)	WETWELL HATCH OPENING	
(G)	SEPARATION OF DISCHARGE RISER PIPING	

NOTE: CONFIGURATION OF PUMP STATION COMPONENTS MAY BE MIRRORED FROM THAT SHOWN BUT MUST OTHERWISE CONFORM TO THIS DETAIL, UNLESS AN ALTERNATE CONFIGURATION IS APPROVED BY UTILITY DEVIATION REVIEW.

PUMP STATION DETAIL - PLAN

REVISION DATE:	JANUARY 2025



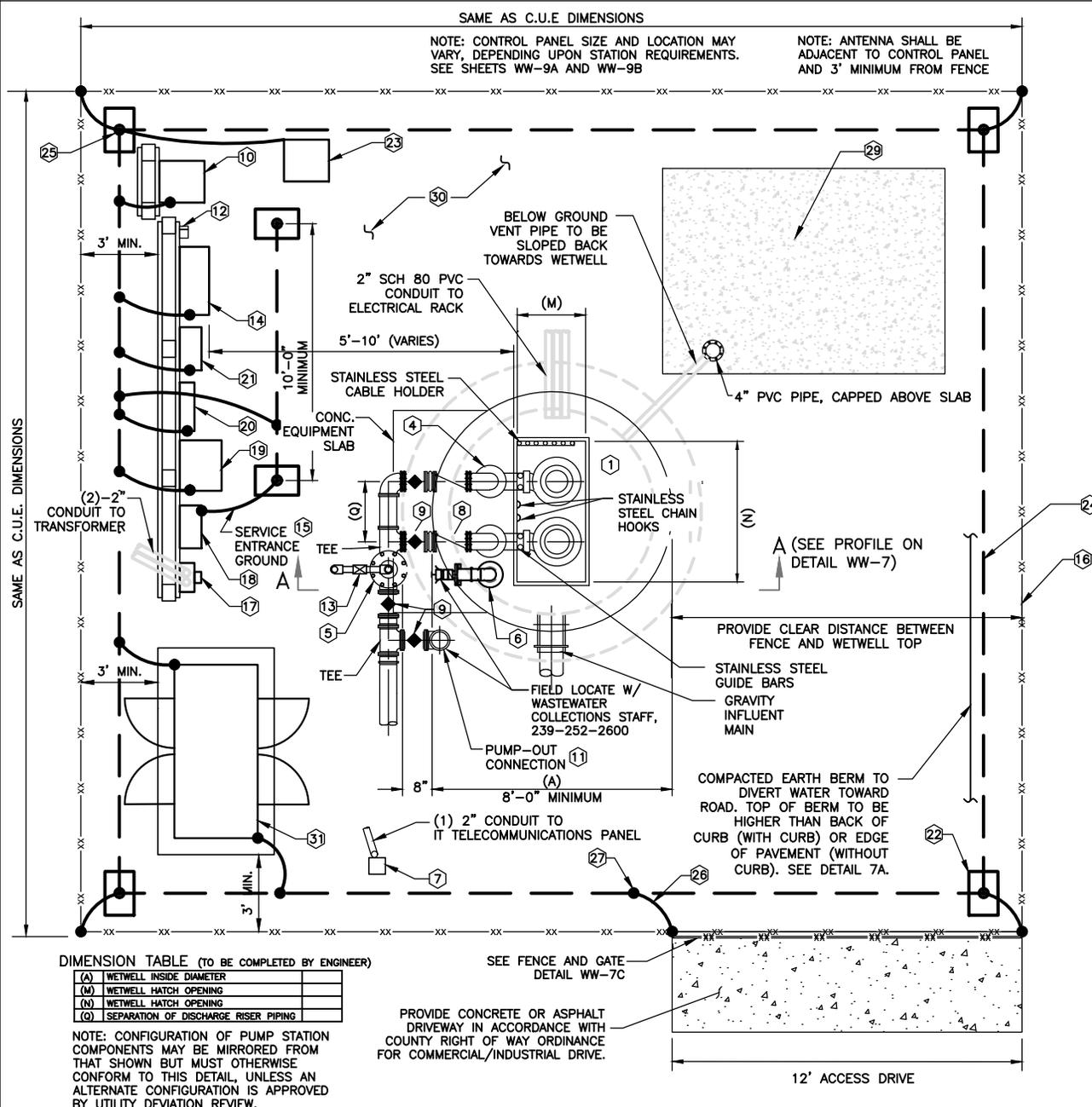
SHEET NO.
WW-8

NTS

EQUIPMENT SPECIFICATIONS

MARK

- ① ACCESS DOOR (SEE COUNTY APPROVED LIST, APPENDIX F) TO BE SIZED BY ENGINEER OF RECORD, FOR PUMPS IN ACCORDANCE WITH PUMP MANUFACTURERS REQUIREMENTS. FOR PUMP SIZE, MINIMUM SEPARATION AND GUIDE BARS. SIZE TO BE PROVIDED IN DATA BOX.
- ② NOT USED
- ③ NOT USED
- ④ ALL PIPING IN THE WET WELL AND ABOVE GRADE SHALL BE HDPE. ALL HDPE FITTINGS SHALL BE MOLDED. CONNECTIONS TO FLANGED PIPING, VALVES, AND FITTINGS SHALL BE MADE WITH HDPE FLANGE ADAPTERS WITH STAINLESS STEEL BOLTING RINGS AND BOLTS. NO SPACER PERMITTED BETWEEN CHECK AND PLUG VALVES SEE SPECIFICATIONS SECTION 330502.
- ⑤ TAPPED STAINLESS STEEL BLIND FLANGE OR COMPANION FLANGE FOR ARV CONNECTION. PROVIDE STAINLESS STEEL BALL VALVE AND PIPE NIPPLES TO CONNECT TO ARV.
- ⑥ COMBINATION SUCTION PIPE AND WETWELL VENT WITH 4" STAINLESS STEEL QUICK-COUPLET UNIT WITH 2-HANDLE STAINLESS STEEL LOCKING CAP. SEE SHEET WW-7A FOR DETAIL.
- ⑦ FIBER-OPTIC HANDHOLE: SEE TECHNICAL DETAILS SPECIFICATION 409500 AND DETAIL G-12, WHERE APPLICABLE.
- ⑧ CHECK VALVE WITH EXTERNAL WEIGHT/LEVER. (K*) (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F)
- ⑨ PLUG VALVE (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F), COMPLETE WITH WRENCH
- ⑩ IT TELECOMMUNICATIONS PANEL: SEE TECHNICAL SPECIFICATION 409500 AND DETAIL G-12, WHERE APPLICABLE.
- ⑪ 4" QUICK-COUPLET UNIT COMPLETE WITH 2-HANDLE STAINLESS STEEL LOCKING CAP ON DUCTILE IRON RISER. PLACE INSIDE METER BOX FLUSH WITH FINISHED GRADE.
- ⑫ GENERATOR RECEPTACLE TO BE FIELD LOCATED w/ WASTEWATER COLLECTION STAFF AT (239)-252-2600
- ⑬ 2" AIR RELEASE VALVE EQUIPPED WITH ONE WAY CHECK VALVE (SEE COUNTY APPROVED PRODUCTS LIST, APPENDIX F) MOUNTED ON 2" STAINLESS STEEL PIPING.
- ⑭ PUMP CONTROL PANEL: SEE TECHNICAL SPECIFICATIONS SECTION 333200, 2.1.H. AND DETAILS WW-9A AND WW-9B, AS APPLICABLE. SINGLE DOOR PANELS TO OPEN AWAY FROM WETWELL.
- ⑮ ALL ELECTRICAL SERVICE TRANSFORMERS SHALL BE INSTALLED OUTSIDE OF PUMP STATION FENCE LINE
- ⑯ 6' HIGH CHAIN LINK FENCE AS PER COUNTY STANDARDS. FENCE SHALL HAVE GREEN SLATS TO SCREEN PUMP STATION FROM VIEW.
- ⑰ POWER METER
- ⑱ SERVICE ENTRANCE RATED CIRCUIT BREAKER DISCONNECT WITH PADLOCKABLE HINGE
- ⑲ AUTOMATIC TRANSFER SWITCH
- ⑳ PANELBOARD / MINI POWER ZONE AS REQUIRED
- ㉑ CIRCUIT BREAKER DISCONNECT WITH PADLOCKABLE HINGE
- ㉒ SEE GROUND TEST WELL DETAIL ON SHEET WW-9C FOR ADDITIONAL REQUIREMENTS (TYP.)
- ㉓ TELEMETRY ANTENNA. SEE WW-17. PROVIDE NEW ANTENNA LIGHTNING ROD, CONDUIT, AND DOWN CONDUCTOR PER DETAIL ON WW-17. ROUTE LIGHTNING ROD DOWN CONDUCTOR TO GROUND ROD AT BOTTOM OF TOWER. BOND GROUND ROD TO STATION GROUND MAT.
- ㉔ #4/0 BARE COPPER. SEE GROUND MAT DETAIL ON SHEET WW-9C FOR ADDITIONAL REQUIREMENTS (TYP.)
- ㉕ 3/4" X 20' COPPER-CLAD GROUND ROD (TYP.)
- ㉖ EXOTHERMICALLY WELDED CONNECTION (TYP.)
- ㉗ #2 SOLID TINNED COPPER JUMPER (TYP.)
- ㉘ BOND FENCE POST. SEE FENCE POST/GATE BONDING DETAIL ON SHEET WW-9C FOR ADDITIONAL REQUIREMENTS (TYP.)
- ㉙ 8' X 11' X 6" CONCRETE PAD FOR FUTURE ODOR CONTROL
- ㉚ GROUND SURFACE WITHIN PUMP STATION FENCE SHALL CONSIST OF <1" DIA STONE, 4" THICK, WITH GEOTEXTILE FILTER FABRIC
- ㉛ STANDBY-BY DIESEL GENERATOR, SUB BASE FUEL TANK, AND CONCRETE PAD. SEE TECHNICAL SPECIFICATIONS SECTION 263213



DIMENSION TABLE (TO BE COMPLETED BY ENGINEER)

(A)	WETWELL INSIDE DIAMETER	
(M)	WETWELL HATCH OPENING	
(N)	WETWELL HATCH OPENING	
(O)	SEPARATION OF DISCHARGE RISER PIPING	

NOTE: CONFIGURATION OF PUMP STATION COMPONENTS MAY BE MIRRORED FROM THAT SHOWN BUT MUST OTHERWISE CONFORM TO THIS DETAIL, UNLESS AN ALTERNATE CONFIGURATION IS APPROVED BY UTILITY DEVIATION REVIEW.

PROVIDE CONCRETE OR ASPHALT DRIVEWAY IN ACCORDANCE WITH COUNTY RIGHT OF WAY ORDINANCE FOR COMMERCIAL/INDUSTRIAL DRIVE.

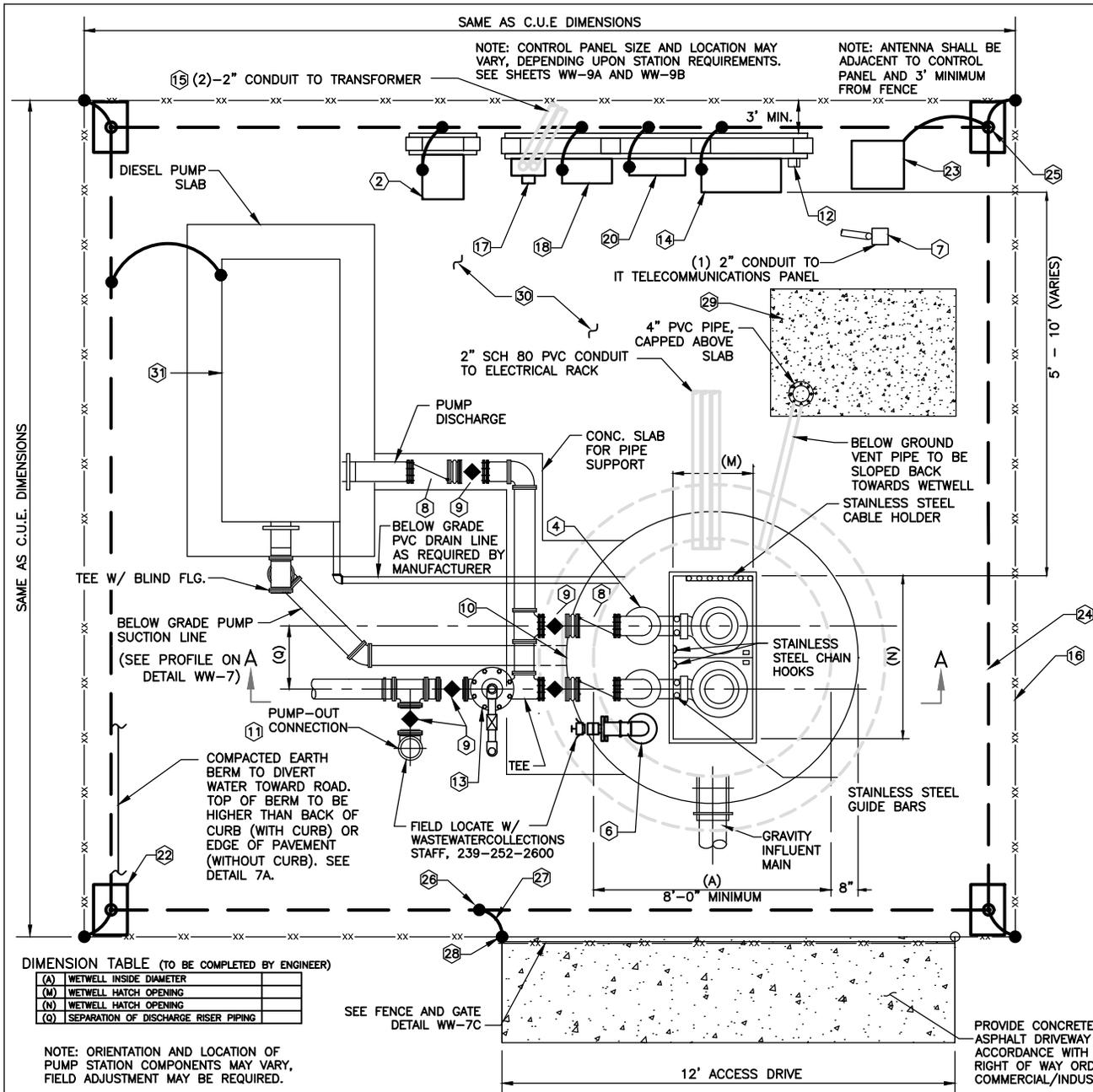
**COMMUNITY PUMP STATION WITH
GENERATOR DETAIL - PLAN**

REVISION DATE:
JANUARY 2025



SHEET NO.
WW-8A

NTS



EQUIPMENT SPECIFICATIONS

- MARK
- ① ACCESS DOOR (SEE COUNTY APPROVED LIST, APPENDIX F) TO BE SIZED BY ENGINEER OF RECORD. FOR PUMPS IN ACCORDANCE WITH PUMP MANUFACTURERS REQUIREMENTS. FOR PUMP SIZE, MINIMUM SEPARATION AND GUIDE BARS. SIZE TO BE PROVIDED IN DATA BOX.
 - ② IT TELECOMMUNICATIONS PANEL: SEE TECHNICAL SPECIFICATION 409500 AND DETAIL G-12, WHERE APPLICABLE.
 - ③ NOT USED
 - ④ ALL PIPING IN THE WET WELL AND ABOVE GRADE SHALL BE HDPE. ALL HDPE FITTINGS SHALL BE MOLDED. CONNECTIONS TO FLANGED PIPING, VALVES, AND FITTINGS SHALL BE MADE WITH HDPE FLANGE ADAPTERS WITH STAINLESS STEEL BOLTING RINGS AND BOLTS. NO SPACERS PERMITTED BETWEEN CHECK AND PLUG VALVES. SEE SPECIFICATIONS SECTION 330502.
 - ⑤ TAPPED STAINLESS STEEL BLIND FLANGE OR COMPANION FLANGE FOR ARV CONNECTION. PROVIDE STAINLESS STEEL BALL VALVE AND PIPE NIPPLES TO CONNECT TO ARV.
 - ⑥ COMBINATION SUCTION PIPE AND WETWELL VENT WITH 4" STAINLESS STEEL QUICK-CONNECT COUPLING UNIT WITH 2-HANDLE STAINLESS STEEL LOCKING CAP. SEE SHEET WW-7A FOR DETAIL.
 - ⑦ FIBER-OPTIC HANDHOLE: SEE TECHNICAL DETAILS SPECIFICATION 409500 AND DETAIL G-12, WHERE APPLICABLE.
 - ⑧ CHECK VALVE WITH EXTERNAL WEIGHT/LEVER. (K) (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F)
 - ⑨ PLUG VALVE (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F), COMPLETE WITH WRENCH
 - ⑩ STAINLESS STEEL WALL PENETRATION ASSEMBLY, BLACK, SEE WW-7A. ALL PENETRATIONS SHALL BE CORED IN THE FIELD.
 - ⑪ 4" QUICK-COUPLING UNIT COMPLETE WITH 2-HANDLE STAINLESS STEEL LOCKING CAP ON DUCTILE IRON RISER. PLACE INSIDE METER BOX FLUSH WITH FINISHED GRADE.
 - ⑫ GENERATOR RECEPTACLE TO BE FIELD LOCATED w/ WASTEWATER COLLECTION STAFF AT (239)-252-2600.
 - ⑬ 2" AIR RELEASE VALVE EQUIPPED WITH ONE WAY CHECK VALVE (SEE COUNTY APPROVED PRODUCTS LIST, APPENDIX F) MOUNTED ON 2" STAINLESS STEEL PIPING.
 - ⑭ PUMP CONTROL PANEL: SEE TECHNICAL SPECIFICATIONS SECTION 333200, 2.1.H. AND DETAILS WW-9A AND WW-9B, AS APPLICABLE. SINGLE DOOR PANELS TO OPEN AWAY FROM WETWELL.
 - ⑮ ALL ELECTRICAL SERVICE TRANSFORMERS SHALL BE INSTALLED OUTSIDE OF PUMP STATION FENCE LINE
 - ⑯ 6' HIGH CHAIN LINK FENCE AS PER COUNTY STANDARDS. FENCE SHALL HAVE GREEN SLATS TO SCREEN PUMP STATION FROM VIEW.
 - ⑰ POWER METER
 - ⑱ SERVICE ENTRANCE RATED CIRCUIT BREAKER DISCONNECT WITH PADLOCKABLE HINGE
 - ⑲ NOT USED
 - ⑳ 120V PANELBOARD / MINI POWER ZONE AS REQUIRED
 - ㉑ NOT USED
 - ㉒ SEE GROUND TEST WELL DETAIL ON SHEET WW-9C FOR ADDITIONAL REQUIREMENTS (TYP.)
 - ㉓ TELEMETRY ANTENNA. SEE WW-17. PROVIDE NEW ANTENNA LIGHTNING ROD, CONDUIT, AND DOWN CONDUCTOR PER DETAIL ON WW-17. ROUTE LIGHTNING ROD DOWN CONDUCTOR TO GROUND ROD AT BOTTOM OF TOWER. BOND GROUND ROD TO STATION GROUND MAT.
 - ㉔ #4/0 BARE COPPER. SEE GROUND MAT DETAIL ON SHEET WW-9C FOR ADDITIONAL REQUIREMENTS (TYP.)
 - ㉕ 3/4" X 20' COPPER-CLAD GROUND ROD (TYP.)
 - ㉖ EXOTHERMICALLY WELDED CONNECTION (TYP.)
 - ㉗ #2 SOLID TINNED COPPER JUMPER (TYP.)
 - ㉘ BOND FENCE POST. SEE FENCE POST/GATE BONDING DETAIL ON SHEET WW-9C FOR ADDITIONAL REQUIREMENTS (TYP.)
 - ㉙ 8' X 11' X 6" CONCRETE PAD FOR FUTURE ODDR CONTROL
 - ㉚ GROUND SURFACE WITHIN PUMP STATION FENCE SHALL CONSIST OF <1" DIA STONE, 4" THICK, WITH GEOTEXTILE FILTER FABRIC
 - ㉛ STAND-BY DIESEL PUMP WITH INTEGRATED FUEL TANK AND CONCRETE PAD. SEE TECHNICAL SPECIFICATIONS SECTION 221336.

DIMENSION TABLE (TO BE COMPLETED BY ENGINEER)

(A)	WETWELL INSIDE DIAMETER	
(M)	WETWELL HATCH OPENING	
(N)	WETWELL HATCH OPENING	
(Q)	SEPARATION OF DISCHARGE RISER PIPING	

NOTE: ORIENTATION AND LOCATION OF PUMP STATION COMPONENTS MAY VARY, FIELD ADJUSTMENT MAY BE REQUIRED.

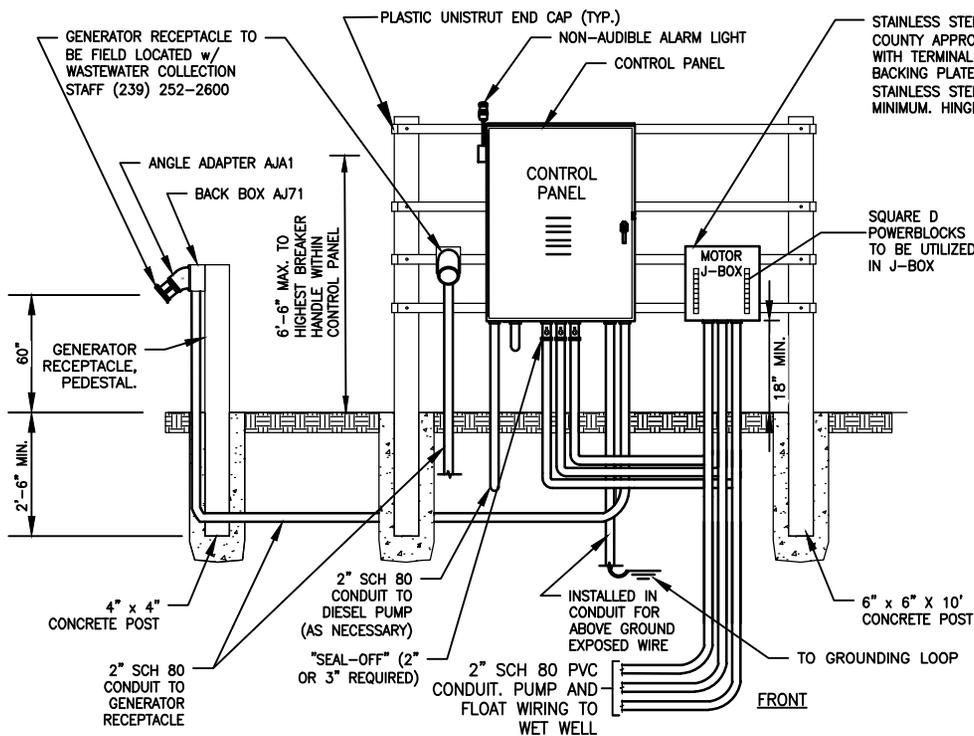
COMMUNITY PUMP STATION WITH DIESEL PUMP DETAIL - PLAN

REVISION DATE:
JANUARY 2025



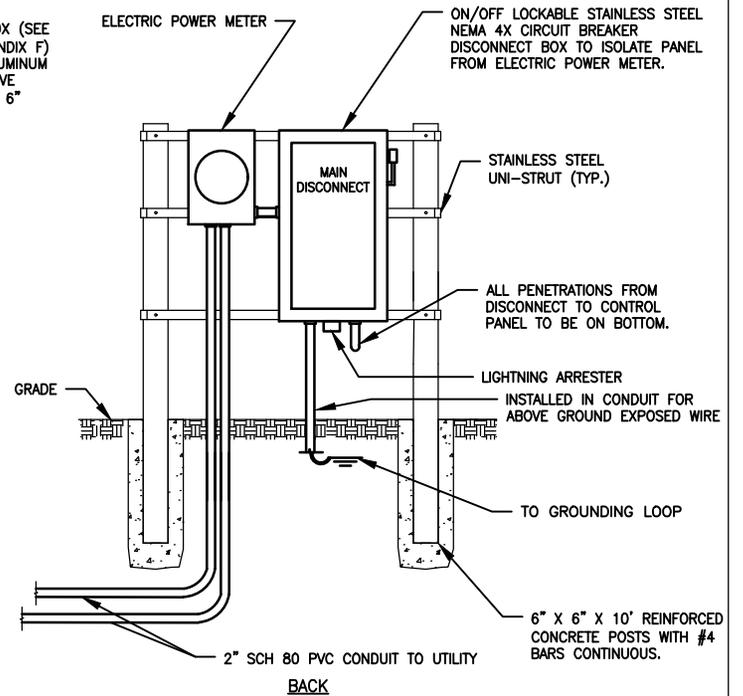
SHEET NO.
WW-8B

NTS



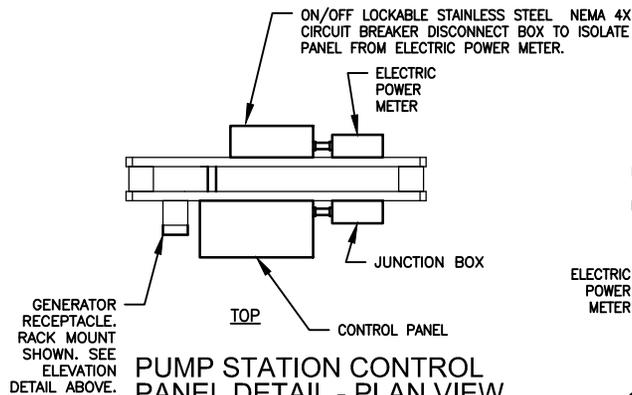
PUMP STATION CONTROL PANEL DETAIL - FRONT ELEVATION

SCALE: 1" = 4'-0"



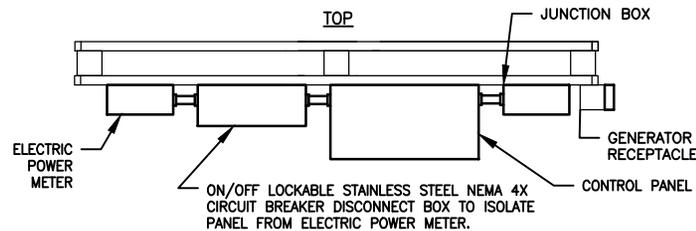
PUMP STATION CONTROL PANEL DETAIL - BACK ELEVATION

SCALE: 1" = 4'-0"



PUMP STATION CONTROL PANEL DETAIL - PLAN VIEW

SCALE: 1" = 4'-0"



SINGLE SIDE ALTERNATE - PLAN VIEW

SCALE: 1" = 4'-0"

NOTES:

1. #10 STRAND MINIMUM FROM CONTROL PANEL TO J-BOX.
2. LIGHTNING ARRESTER (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) MUST BE INSTALLED EXTERNALLY ON LOAD SIDE OF DISCONNECT BETWEEN DISCONNECT AND MAIN BREAKER. THE PENETRATION THROUGH THE DISCONNECT MUST BE MADE BELOW THE WORKING MECHANISM OF THE DISCONNECT.
3. PUMP CONTROL PANEL (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) WITH ALL COMPONENTS FOR OPERATING TWO PUMPS AND LIQUID LEVEL REGULATORS; GENERATOR RECEPTACLE AND ANGLE ADAPTER (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) AND NEMA 4X STAINLESS STEEL ENCLOSURE. SINGLE DOOR PANELS TO OPEN AWAY FROM WETWELL.
4. SEE DETAIL WW-17 FOR ANTENNA MOUNT DETAIL.
5. GROUND WIRE FROM SERVICE SHALL BE INSTALLED IN SCH 80 PVC CONDUIT.
6. ALL CONDUIT SHALL BE SCH 80 PVC
7. GENERATOR RECEPTACLE AND ANGLE ADAPTER (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F).
8. GENERATOR RECEPTACLE TO BE FIELD LOCATED w/ WASTEWATER COLLECTION STAFF (239) 252-2600
9. SIDE PANEL PENETRATIONS ARE ACCEPTABLE WITH USE OF MYERS HUBS.
10. PHASE MONITOR TO BE INSTALLED PARALLEL WITH FPL METER (ON FPL SIDE).
11. CHICO USED TO SEAL-OFF IN EXPLOSION PROOF FITTINGS UNDER J-BOX, PUTTY FOR ALL OTHER CONDUIT OPENINGS.
12. ALL UNI-STRUT TO BE MOUNTED FLUSH WITH POST AND PENETRATE POST WITH STAINLESS STEEL HARDWARE.
13. ALL MOUNTED EQUIPMENT MUST BE EVENLY SPACED, LEVEL, PLUMB AND INSTALLED IN A WORKMANLIKE MANNER.

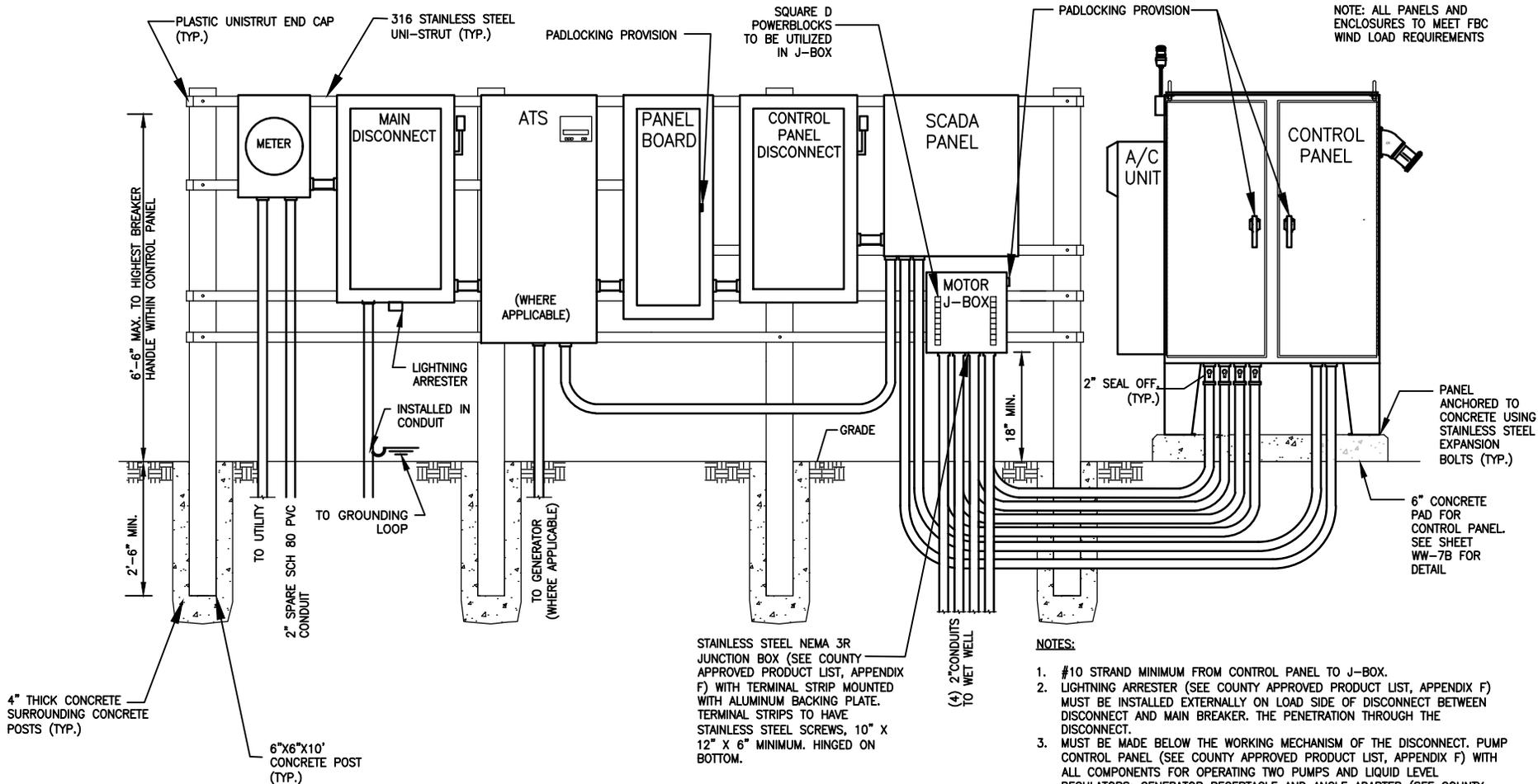
PUMP STATION CONTROL PANEL DETAIL

NTS

REVISION DATE:
JANUARY 2025



SHEET NO.
WW-9



NOTE: ALL PANELS AND ENCLOSURES TO MEET FBC WIND LOAD REQUIREMENTS

NOTES:

1. #10 STRAND MINIMUM FROM CONTROL PANEL TO J-BOX.
2. LIGHTNING ARRESTER (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) MUST BE INSTALLED EXTERNALLY ON LOAD SIDE OF DISCONNECT BETWEEN DISCONNECT AND MAIN BREAKER. THE PENETRATION THROUGH THE DISCONNECT.
3. MUST BE MADE BELOW THE WORKING MECHANISM OF THE DISCONNECT. PUMP CONTROL PANEL (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) WITH ALL COMPONENTS FOR OPERATING TWO PUMPS AND LIQUID LEVEL REGULATORS; GENERATOR RECEPTACLE AND ANGLE ADAPTER (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) AND NEMA 4X STAINLESS STEEL ENCLOSURE. SINGLE DOOR PANELS TO OPEN AWAY FROM WETWELL.
4. SEE DETAIL WW-17 FOR ANTENNA MOUNT DETAIL.
5. GROUND WIRE FROM SERVICE SHALL BE INSTALLED IN CONDUIT.
6. ALL CONDUIT SHALL BE SCH 80 PVC.
7. LABEL ALL EQUIPMENT USING MIN. 1/8" BLACK LETTERING ON WHITE PLASTIC LABELS FIX MOUNTED ONTO FRONT OF ALL PANELS AND CABINETS.
8. SIDE PANEL PENETRATIONS ARE ACCEPTABLE WITH USE OF MYERS HUBS.
9. PHASE MONITOR TO BE INSTALLED PARALLEL WITH FPL METER (ON FPL SIDE).
10. CHICO USED TO SEAL-OFF IN EXPLOSION PROOF FITTINGS UNDER J-BOX, PUTTY FOR ALL OTHER CONDUIT OPENINGS.
11. ADD EMERGENCY STOP FOR GENERATOR AND FIRE EXTINGUISHER ON POST FURTHEST FROM GENERATOR WITH APPROPRIATE SIGNAGE.
12. ALL UNI-STRUT TO BE MOUNTED FLUSH WITH POST AND PENETRATE POST WITH STAINLESS STEEL HARDWARE.
13. ALL MOUNTED EQUIPMENT MUST BE EVENLY SPACED, LEVEL, PLUMB AND INSTALLED IN A WORKMANLIKE MANNER.

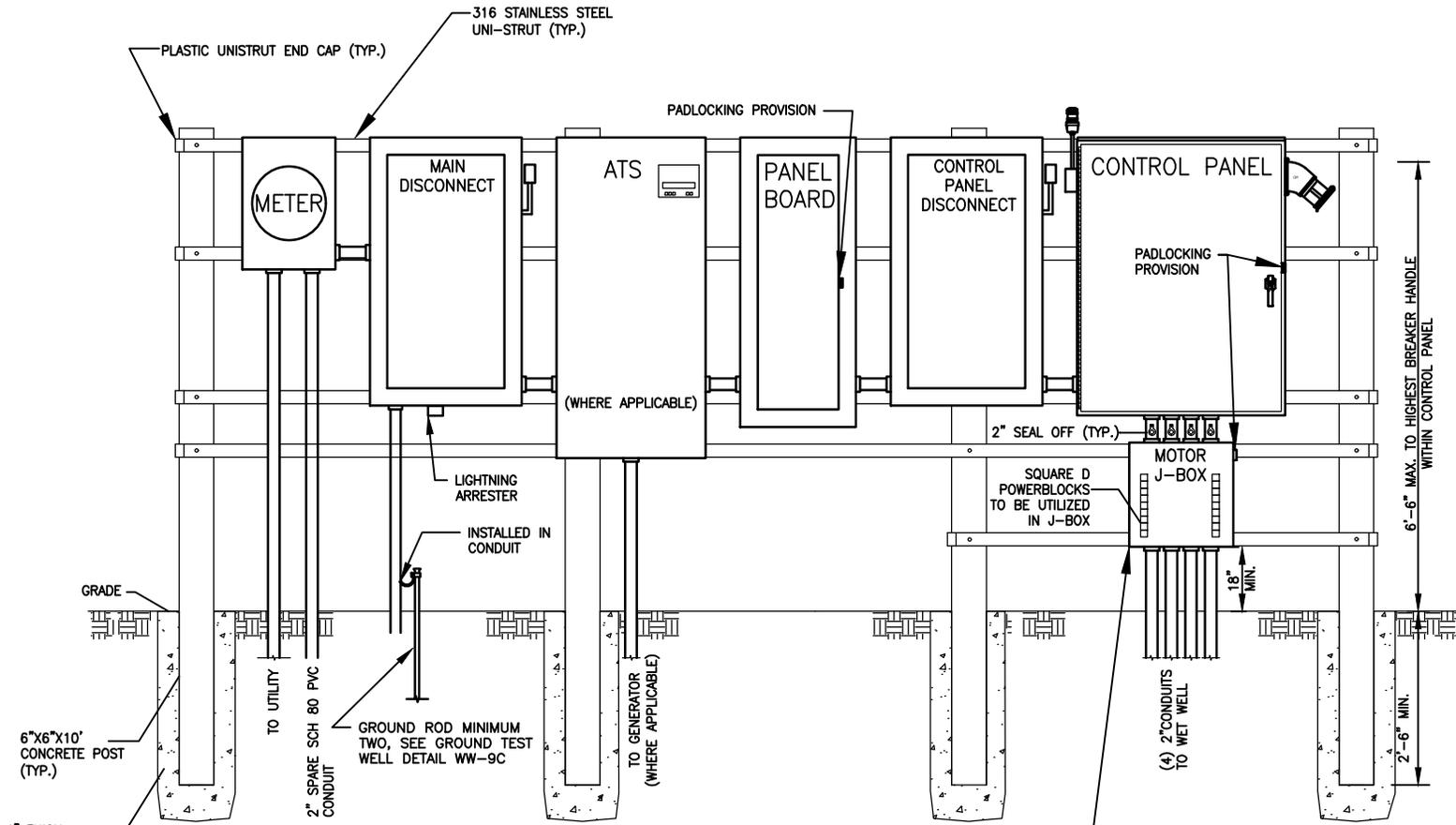
**COMMUNITY PUMP STATION CONTROL PANEL DETAIL
VFD STATION WITH GENERATOR**

REVISION DATE:
JANUARY 2025



SHEET NO.
WW-9A

NTS



4" THICK CONCRETE SURROUNDING CONCRETE POSTS (TYP.)

NOTES:

1. #10 STRAND MINIMUM FROM CONTROL PANEL TO J-BOX.
2. LIGHTNING ARRESTER (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) MUST BE INSTALLED EXTERNALLY ON LOAD SIDE OF DISCONNECT BETWEEN DISCONNECT AND MAIN BREAKER. THE PENETRATION THROUGH THE DISCONNECT MUST BE MADE BELOW THE WORKING MECHANISM OF THE DISCONNECT.
3. PUMP CONTROL PANEL (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) WITH ALL COMPONENTS FOR OPERATING TWO PUMPS AND LIQUID LEVEL REGULATORS; GENERATOR RECEPTACLE AND ANGLE ADAPTER (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) AND NEMA 4X STAINLESS STEEL ENCLOSURE. SINGLE DOOR PANELS TO OPEN AWAY FROM WETWELL.
4. SEE DETAIL WW-17 FOR ANTENNA MOUNT DETAIL.
5. GROUND WIRE FROM SERVICE SHALL BE INSTALLED IN CONDUIT.
6. ALL CONDUIT SHALL BE SCH 80 PVC.
7. LABEL ALL EQUIPMENT USING MIN. 1/2" BLACK LETTERING ON WHITE PLASTIC LABELS FIX MOUNTED ONTO FRONT OF ALL PANELS AND CABINETS.
8. SIDE PANEL PENETRATIONS ARE ACCEPTABLE WITH USE OF MYERS HUBS.
9. PHASE MONITOR TO BE INSTALLED PARALLEL WITH FPL METER (ON FPL SIDE).
10. CHICO USED TO SEAL-OFF IN EXPLOSION PROOF FITTINGS UNDER J-BOX, PUTTY FOR ALL OTHER CONDUIT OPENINGS.
11. ADD EMERGENCY STOP FOR GENERATOR AND FIRE EXTINGUISHER ON POST FURTHEST FROM GENERATOR WITH APPROPRIATE SIGNAGE.
12. ALL UNI-STRUT TO BE MOUNTED FLUSH WITH POST AND PENETRATE POST WITH STAINLESS STEEL HARDWARE.
13. ALL MOUNTED EQUIPMENT MUST BE EVENLY SPACED, LEVEL, PLUMB AND INSTALLED IN A WORKMANLIKE MANNER.

STAINLESS STEEL NEMA 3R JUNCTION BOX (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) WITH TERMINAL STRIP MOUNTED WITH ALUMINUM BACKING PLATE. TERMINAL STRIPS TO HAVE STAINLESS STEEL SCREWS, 10" X 12" X 6" MINIMUM. HINGED ON BOTTOM.

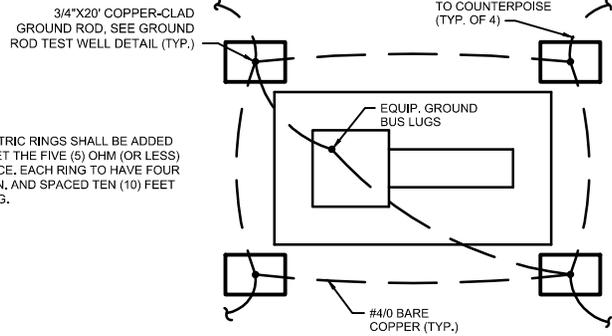
COMMUNITY PUMP STATION CONTROL PANEL DETAIL NON-VFD STATION WITH GENERATOR

NTS

REVISION DATE:	JANUARY 2025

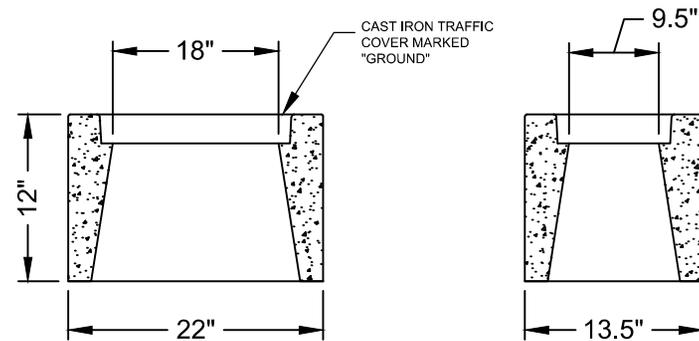


SHEET NO.
WW-9B

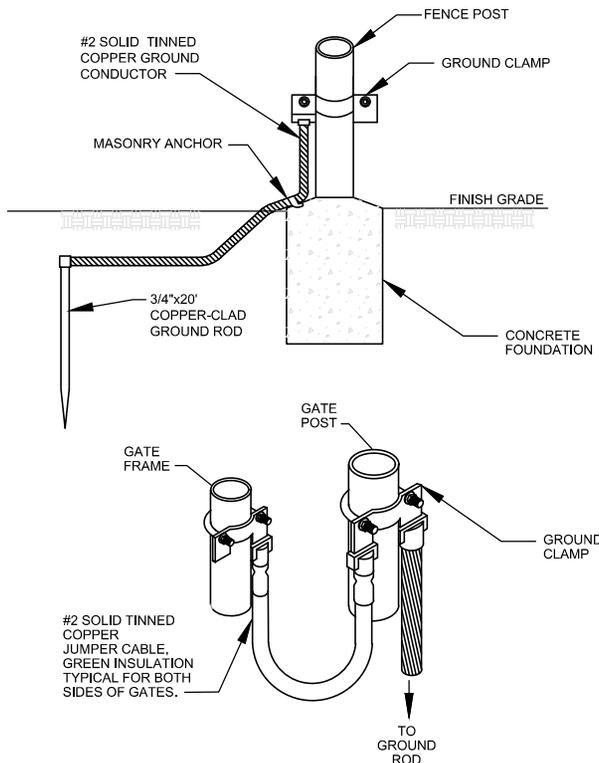


NOTES:
 1. ADDITIONAL CONCENTRIC RINGS SHALL BE ADDED AS REQUIRED TO MEET THE FIVE (5) OHM (OR LESS) SPECIFIED RESISTANCE, EACH RING TO HAVE FOUR (4) GROUND RODS MIN, AND SPACED TEN (10) FEET FROM THE INNER RING.

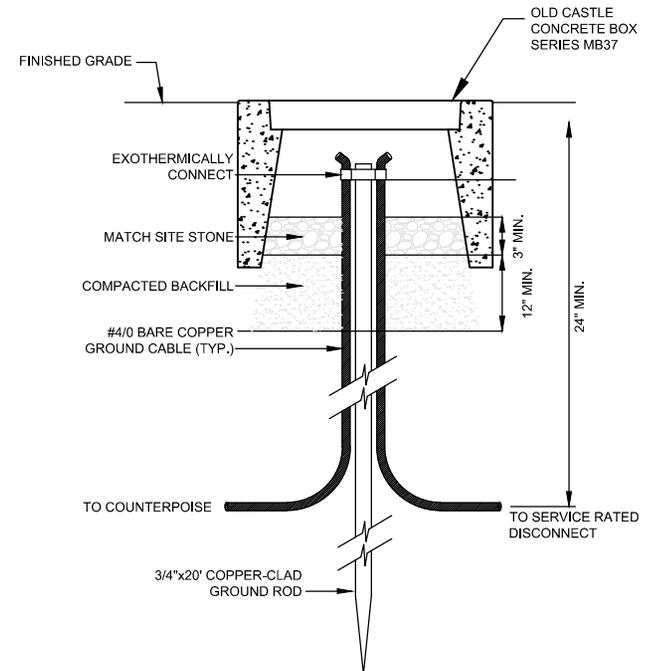
GROUND MAT DETAIL
 NOT TO SCALE



GROUND TEST WELL DETAIL
 NOT TO SCALE



FENCE POST/GATE BONDING DETAIL
 NOT TO SCALE



PUMP STATION LIGHTNING PROTECTION DETAILS

REVISION DATE:
 JAN. 2015

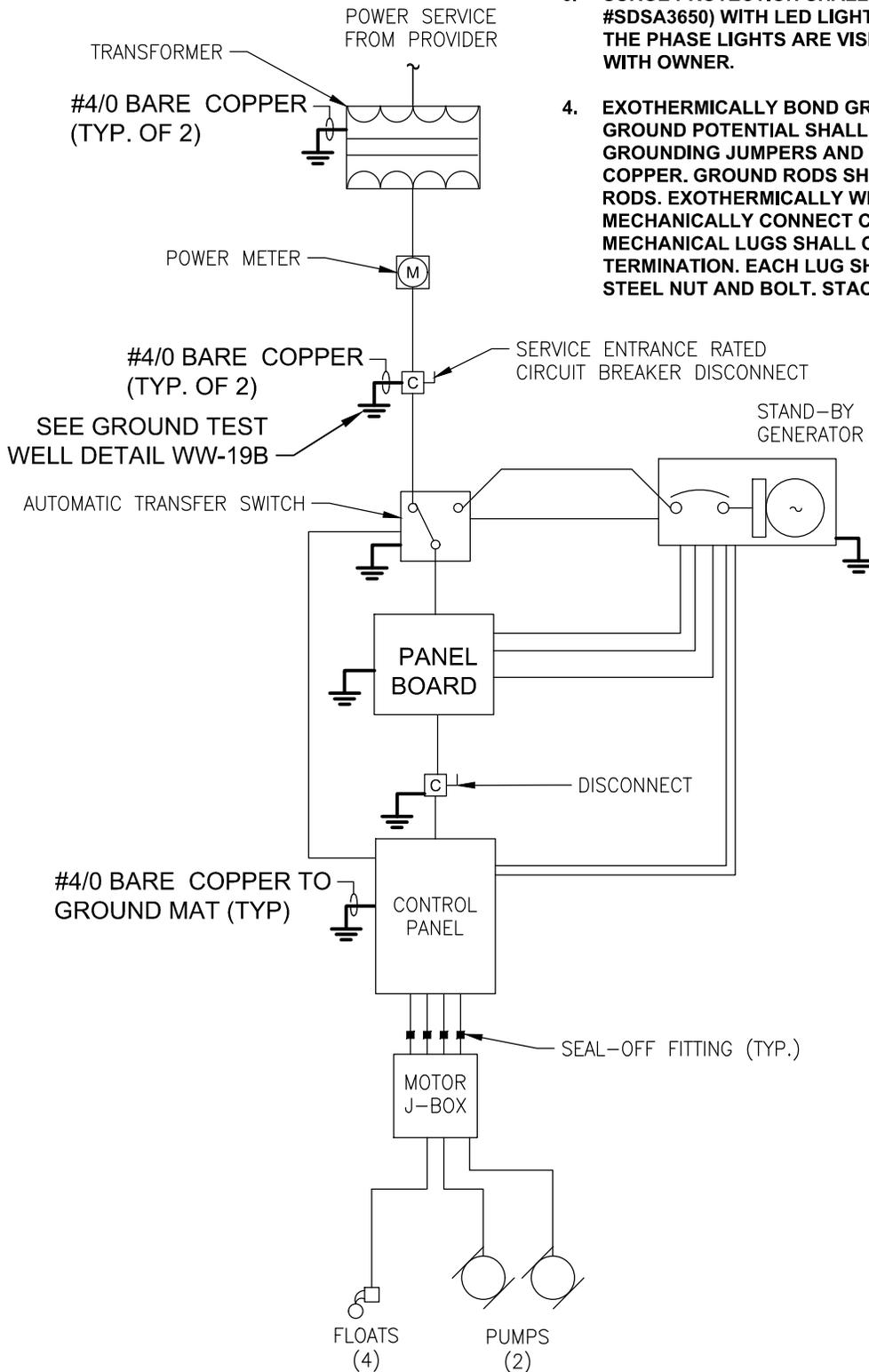
NTS



SHEET NO.
 WW-9C

NOTES

1. BOND FENCE AND VEHICLE ACCESS GATE TO COUNTERPOISE.
2. PROVIDE LIGHTNING PROTECTION FOR SCADA ANTENNA.
3. SURGE PROTECTION SHALL BE SQUARE D (THREE PHASE: #SDSA3650) WITH LED LIGHTS AND MOUNTED IN A FASHION THAT THE PHASE LIGHTS ARE VISIBLE. COORDINATE EXACT LOCATION WITH OWNER.
4. EXOTHERMICALLY BOND GROUNDING JUMPERS TO COUNTERPOISE. GROUND POTENTIAL SHALL BE CONSISTENT FOR ENTIRE SITE. GROUNDING JUMPERS AND COUNTERPOISE SHALL BE #4/0 BARE COPPER. GROUND RODS SHALL BE 3/4" X 20' COPPER-CLAD GROUND RODS. EXOTHERMICALLY WELD CONNECTIONS BELOW GRADE. MECHANICALLY CONNECT CONNECTIONS ABOVE GRADE. MECHANICAL LUGS SHALL ONLY HAVE ONE WIRE LANDED IN EACH TERMINATION. EACH LUG SHALL BE FASTENED WITH A STAINLESS STEEL NUT AND BOLT. STACKING OF INDIVIDUAL LUGS WILL NOT BE ACCEPTABLE. GROUND BOXES SHALL BE 14" LONG QUAZITE #PC1118CA0017 OR #PG1118BA12, INSTALL LEVEL WITH THE ADJACENT GROUND, PROVIDE 57 STONE OR MATCH SITE STONE IN BOX, WITH GROUND ROD LOCATED OFF CENTER OF BOX. QUAZITE BOX COVER TO READ "GROUND". EXPOSED GROUNDING SHALL BE IN 1" SCHEDULE 80 PVC OR LIQUID TIGHT FLEXIBLE CONDUIT.
5. PROVIDE COUNTY SIGNED INSPECTION OR PHOTO OF ALL CAD-WELDED SPLICES AND UNDERGROUND TAPS. PROVIDE GROUND TEST REPORT TO COUNTY VERIFYING COUNTERPOISE RESISTANCE IS LESS THAN 5 OHMS.



**COMMUNITY PUMP STATION – RISER
DIAGRAM WITH GENERATOR BACKUP**

NTS

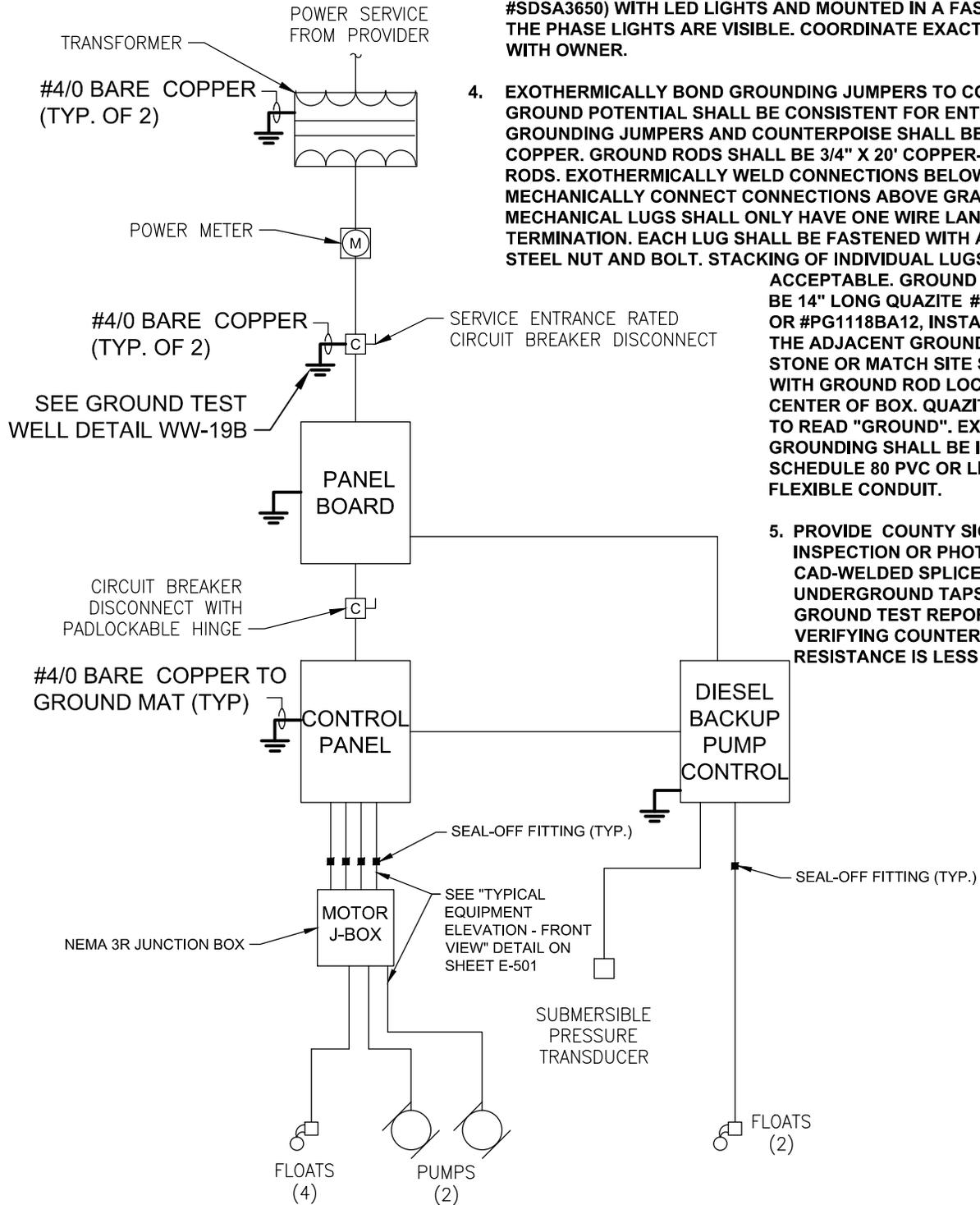
REVISION DATE:
JAN. 2015



SHEET NO.
WW-9D

NOTES

1. BOND FENCE AND ACCESS GATE TO COUNTERPOISE.
2. PROVIDE LIGHTNING PROTECTION FOR SCADA ANTENNA.
3. SURGE PROTECTION SHALL BE SQUARE D (THREE PHASE: #SDSA3650) WITH LED LIGHTS AND MOUNTED IN A FASHION THAT THE PHASE LIGHTS ARE VISIBLE. COORDINATE EXACT LOCATION WITH OWNER.
4. EXOTHERMICALLY BOND GROUNDING JUMPERS TO COUNTERPOISE. GROUND POTENTIAL SHALL BE CONSISTENT FOR ENTIRE SITE. GROUNDING JUMPERS AND COUNTERPOISE SHALL BE #4/0 BARE COPPER. GROUND RODS SHALL BE 3/4" X 20' COPPER-CLAD GROUND RODS. EXOTHERMICALLY WELD CONNECTIONS BELOW GRADE. MECHANICALLY CONNECT CONNECTIONS ABOVE GRADE. MECHANICAL LUGS SHALL ONLY HAVE ONE WIRE LANDED IN EACH TERMINATION. EACH LUG SHALL BE FASTENED WITH A STAINLESS STEEL NUT AND BOLT. STACKING OF INDIVIDUAL LUGS WILL NOT BE ACCEPTABLE. GROUND BOXES SHALL BE 14" LONG QUAZITE #PC1118CA0017 OR #PG1118BA12, INSTALL LEVEL WITH THE ADJACENT GROUND, PROVIDE 57 STONE OR MATCH SITE STONE IN BOX, WITH GROUND ROD LOCATED OFF CENTER OF BOX. QUAZITE BOX COVER TO READ "GROUND". EXPOSED GROUNDING SHALL BE IN 1" SCHEDULE 80 PVC OR LIQUID TIGHT FLEXIBLE CONDUIT.
5. PROVIDE COUNTY SIGNED INSPECTION OR PHOTO OF ALL CAD-WELDED SPLICES AND UNDERGROUND TAPS. PROVIDE GROUND TEST REPORT TO COUNTY VERIFYING COUNTERPOISE RESISTANCE IS LESS THAN 5 OHMS.



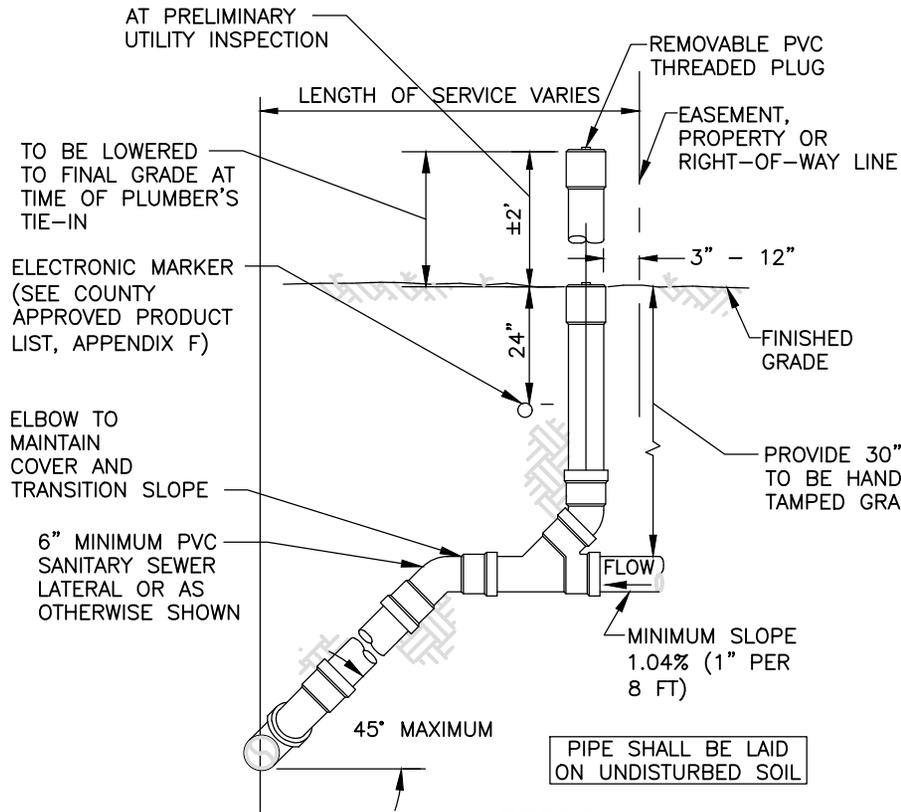
**COMMUNITY PUMP STATION – RISER
DIAGRAM WITH DIESEL BACKUP PUMP**

NTS

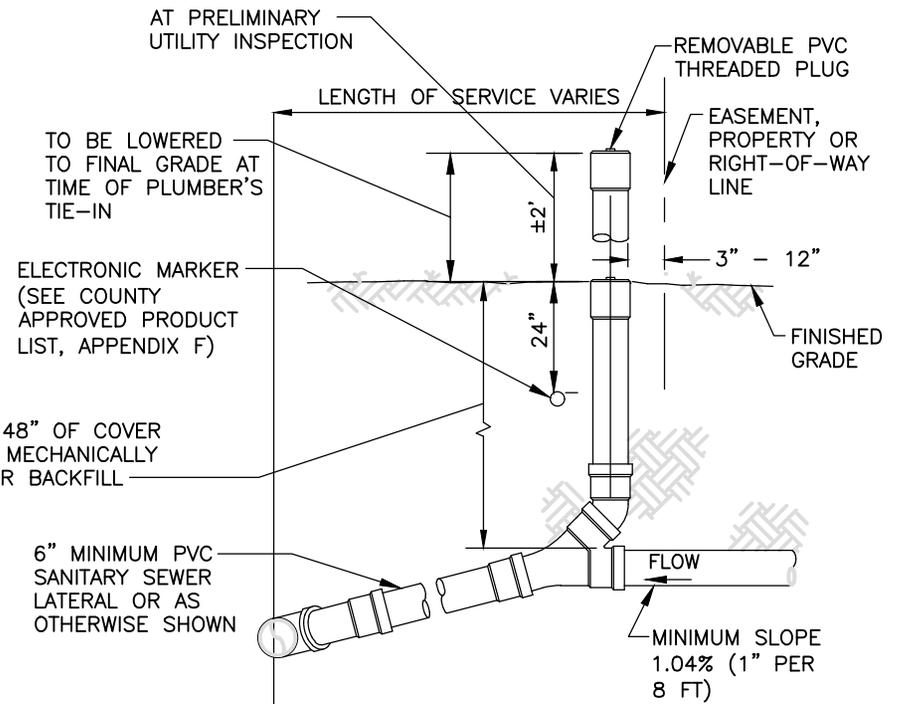
REVISION DATE:
JAN. 2015



SHEET NO.
WW-9E



SECTION
DEPTH 8' AND OVER



SECTION
DEPTH LESS THAN 8'

NOTE:

AT TIME OF PLUMBER'S TIE-IN,
ADD CONCRETE COLLAR AS PER
DETAIL WW-12.

SEWER CONNECTION DETAILS
PROPERTY, RIGHT-OF-WAY OR EASEMENT LINE

NTS

REVISION DATE:
MAY 2009



SHEET NO.
WW-10

SEWER CLEAN-OUT RIM AND COVER (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) FLUSH IN PAVEMENT AREAS

REMOVABLE PVC THREADED PLUG

ELECTRONIC MARKER
(SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F)

CAST IRON OR TRAFFIC TYPE METER BOX

PROVIDE CLEAN-OUT ON SEWER LATERALS AT UTILITY EASEMENT LIMITS. SEE PLANS

3/4" CRUSHED ROCK

SEWER BRANCH WYE

45° BEND

← FLOW

6" SANITARY LATERAL

MINIMUM SLOPE

ELEVATION

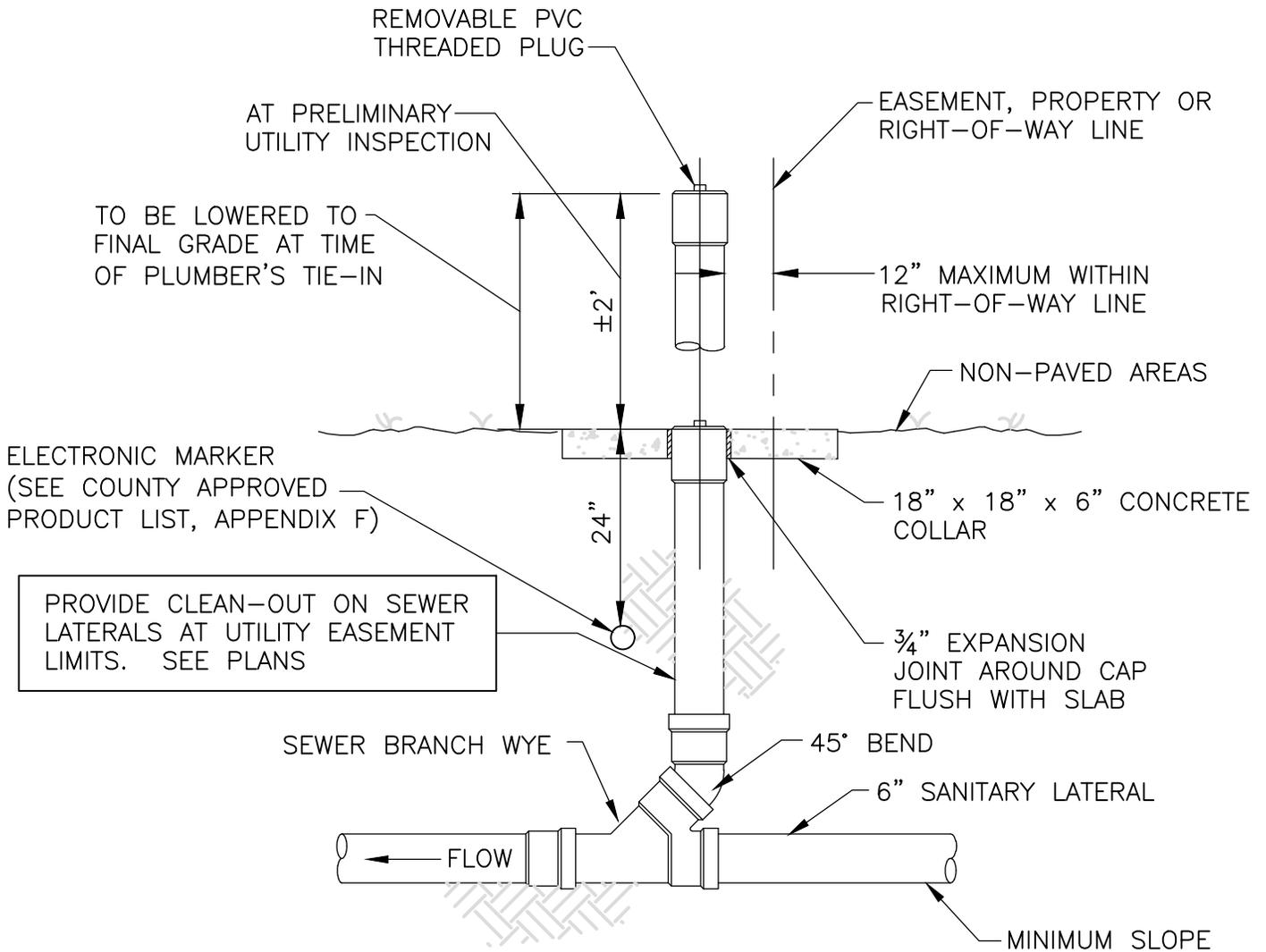
**SEWER CLEAN-OUT DETAIL
PAVED AREAS**

REVISION DATE:
JULY 2018



SHEET NO.
WW-11

NTS



ELEVATION

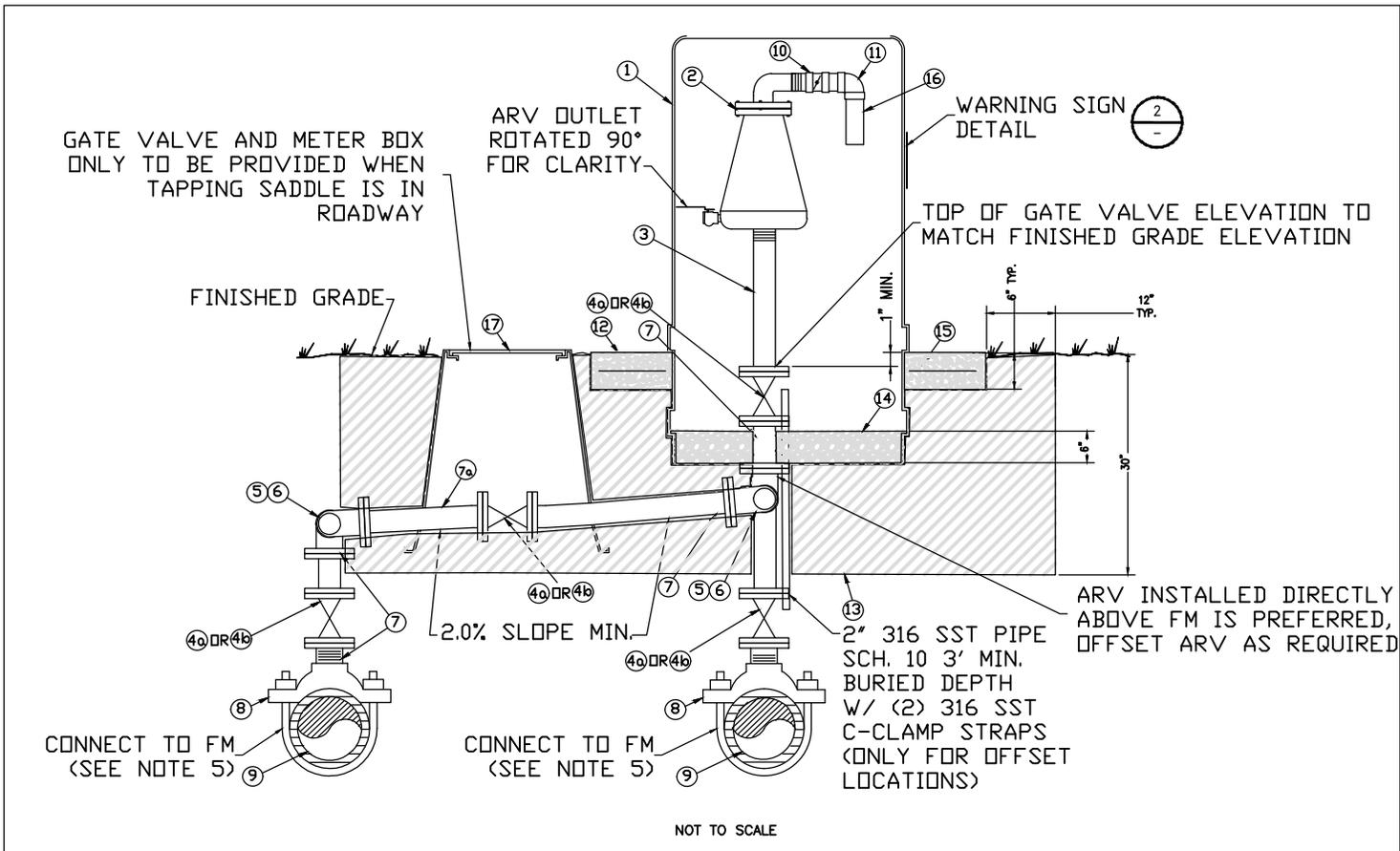
**SEWER CLEAN-OUT DETAIL
NON PAVED AREAS**

REVISION DATE:
JANUARY 2014



SHEET NO.
WW-12

NTS



NOTE:
 PROVIDE 3" DIAMETER BRASS DISC ANCHORED IN CONCRETE SLAB.

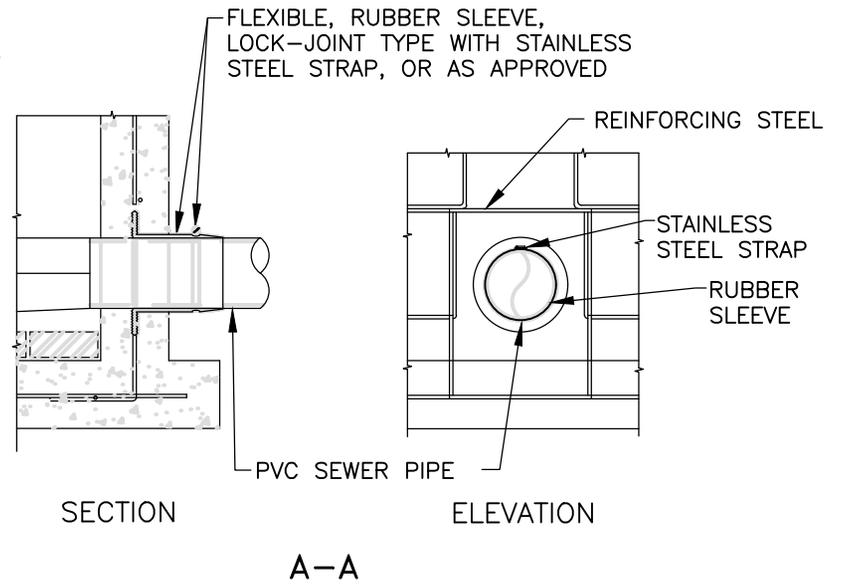
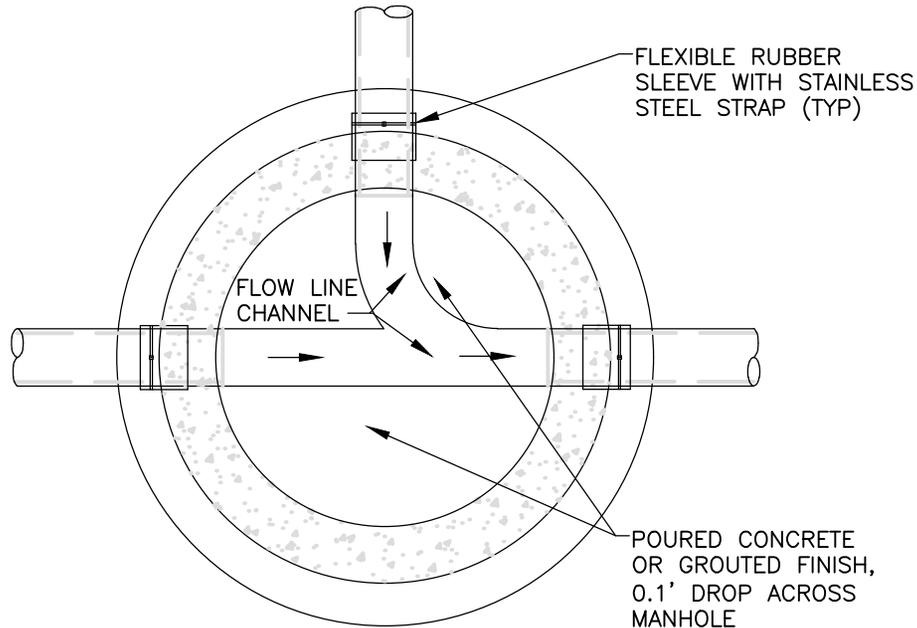
1 ARV BRASS DISC DETAIL
 NOT TO SCALE

NOTE:
 WARNING SIGN SHALL BE ATTACHED TO ENCLOSURE AND SHALL BE FIBERGLASS.

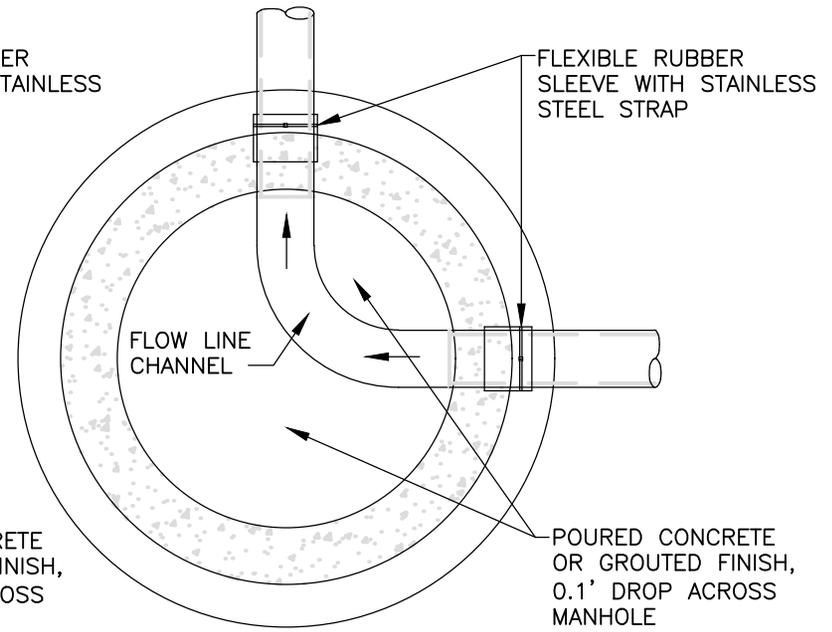
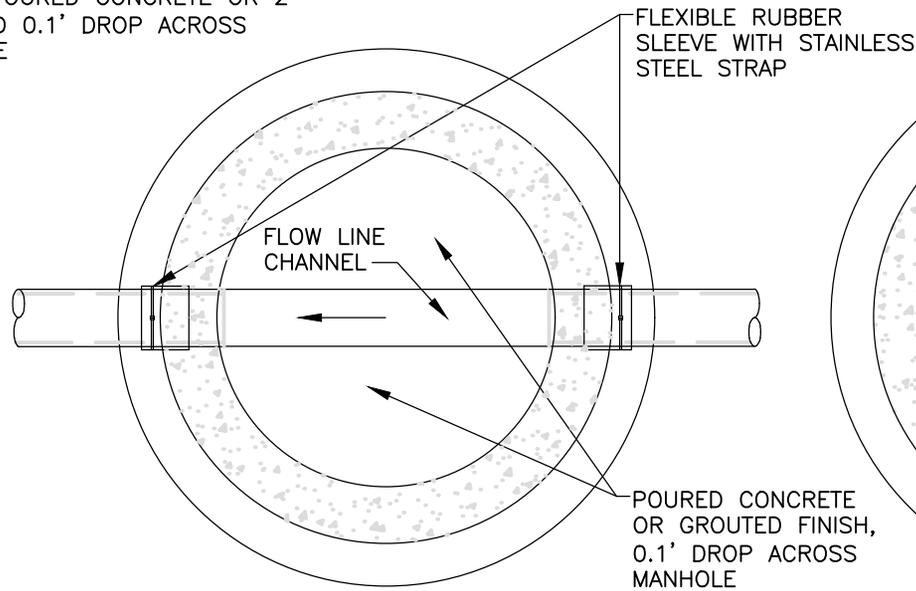
2 WARNING SIGN DETAIL
 NOT TO SCALE

MATERIAL		
ITEM	QUANT.	DESCRIPTION
1	1	VENTED ENCLOSURE, WATER PLUS H30 MODEL FOR 2" & 3" ARVS, WATER PLUS H40 MODEL FOR ARVS >4"
2	1	AIR RELEASE VALVE, (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) (<2" AND 3" THR, >4" FLG)
3	1	SCH 80 PVC NIPPLE, LENGTH AS REQUIRED, THR X THR (<2" & 3" ARV), 316 SST VAN STONE FLANGE (VSF) X 316 VSF (>4" ARV)
4a	UP TO 3	2" DR 3" 316 SST BALL VALVE, FULL PORT, 316 SST HANDLE (THR)
4b	UP TO 3	4" - 8" PLUG VALVE (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) (FLG)
5	UP TO 4	90° ELBOW, 316 SST (THR FOR 2" AND 3" ARVS, FLG FOR >4" ARVS)
6	2	SHORT NIPPLE, 316 SST, (THR BOTH ENDS FOR 2" AND 3" ARVS, FLG FOR >4" ARV)
7	2	316 SST PIPE, LENGTH AS REQUIRED, THR CONN FOR 2" AND 3", FLG CONN >4"
7a	2	2" PE 3408/3608 FOR 2" ARVS. 3" - 8" HDPE PIPE, PE 3608, DR 17 FOR ARVS 3" - 8".
8	1	DOUBLE STRAP TAPPING SADDLE, 316 SST WITH THREADED OUTLET FOR 2" & 3" ARV'S, DI TEE (MJ X MJ X FLANGE) FOR ARV'S >4"
9	2	4" & LARGER PIPE, D.I. OR PVC (DR-18)
10	1	1-1/2" CHECK VALVE, PVC, BY ARV MANUFACTURER
11	1	1-1/2" X 90° ELBOW, PVC SCH 80, BY ARV MANUFACTURER
12	1	CONCRETE SLAB FOR ENCLOSURES, 3000 PSI CONCRETE
13	1	COMPACTED FILL PER COLLIER COUNTY TYPICAL DETAIL, G-1
14	1	57 STONE
15	1	(2) #4 BARS CONTINUOUS & (4) #4 BARS DIAGONAL (<2" MIN. COVER)
16	1	1-1/2" SCH 80 PVC, LENGTH AS REQUIRED
17	1	12" ALLIANCE METER BOX (ARV'S <4"), 18" ALLIANCE METER BOX (ARV'S >4"), BLACK

- NOTES:
- PROVIDE DARK GREEN REFLECTIVE MARKER ON CURB OR EDGE OF ROADWAY CLOSEST TO THE ARV.
 - PROVIDE 3'-0" RADIUS AROUND ARV ENCLOSURE CLEAR OF ALL LANDSCAPING FOR MAINTENANCE ACCESS.
 - PROVIDE 316 SST PIN ALLEN BOLT KEY SYSTEM WITH EACH ENCLOSURE.
 - THE THREADED OR FLANGED OUTLET SIZE OF THE ARV SHALL BE SIZED BY THE DESIGN ENGINEER. A MINIMUM DIAMETER OF 2-INCHES SHALL BE PROVIDED.
 - TAPPING SADDLE IS DEPICTED HOWEVER A TEE (DIA. OF FM X SIZE OF ARV) SHALL BE INSTALLED INSTEAD OF A TAPPING SADDLE FOR ARV'S >4".



FLOW LINE CHANNELS SHALL BE CLAY BRICK HAVING A MINIMUM OF 2" POURED CONCRETE OR 2" GROUTED 0.1' DROP ACROSS MANHOLE



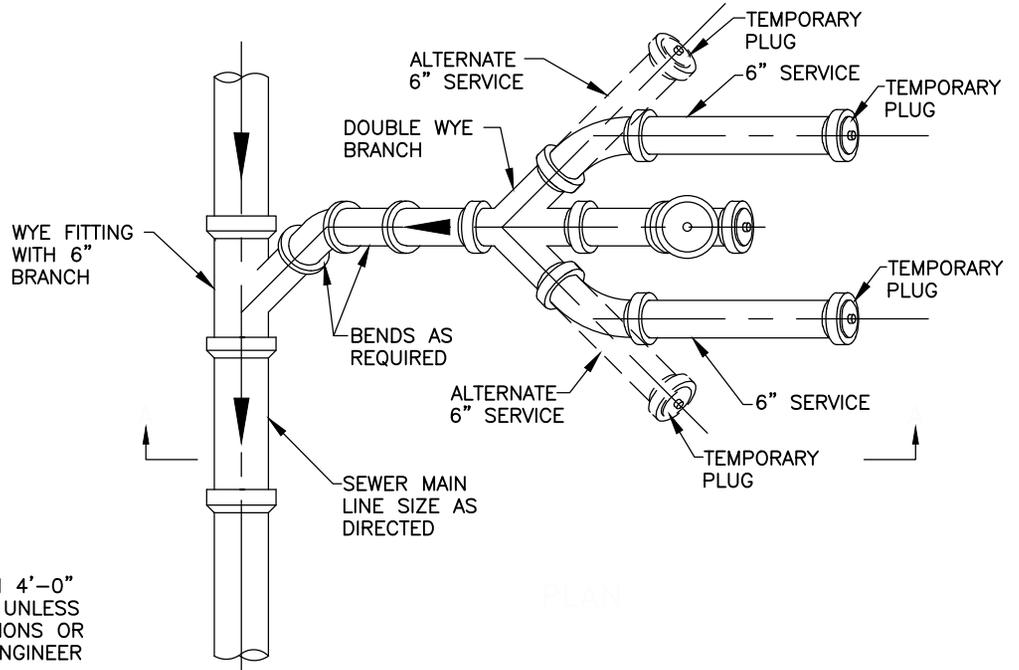
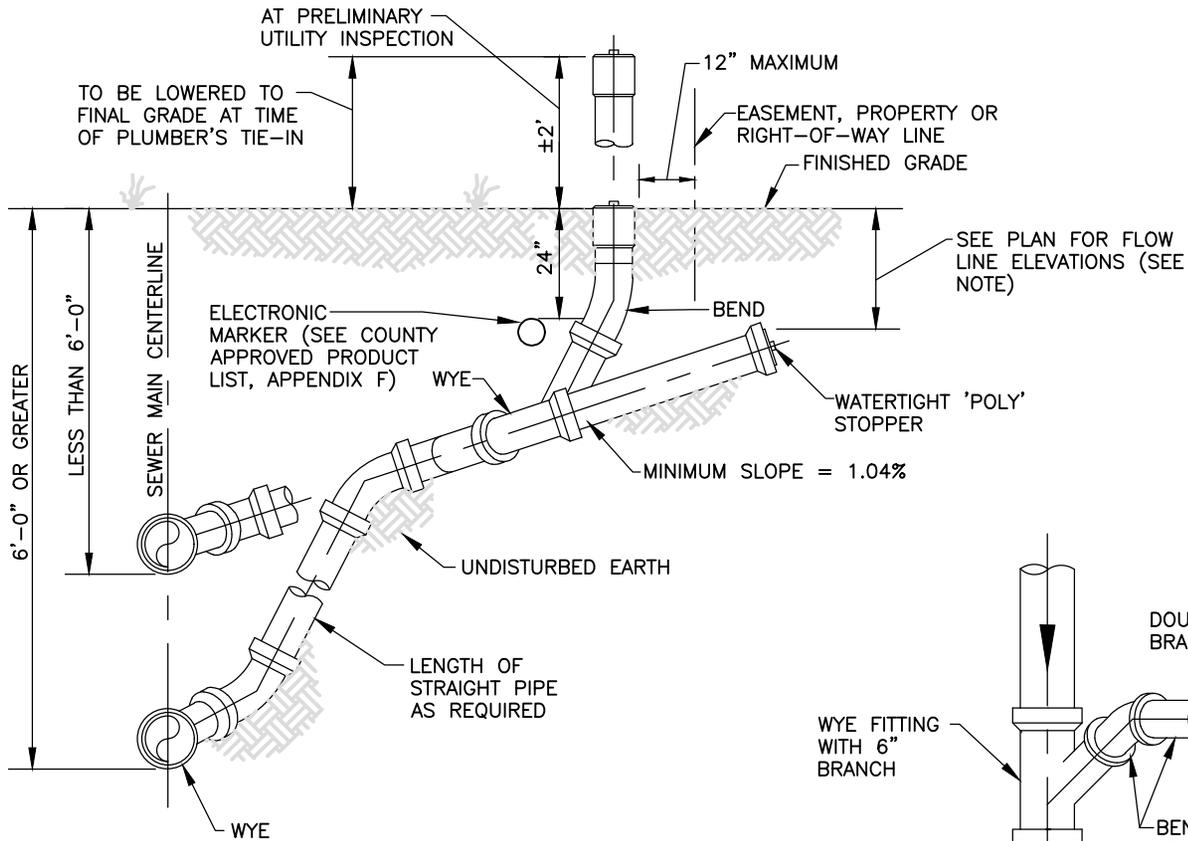
TYPICAL FLOW LINE CHANNELS DETAIL

REVISION DATE:
APRIL 2006

NTS



SHEET NO.
WW-15



NOTE:

ALL SERVICES TO HAVE MINIMUM 4'-0" COVER FROM NATURAL GROUND UNLESS PROHIBITED BY EXISTING CONDITIONS OR OTHERWISE SPECIFIED BY THE ENGINEER

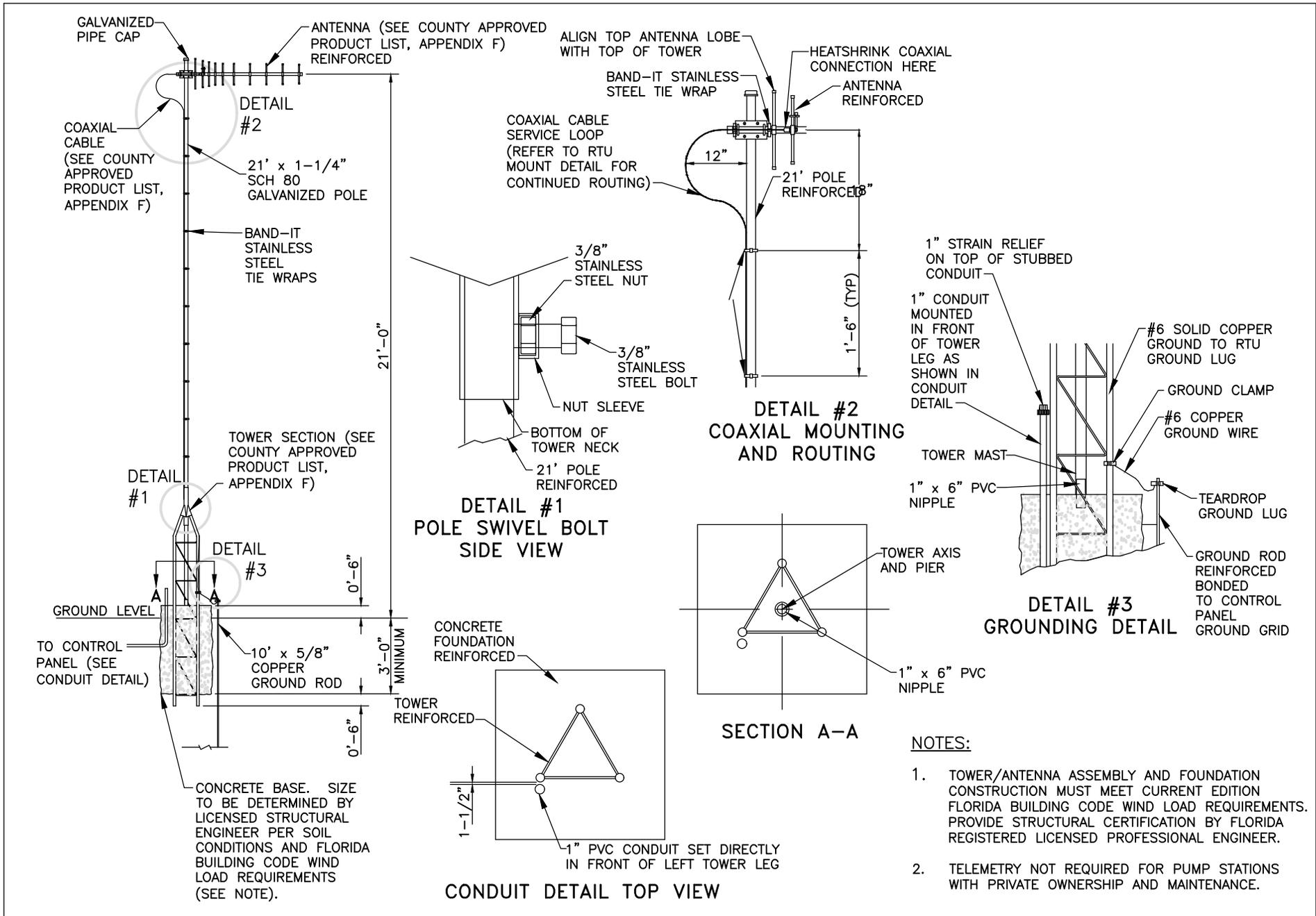
DOUBLE SEWER CLEAN-OUT DETAIL

REVISION DATE:
MAY 2009

NTS



SHEET NO.
WW-16



NOTES:

1. TOWER/ANTENNA ASSEMBLY AND FOUNDATION CONSTRUCTION MUST MEET CURRENT EDITION FLORIDA BUILDING CODE WIND LOAD REQUIREMENTS. PROVIDE STRUCTURAL CERTIFICATION BY FLORIDA REGISTERED LICENSED PROFESSIONAL ENGINEER.
2. TELEMETRY NOT REQUIRED FOR PUMP STATIONS WITH PRIVATE OWNERSHIP AND MAINTENANCE.

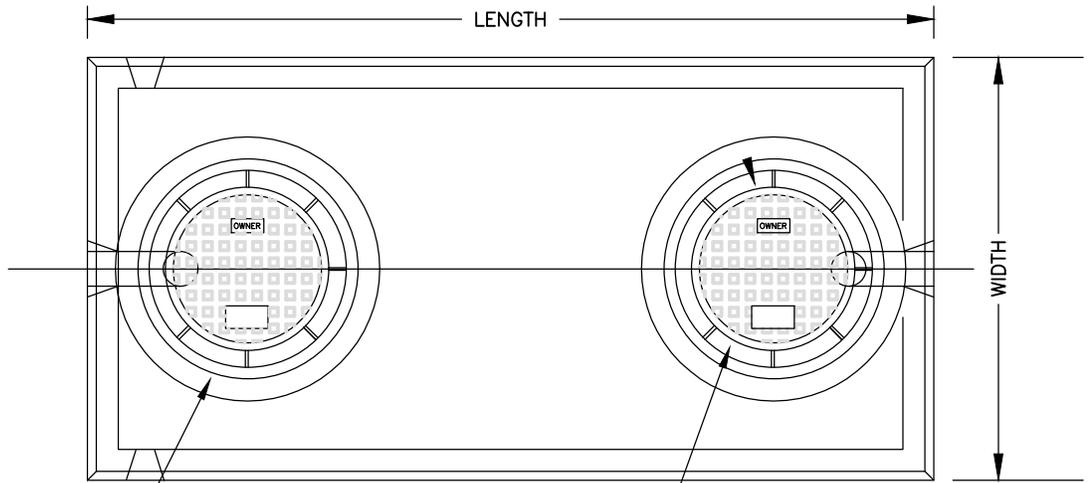
TELEMETRY ANTENNA MOUNT DETAIL

REVISION DATE:	AUGUST 2008



SHEET NO.
WW-17

NTS



PLAN

WATERTIGHT SEWER MANHOLE FRAME AND COVER (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F), FLUSH IN PAVED AREAS AND 2-1/2" ABOVE THE FINISH GRADE IN UNPAVED AREAS (24" MINIMUM DIAMETER)

CAST IRON FRAME AND COVER (TYP)

MINIMUM OF TWO PRECAST CONCRETE OR HDPE RISER RINGS OR BRICK AND MORTAR (3 COURSES MAXIMUM) BETWEEN MANHOLE AND CAST IRON FRAME (TYP)

UNPAVED AREA

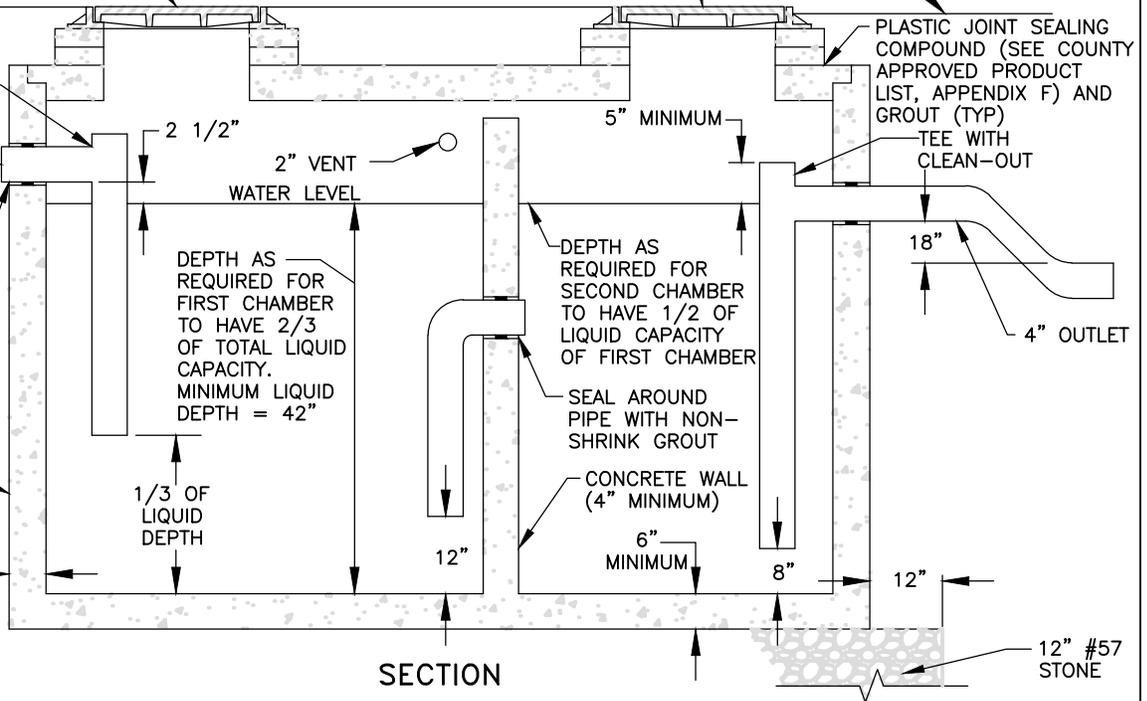
PAVEMENT

TEE WITH CLEAN-OUT
3" OR LARGER PVC PIPES (TYP). USE SEALING ELEMENT (SEE COUNTY APPROVED PRODUCT LIST, APPENDIX F) ON INLET AND OUTLET PIPES WITH STAINLESS STEEL HARDWARE

CORED OR FORMED CIRCULAR OPENING (TYP)

PRECAST CONCRETE GREASE INTERCEPTOR

6" MINIMUM



SECTION

NOTES:

- GREASE INTERCEPTOR SHALL COMPLY WITH STRUCTURAL REQUIREMENTS APPLICABLE TO SEPTIC TANKS EXCEPT THAT THE INLET INVERT SHALL DISCHARGE A MINIMUM 2-1/2 INCHES ABOVE THE LIQUID LEVEL LINE AND THE OUTLET PIPE SHALL HAVE A TEE WITH A MINIMUM DIAMETER OF FOUR (4) INCHES THAT EXTENDS TO WITHIN 8 INCHES OF THE BOTTOM OF THE TANK.
- INTERCEPTOR MUST BE LOCATED SO AS TO PROVIDE EASY ACCESS FOR ROUTINE INSPECTION AND CLEANING.
- WHERE A GREASE INTERCEPTOR IS REQUIRED, ONLY KITCHEN WASTEWATER SHALL FIRST PASS THROUGH THE INTERCEPTOR AND THEN BE DISCHARGED INTO THE FIRST COMPARTMENT OF A SEPTIC TANK OR OTHER APPROVED SYSTEM.
- SIZING OF GREASE INTERCEPTORS SHALL BE BASED ON THE DETAIL WW-18A EQUATIONS. THE MINIMUM VOLUME OF ANY GREASE INTERCEPTOR SHALL BE 750 GALLONS AND THE MAXIMUM VOLUME OF A SINGLE GREASE INTERCEPTOR SHALL BE 1250 GALLONS. WHEN THE REQUIRED EFFECTIVE CAPACITY OF THE GREASE INTERCEPTOR IS GREATER THAN 1250 GALLONS, INSTALLATION OF GREASE TRAPS IN SERIES IS REQUIRED.
- KEYED JOINT SEALED WITH BUTYL RUBBER.

GREASE INTERCEPTOR

NTS

REVISION DATE:
AUGUST 2008



Collier County

SHEET NO.
WW-18

**SIZING FORMULA FOR RESTAURANTS, COUNTRY CLUBS
AND ASSISTED LIVING FACILITIES**

$$(S) \times (GS) \times (HR/12) \times LF = \text{EFFECTIVE CAPACITY OF GREASE INTERCEPTOR IN GALLONS}$$

WHERE:

- S = NUMBER OF SEATS IN DINING AREA.
- GS = GALLONS OF WASTE WATER PER SEAT
(USE 25 GALLONS FOR RESTAURANTS WITH CHINA DISHES AND/OR AUTOMATIC DISHWASHER)
(USE 10 GALLONS FOR RESTAURANTS WITH PAPER OR BASKETS AND NO DISHWASHER)
- HR = NUMBER OF HOURS RESTAURANT IS OPEN
- LF = LOADING FACTOR
(USE 2.00 INTERSTATE HIGHWAY; 1.50 OTHER FREEWAYS; 1.25 RECREATIONAL AREA; 1.00 MAIN HIGHWAY; 0.75 OTHER HIGHWAY)

**SIZING FORMULA FOR SCHOOLS AND OTHER ESTABLISHMENTS
WITH COMMERCIAL KITCHENS (NO DISHWASHER)**

$$(M) \times (GM) \times (LF) = \text{EFFECTIVE CAPACITY OF GREASE INTERCEPTOR IN GALLONS}$$

WHERE:

- M = MEALS PREPARED PER DAY
- GM = GALLONS OF WASTE WATER PER MEAL
(USE 5 GALLONS)
- LF = LOADING FACTOR
(USE 1.00 WITH DISHWASHING MACHINE AND 0.75 WITHOUT DISHWASHING MACHINE)

**NO COMMERCIAL DISHWASHER, NO CHINA OR DISPOSAL CHINA ONLY
CAPACITY OF GREASE TRAPS**

TOTAL FLOW-THROUGH RATING (GPM)	GREASE RETENTION CAPACITY (POUNDS)
4	8
6	12
7	14
9	18
10	20
12	24
14	28
15	30
18	36
20	40
25	50
35	70
50	100

SECTION 4

APPENDICES

For the latest revisions to the Appendices visit:

**Collier County Public Utilities
Engineering and Project Management Resources Webpage.**

**COLLIER COUNTY WATER-SEWER DISTRICT
UTILITIES STANDARDS MANUAL**

SECTION 4

APPENDICES

Table of Contents

Appendix A	Utility Deviation Form
Appendix B	Water Meter Sizing Form
Appendix C	Final Waiver of Liens – Conveyance of Utilities Facilities to County
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Appendix E	Vendor and Manufacturer Approval Application Form
Appendix F	County Approved Product List
Appendix G	Approved Backflow Devices
Appendix H	Basic User Application & Agreement for Delivery and Reuse of IQ Water



**COLLIER COUNTY PUBLIC UTILITIES DEPARTMENT
ENGINEERING AND PROJECT MANAGEMENT DIVISION**

**3339 East Tamiami Trail
Suite 303
Naples, FL 34112
Phone: (239) 252-8836**

Any request for a deviation from the Collier County Water-Sewer District Utilities Standards and Procedures must be submitted on the Utility Deviation Form and should include all required information for a faster and more efficient process. Please email your request to UtilityPlanning@colliercountyfl.gov.

Please maintain on deviation per form and select the appropriate type(s) of deviation (Wastewater, Water, IQ Water, or Grease Trap). Provide the associated land use application number assigned by the Growth Management Department. Ensure to select whether the deviation is on a privately owner or county owner system. Include a drawing that has the area(s) of interest highlighted for quick referencing.

Please include any and all equipment specification information, pressures and velocities of flows, or other pertinent documentation and a cover letter to give additional information that may not be addressed on the form.

For Grease Trap Deviations, please include a cover letter giving any relevant information regarding the kitchen and its use, a copy of the menu of what is to be cooked and served, and a floor plan of the kitchen and seating area.

Typically, Utility Deviation requests are processed within 5-10 business days. You will be notified by email of the outcome of your deviation request. If the deviation is rejected, a meeting may be requested with the appropriate Director and staff to discuss.

If you have any questions regarding this process, please call (239) 252-8836 or email your questions to UtilityPlanning@colliercountyfl.gov.



UTILITY DEVIATION FORM
Petitioners Request

Date: _____ Wastewater Water IQ Water Grease Trap

Land Use Application # _____ Privately Owned County Owned

Project Name: _____

Folio Number(s): _____

Petitioner's Name & Business Name: _____

Business Address: _____

Phone #: _____

Email: _____

Reason for Request: _____

How does this Request Differ from Ordinance: _____

Impact of this Request of Affected Area: _____

Impact of this Request on the Maintenance of the System: _____

Explain Benefits Request Will Have to the Operation/Maintenance of the Collier County Utility

System: _____

Additional Comments: _____

<p style="text-align: center;">REQUIRED INFORMATION</p> <p>Cover Letter w/Pertinent Information</p> <p>Site Drawings</p> <p>Detail Specifications (include MFR Maint. Procedures for Grease Trap Deviations)</p> <p>Menu & Seating (Only for Grease Trap Deviations)</p>



Water Meter Sizing Form

One Form Per Meter

Preparer's Information:

Name =====> _____

Title =====> _____

Company=====> _____

Address =====> _____

Phone =====> _____

Email Address =====> _____

Project Information:

Date =====> _____

Permit or AR Number _____

Name of Project =====> _____

Project Address =====> _____

Please Note:

1. All commercial facilities must be metered separately from residential facilities with the exception of those commercial facilities that are within a master metered residential development and designed for the exclusive use of the residents within such development.
2. The Design Engineer/Architect must submit signed and sealed documentation supporting meter sizing. Sizing shall be based upon fixture flow values, as shown on the following page and the table on page 3, unless approved otherwise by Utility Deviation. If an increase in meter size is requested to accommodate for fire flow, the Engineer/Architect should check appropriate box below. A Utility Deviation will not be required for increasing meter size for fire flow requirements. For all meter sizes, the Engineer/Architect must consider all relevant factors before selecting the final meter size.
3. For remodeling projects this form must be submitted only if there is a net increase in fixture flow value.

This Section to be filled out by Engineer/Architect of Record:

Demand in accordance with the Fixture Flow Value Worksheet and the Table for Estimating Demand

_____ GPM

Meter Size Required: _____

Meter Size Requested: _____

Existing Meter Size: _____

If the meter size requested is larger than the meter size required per the table below, please indicate the reason for the request by checking the appropriate box:

- Fire Flow Other (Please attach Utility Deviation approval)

Demand Range (GPM)	Meter Size
0 to 30	3/4"
30.1 to 50	1"
50.1 to 100	1 1/2"
100.1 to 160	2"
160.1 to 435	3"
435.1 to 750	4"
750.1 to 1600	6"
1600.1 to 2800	8"
2800.1 to 4200	10"

Demand ranges from AWWA M22 Table 6-1 Third Edition

 Type or Print Name of Engineer/Architect of Record for Project

 Signature of Engineer/Architect of Record for Project and Date
[Affix Engineering/Architect Seal Here]



Fixture Flow Value Worksheet

Please call Public Utilities Engineering (239) 252-2380 with any questions.

Enter # of Fixtures of each Fixture Type, per unit, then multiply by appropriate Load Value to get Fixture Flow Value

Fixture	Occupancy	Type of Supply Control	Load Values, in Water Supply Fixture Units (wsfu) Total		# of Fixtures Per Unit	Fixture Flow Value
Bathroom group	Private	Flush tank	3.6	x		=
Bathroom group	Private	Flushometer valve	8	x		=
Bath tub	Private	Faucet	1.4	x		=
Bath tub	Public	Faucet	4	x		=
Bidet	Private	Faucet	2	x		=
Combination fixture	Private	Faucet	3	x		=
Dishwashing machine	Private	Automatic	1.4	x		=
Drinking fountain	Offices, etc.	3/8" valve	0.25	x		=
Kitchen sink	Private	Faucet	1.4	x		=
Kitchen sink	Hotel, restaurant	Faucet	4	x		=
Laundry trays (1 to 3)	Private	Faucet	1.4	x		=
Lavatory	Private	Faucet	0.7	x		=
Lavatory	Public	Faucet	2	x		=
Service sink	Offices, etc.	Faucet	3	x		=
Shower head	Public	Mixing valve	4	x		=
Shower head	Private	Mixing valve	1.4	x		=
Urinal	Public	1" flushometer valve	10	x		=
Urinal	Public	3/4" flushometer valve	5	x		=
Urinal	Public	Flush tank	3	x		=
Washing machine (8 lb)	Private	Automatic	1.4	x		=
Washing machine (8 lb)	Public	Automatic	3	x		=
Washing machine (15 lb)	Public	Automatic	4	x		=
Water closet	Private	Flushometer valve	6	x		=
Water closet	Private	Flush tank	2.2	x		=
Water closet	Public	Flushometer valve	10	x		=
Water closet	Public	Flush tank	5	x		=
Water closet	Public or private	Flushometer tank	2	x		=
For any fixtures not listed, submit manufacturer's data sheets and enter appropriate description and value:						
Other:				x		=
Other:				x		=
Other:				x		=
Other:				x		=
Other:				x		=
Total Fixture Value Per Unit =====>						
Number of Units with this Fixture Count =====>						
Grand Total of Fixture Flow Value (Per Unit Total x Number of Units)** =====>						

**Use total Fixture Flow Value on "Table for Estimating Demand" to estimate water meter demand.

Fixture Flow Value worksheet from FBC 2023 edition



Table for Estimating Demand

Please call Public Utilities Engineering (239) 252-2380 with any questions.

Enter # of Fixtures of each Fixture Type, per unit, then multiply by appropriate Load Value to get Fixture Flow		SUPPLY SYSTEMS PREDOMINANTLY FOR FLUSH VALVES	
Load	Demand	Load	Demand
Fixture Flow Value	Gallons per minute	Fixture Flow Value	Gallons per minute
1	3.0	---	---
2	5.0	---	---
3	6.5	---	---
4	8.0	---	---
5	9.4	5	15.0
6	10.7	6	17.4
7	11.8	7	19.8
8	12.8	8	22.2
9	13.7	9	24.6
10	14.6	10	27.0
11	15.4	11	27.8
12	16.0	12	28.6
13	16.5	13	29.4
14	17.0	14	30.2
15	17.5	15	31.0
16	18.0	16	31.8
17	18.4	17	32.6
18	18.8	18	33.4
19	19.2	19	34.2
20	19.6	20	35.0
25	21.5	25	38.0
30	23.3	30	42.0
35	24.9	35	44.0
40	26.3	40	46.0
45	27.7	45	48.0
50	29.1	50	50.0
60	32.0	60	54.0
70	35.0	70	58.0
80	38.0	80	61.2
90	41.0	90	64.3
100	43.5	100	67.5
120	48.0	120	73.0
140	52.5	140	77.0
160	57.0	160	81.0
180	61.0	180	85.5
200	65.0	200	90.0
225	70.0	225	95.5
250	75.0	250	101.0
275	80.0	275	104.5
300	85.0	300	108.0
400	105.0	400	127.0
500	124.0	500	143.0
750	170.0	750	177.0
1,000	208.0	1,000	208.0
1,250	239.0	1,250	239.0
1,500	269.0	1,500	269.0
1,750	297.0	1,750	297.0
2,000	325.0	2,000	325.0
2,500	380.0	2,500	380.0
3,000	433.0	3,000	433.0
4,000	535.0	4,000	535.0
5,000	593.0	5,000	593.0

Table for estimating demand taken from Florida Building Code 2023 Edition

**FINAL WAIVER OF LIENS -
CONVEYANCE OF UTILITY FACILITIES TO COUNTY**

KNOW ALL MEN BY THESE PRESENTS, that for and in consideration in the amount of \$_____ lawful money of United States of America, to me in hand paid, the receipt whereof of which is hereby acknowledged, does hereby waive, release, remiss and relinquish any and all right to claim any lien(s) for work performed and/or for material furnished, and/or for any claim whatsoever with regard to utility facilities constructed in, over or under the below-described real property. The undersigned certifies to the County that the undersigned has all requisite authority to execute this Waiver for all intended purposes.

Every individual who, and each entity that, pursuant to the undersigned's agreement with regard to the subject utility facilities, has supplied or furnished service(s), labor, material(s) and/or supplies used in installation, construction, maintenance, repair, location, relocation, or otherwise, with regard to utility facilities thereby located in, on or over the real property described below, have been paid in full (or have been adequately bonded) whereby as to all such services, labor, materials and/or supplies there exist no claim(s) from any such individual or entity that will affect conveyance of good and marketable title to the utility facilities to Collier County and/or to the Collier County Water-Sewer District.

Legal description of the site where the subject utility facilities have been constructed or installed is _____
_____.

Signed: _____
Printed (or typed) Name

STATE OF FLORIDA)
COLLIER COUNTY)

The foregoing instrument was acknowledged before me this _____ day of _____, 200__ by _____, who is personally known to me OR who provided identification Type of identification produced: _____.

_____ My Commission Expires _____
Notary Public, State of Florida

Utilities Conveyance Checklist

POTABLE WATER, NON-POTABLE IRRIGATION WATER AND WASTEWATER FACILITIES ACCEPTANCE

Today's Date: _____

Project Name: _____

Original Project No. (AR/PL): _____

Utility PL#: _____

Submittal Requirements

	N/A	In review	Item accepted	Item Needed	Notes
1.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Final Utility Acceptance Application	_____
2.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Addressing Checklist (ID number or Folio number of Property)	_____

Legal Documents

	N/A	In review	Item accepted	Item Needed	Notes
1.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Attorney's Affidavit	_____
2.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Owner's Affidavit	_____
3.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Warranty Deed/Bill of Sale with Exhibit B per Utilities Standards and Procedures Ordinance Section 10.2.6	_____
4.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Utilities Facilities Securities Subordination (required when any security interest in the utility facilities/systems is involved). UCC-1(s) can be subordinated by a Subordination or by use of UCC-3(s) if not released by Subordination.	_____
5.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Deed of Utility Easement - Copy of last Deed that conveyed title of the Associated Real Property and Copy of all Utility Easements then being conveyed to the County, including legal description with Surveyor's Sketch of Easement. (Utility easements are not required provided all utility facilities then being conveyed are in public right-of way, are in then existing utility easements, or are in CUEs)	_____
6.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Utilities Performance Security (UPS) 10% of Total Cost plus Final Obligations cash bond of not less than \$4,000 (AR-5939 & above)	_____
7.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Final Release of Lien from Utility Contractor for the system(s) or portion(s) thereof constructed	_____
8.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Facilities Lease (when applicable)	_____

9. Facilities Lease (including Sub-Developer) use Form 10.1

Tests, Certifications and Supplemental Documents

	N/A	In review	Item accepted	Item Needed	Notes
1.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Sewer Video of constructed gravity sewer (Sewer Report & Master Utility Sheet)	<hr/>
2.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Certification of pressure testing of wastewater force mains by Engineer of Record	<hr/>
3.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Certification of the infiltration/exfiltration tests for the sewer lines by Engineer of Record	<hr/>
4.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Coating certification from the manufacturer or a professional testing laboratory for all manholes, wet wells and valve vault.	<hr/>
5.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Lift station(s) start up report(s)	<hr/>
6.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Electrical Contractor's certification of Lift Station electric service wire sizing and voltage drop pursuant to National Electrical Code Specifications	<hr/>
7.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Start-up and successful testing of Data Flow telemetry equipment (AR-7936 & above)	<hr/>
8.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Certification of pressure testing of water and non-potable irrigation mains by Engineer of Record	<hr/>
9.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Letter by Engineer certifying that: <ul style="list-style-type: none"> • All water, non-potable irrigation and/or sewer facilities are located within the public right-of-way or dedicated easements • All the utilities system(s), or portion(s) thereof, has been constructed in accordance with County Ordinances and Regulations, including the required color for piping 	<hr/>
10.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	One year (1) Warranty on work performed and system(s) or portion(s) thereof installed by Utilities Contractor	<hr/>
11.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Engineer's Final Payment Confirmation	<hr/>
12.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	DEP Certification and copy of General Permit for WATER facilities (including interim facilities, if applicable);	<hr/>
13.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	DEP WATER Certification approval to be forwarded when received	<hr/>

- 14. DEP Certification and copy of General Permit for **SEWER** facilities (including interim facilities, if applicable); _____
- 15. DEP SEWER Certification approval to be forwarded when received _____
- 16. DEP Certification and copy of General Permit for (RECLAIMED) **NON-POTABLE IRRIGATION WATER** facilities (including interim facilities, if applicable); In-service Letter to be forwarded when received _____
- 17. Lab results on bacteriological tests for potable water mains _____
- 18. Satisfactory Test Reports and Certification of backflow device by Certified Laboratory. _____
- 19. Verification of Final Cost (Include materials **and** labor, misc.) Cost breakdown – Contributory Assets for County/Private Materials (materials **only**) (i.e. detailed quantities, sizes, unit cost, total cost, etc) _____
- 20. Letter from the Fire District regarding ownership and maintenance of fire hydrants _____
- 21. Signed copy of field fire flow testing by the applicable Fire Control District _____

Engineering Documents

	N/A	In review	Item accepted	Item Needed		Notes
1.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	One (1) complete set of Record Drawings to include <u>all</u> utilities and all related underground work <u>signed</u> and <u>sealed</u> by the Engineer of Record for potable water, non-potable irrigation water and / or wastewater system(s) or portion(s) thereof		_____
2.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	One (1) computer-generated disk of Record Drawings in CAD and PDF format in accordance with Section 10.4: Record Drawings of the Utilities Standards and Procedures Ordinance		_____
3.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Longitude and latitude shall appear on detail sheet. (AR-7936 & above)		_____

Office Use Only below this line
W W/S S IRR

VENDOR AND MANUFACTURER APPROVAL APPLICATION FORM

Please prepare the completed Approval Application Form along with all requested information, and email all documents to the Public Utilities Engineering and Project Management Division as noted below. All documents must be in either PDF or WORD or EXCEL format. Other file formats will not be accepted. Faxes will not be accepted.

UtilityPlanning@colliercountyfl.gov

VENDOR AND MANUFACTURER APPROVAL APPLICATION FORM

Date: _____

A. Application Contact Name & Business:

Address _____

Phone # _____ Fax # _____

Email address _____

B. Manufacturer of Product

Address _____

Phone # _____ Fax # _____

Email address _____

C. Specific Location(s) of Product Manufacture and Assembly

Address _____

Phone # _____ Fax # _____

Email address _____

D. Identify specific County Detail(s) or Specification(s) on which approval is sought.

E. Is the applicant the product manufacturer? If not, describe the relationship of the applicant to the manufacturer.

Yes _____

No _____

F. Is the product available through more than one vendor? Describe who will provide sales and service to the County for the submitted product.

Yes _____ No _____

G. Is the product is manufactured in whole or in part outside of the United States?

Yes _____ No _____

H. If the answer to Item G is Yes, attach copy of ISO 9001 Quality Control current certification certificates for the manufacturer and the point of manufacture.

I. How long has the specific product or service being proposed been on the market for public purchase?

No. of Years _____

J. In the case of applicators or installers, for how long has work been commenced and completed using the specific product or service being proposed?

No. of Years _____

K. Provide a product or service customer reference list that identifies the organization, location, contact person, email address, phone number, date of first installation, date of completion, number of products used, and the specific application of the product with each reference. Applicators and installers must have at least three references using the specific product or service being proposed.

L. Provide a list identifying the public utility departments or organizations that have approved your product. Preference should be given to utility departments within the state of Florida. The list must include a contact name, email address and phone number at each public utility.

M. Attach legible copies of pertinent product data sheets, shop drawings and performance data to assist with the County’s review. All information must be submitted with the Application form. Clearly identify what product and product sizes are being proposed. Complete submittals are required with initial application, and supplemental submittals will not be accepted.

N. As applicable, provide copies of certifications that specific product being proposed meets the following standards:

UL Approval attached Yes _____ No _____

FM Approval attached Yes _____ No _____

NSF 61 Approval attached Yes _____ No _____

(NSF 61 approval is mandatory for all products that may be in contact with potable water.)

O. Summarize the advantages of the submitted product or service. Provide no more than one page of text.

P. Provide estimated unit cost for the submitted product or service.

Q. Provide separate estimated unit costs for the operation and the maintenance of the submitted product or service.

R. Based on the references identified above, identify the anticipated life of the submitted product or service before either replacement or major repair is needed.

S. Explain benefits this application will have to the operation and maintenance of the Collier County Utility system:

The applicant hereby affirms the information provided with this Application Form is complete, accurate and current.

Submitted by _____

Signature _____

Firm name _____

Date _____

**Collier County Public Utilities Department
County Approved Product List
All Systems**

NOTES:

- 1) Substitutions for any item listed below shall be submitted using the "Vendor and Manufacturer Approval Application Form," Appendix E, and reviewed to be considered an equal.
2) If a product is not listed, refer to the Specifications for performance standards.

Item	Manufacturer	Model(s)	Location in Standards Manual
Casing Spacer End Seals	Power Seal	EndSeal	Section 330523.16, Page 4, 3.1 B
Casing Spacer End Seals	Cascade Waterworks MFG Co.	CCES	Section 330523.16, Page 4, 3.1 B
Casing Spacers Stainless Steel	Power Seal	4810	Section 330523.16, Page 4, 3.1 BG-5
Casing Spacers Stainless Steel	Cascade Waterworks MFG Co.	CCS	Section 330523.16, Page 4, 3.1 B-5
Electronic Markers	3M Electronic Ball Marker	1423, 1424 & 1428	Section 1: 2.6.1, 3.1.4, 3.2.1/WW-10/WW-12/WW-16
Electronic Markers	Tempo Communications - Omni Marker	160, 161, 162 & 168	Section 330518, Page 9, 3.2 O.2
Electronic Markers	Tempo Communications - Omni Marker II	OM-01 (66.4 kHz), OM-04 (92.0 kHz), OM-06 (121.6 kHz), OM-08 (145.7 kHz), OM-09 (169.8 kHz)	Section 330518, Page 9, 3.2 O.2
Electronic Marking System (EMS)	3M	3M EMS Warning Tape 7900 Series	Design Criteria Part 2 2.1, Part 3 3.2, 3.2.1 Section 330518 Part 3 3.2 O.1
Joint Restraint Devices	EBAA Iron Sales		Section 1: 2.3/Section 330503, Page 5, 2.1 L/Section 330504, Page 7, 2.5 F
Joint Restraint Devices	Romac Industries		Section 1: 2.3/Section 330503, Page 5, 2.1 L/Section 330504, Page 7, 2.5 F
Joint Restraint Devices	Sigma		Section 1: 2.3/Section 330503, Page 5, L/Section 330504, Page 7, 2.5 F
Joint Restraint Devices	Star Pipe Products		Section 1: 2.3/Section 330503, Page 5, 2.1 L/Section 330504, Page 7, 2.5 F
Joint Restraint Devices	Ford Meter Box Company		Section 1: 2.3/Section 330503, Page 5, L/Section 330504, Page 7, 2.5 F
Joint Restraint Devices, Push-On joints for push joint pipe	American Cast Iron Pipe Company	Flex-Ring & Lok-Ring	Section 330504, Page 7, F.3
Joint Restraint Devices, Push-On joints for push joint pipe	McWane Inc.	Super-Lock & TR Flex	Section 330504, Page 7, F.3

**Collier County Public Utilities Department
County Approved Product List
All Systems**

NOTES:

- 1) Substitutions for any item listed below shall be submitted using the "Vendor and Manufacturer Approval Application Form," Appendix E, and reviewed to be considered an equal.
2) If a product is not listed, refer to the Specifications for performance standards.

Item	Manufacturer	Model(s)	Location in Standards Manual
Joint Restraint Devices, Push-On joints for push joint pipe	U.S. Pipe		Section 330504, Page 7, F.3
Metalized Tape	Reef Industries, Inc. Houston, TX	Terra Tape	Section 330518, Page 9, O.1
Metalized Tape	Proline Safety Products	Detectable Tape	Section 330518, Page 9, O.1
Rubber Gasket pipe	McWane Inc.	Long-Span Pipe	Section 330518, Page 10, Q.1
Rubber Gasket pipe	American Cast Iron Pipe Company	Flanged	Section 330518, Page 10, Q.1
Rubber Gasket pipe	US Pipe	Flanged	Section 330518, Page 10, Q.1
Single Sealed Gasket Push-on type joint	American Cast Iron Pipe Company	Fastite -	Section 330504, Page 10, 3.3.C
Single Sealed Gasket Push-on type joint	U.S. Pipe	Tyton	Section 330504, Page 10, 3.3.C
Single Sealed Gasket Push-on type joint	McWane Inc.	Tyton	Section 330504, Page 10, 3.3.C
Two-part Coal tar Epoxy	Madewell Products Corp.	Madewell 1104	Section 330518, Page 6, 3.2 G.4

**Collier County Public Utilities Department
County Approved Product List
Water Systems**

NOTES:			
1) Substitutions for any item listed below shall be submitted using the "Vendor and Manufacturer Approval Application Form," Appendix E, and reviewed to be considered an equal.			
2) If a product is not listed, refer to the Specifications for performance standards.			
Item	Manufacturer	Model(s)	Location in Standards Manual
Automatic Flushing Device, Ground Mounted	Mueller/Hydro-Guard	HG-1	W-2
Automatic Flushing Device, Ground Mounted	Kupferle Foundry Company	Eclipse #9400-WC	W-2
Automatic Flushing Device, Hydrant Mounted	Mueller/Hydro-Guard	HG-6	W-2
Automatic Flushing Device, Hydrant Mounted	Kupferle Foundry Company	Eclipse #9700	W-2
Backflow Preventer Assembly	See Approved Backflow Devices List, Appendix G		
Bushing	Ford	C18	W-6
Corporation Stops	Ford	F1100NL SERIES	W-6
Corporation Stops	Ford	FB1100NL SERIES	W-6
Corporation Stops	A.Y. McDonald	4104NL	W-5
Corporation Stops	A.Y. McDonald	4101 BF NL	W-5
Corporation Stops	Mueller	H10045N, H15008N	Section 331200, Page 2, 2.3 A.1
Corporation Stops	Mueller	H-10046N/ H-10046	W-5
Coupling	Ford	Model numbers vary by application	W-6
Coupling	A.Y. McDonald	Model numbers vary by application	W-6
Coupling	Mueller	Model numbers vary by application	W-6
Curb Stop	Ford	B43xxxW-NL	W-12
Curb Stop	A.Y. McDonald	76102-22	W-12
Curb Stop	Mueller	Mark II Oriseal H-15172N	Section 331200, Page 2, 2.3 A.1

**Collier County Public Utilities Department
County Approved Product List
Water Systems**

NOTES:

- 1) Substitutions for any item listed below shall be submitted using the "Vendor and Manufacturer Approval Application Form," Appendix E, and reviewed to be considered an equal.
- 2) If a product is not listed, refer to the Specifications for performance standards.

Item	Manufacturer	Model(s)	Location in Standards Manual
HDPE Stab Fitting	Elster	Hydrosert	
Hydrant	American Darling	6-inch B-84-B	Section 331619, Page 2, 2.1 G
Hydrant	Clow	Medallion	Section 331619, Page 2, 2.1 G
Hydrant	Mueller	Centurion A-423	Section 331619, Page 2, 2.1 G
Meter Box (Staff Use)	Carson	Fiberlyte FL12	W-12
Meter Box (Staff Use)	Carson	Fiberlyte FL30	W-12
Meter Box (Staff Use)	Oldcastle	Lid-FL12 GP (AMR)	W-12
Meter Box (Staff Use)	Oldcastle	Box, FL12 T 12 (w/mouseholes)	W-12
Meter Box (Staff Use)	Oldcastle	Unit, FL30 P	W-12
Meter Box (Staff Use)	DFW	DFW1324XX-12-AF1PT MUE	W-12
Meter Box	DFW	DFW37F-12-AF1PT MUE	W-12
Meter Box	DFW	DFW1324F-12-AF1PT MUE	W-12
Meter, Fire Protection (3", 4", 6", 8")	Elster AMCO	evoQ4 Electromagnetic Meter	W-9/W-14
Meter, Fire Protection (3", 4", 6", 8", 10")	Neptune	HP Fire Service Turbine Meter	W-9/W-14
Meter, Fire Protection (3/4", 1", 1-1/2", 2")	Mueller Systems - Hersey	Residential Fire Meter	W-9
Meter, Fire Protection (4", 6", 8", 10")	Neptune	HP Protectus III Fire Service Meter	W-9/W-14
Meter, Potable Water	Neptune	Tru/Flo	W-13
Meter, Potable Water	Neptune	Mach 10	W-13
Pedestal Housing	Channel	CCWD Signature Series SPH	W-5
Pedestal Housing	Water Plus Corp	131632	NP-4
Pedestal Housing	PenCell Plastics	AV142034HDHS001009	NP-4
Sampling Station	Kupferle Foundry Company	Eclipse 88	W-6
Sampling Station	Mueller Company	Safety Guard BOSS SMPL STA	W-6

**Collier County Public Utilities Department
County Approved Product List
Water Systems**

NOTES:

- 1) Substitutions for any item listed below shall be submitted using the "Vendor and Manufacturer Approval Application Form," Appendix E, and reviewed to be considered an equal.
- 2) If a product is not listed, refer to the Specifications for performance standards.

Item	Manufacturer	Model(s)	Location in Standards Manual
Sampling Station	Mueller Company	2" BOSS-BSS0212CHANLCSR	W-6
Service Saddles (Brass)	Ford	F202B	Section 331200, Page 7, 2.3 G.1
Service Saddles (Brass)	Mueller	DR2 B	Section 331200, Page 7, 2.3 G.1
Service Saddles (PVC) Perm Bact Sample Point	Powerseal	P3401 SERIES	Section 331200, Page 7, 2.3 G.1/W-6
Service Saddles (PVC) Perm Bact Sample Point	Ford	S 90 SERIES	Section 331200, Page 7, 2.3 G.1/W-6
Service Wye	Ford	Y44-xxx-NL	W-12
Strainer, Flanged (Staff Use)	Mars	Z-plate	
Strainer, Flanged (Staff Use)	Neptune	Rilsan nylon-coated ductile iron	
Tapping Saddle/ Hot taps	Powerseal	P3490MJ Series	W-12
Valve Box	Tyler/Union	461	Section 331200, Page 4, 2.3 B.2
Valve Box, Locking Cover	AMPro USA	LL562	Section 331200, Page 4, 2.3 B.2.
Valve Setter	Wilkins	WMJS	W-9A/W-11A
Valve, Air	Val-Matic	Model 801AS	W-11/W-14/W-16
Valve, Air Release	A.R.I.	D-040 (nylon), D-040 ST ST (SS)	W-5
Valve, Bacterial Sampling Station Line	Mueller	Mark II Oriseal	Section 331200, Page 3, 2.3 A.1
Valve, Ball	Ford		Section 331200, Page 3, 2.3 A.1
Valves and Appurtenances	American Darling		Section 331200 2.3 A
Valves and Appurtenances	A.Y. McDonald		Section 331200 2.3 A
Valves and Appurtenances	Clow		Section 331200 2.3 A
Valves and Appurtenances	Ford		Section 331200 2.3 A
Valves and Appurtenances	Kennedy		Section 331200 2.3 A
Valves and Appurtenances	Mueller		Section 331200 2.3 A
Valves and Appurtenances	U.S. Pipe		Section 331200 2.3 A

**Collier County Public Utilities Department
County Approved Product List
Irrigation Quality (IQ) Systems**

NOTES:

- 1) Substitutions for any item listed below shall be submitted using the "Vendor and Manufacturer Approval Application Form," Appendix E, and reviewed to be considered an equal.
- 2) If a product is not listed, refer to the Specifications for performance standards.

Item	Manufacturer	Model(s)	Location in Standards Manual
120VAC Surge Suppressor	Edco	HSP121	NP-E3
12VDC Power Supply	Allen Bradley	1606-XLS	NP-E3
12VDC Power Supply	Sola HD	SDN-P	NP-E3
12VDC Power Supply	PULS	Dimension - QS	NP-E3
24VDC Power Supply	Allen Bradley	1606-XLE	NP-E3
24VDC Power Supply	Sola HD	SDN-P	NP-E3
24VDC Power Supply	PULS	Dimension - QS	NP-E3
Antenna Subsystem	Data Flow Systems, Inc.	RTA209 Yagi Antenna	NP-E9
Back Pressure Sustaining Valve	Ames	No. 920	NP-1/NP-E2
Plate Strainer, Top Access	Mars		NP-1/NP-E2
Corporation Stops	Ford	FB 1100-NL/ FB 1100	NP-2
Corporation Stops	A.Y. McDonald	74704B	NP-2
Corporation Stops	A.Y. McDonald	74104NL/ 74104	NP-4
Corporation Stops	A.Y. McDonald	74101 BF NL/ 74101 BF	NP-4
Corporation Stops	Mueller	H-10046N/ H-10046	NP-4
Curb Stop	Ford	B43-444W-NL, Compression x Meter Swivel	NP-2
Data Radio	Integra	TR	NP-E3
Data Signal Line Surge Processor	Edco	PC642 Series	NP-E3
Geomembrane	GSE Environmental		Section 334713, Page 4, 1.6 A.1
Level Transducer	Wika		NP-E6

**Collier County Public Utilities Department
County Approved Product List
Irrigation Quality (IQ) Systems**

NOTES:

- 1) Substitutions for any item listed below shall be submitted using the "Vendor and Manufacturer Approval Application Form," Appendix E, and reviewed to be considered an equal.
- 2) If a product is not listed, refer to the Specifications for performance standards.

Item	Manufacturer	Model(s)	Location in Standards Manual
Meter Box (Staff Use)	Carson	Fiberlyte FL12	NP-2
Meter Box (Staff Use)	Carson	Fiberlyte FL30	NP-2
Meter Box (Staff Use)	Oldcastle	Lid-FL12 GP (AMR)	NP-2
Meter Box (Staff Use)	Oldcastle	Box, FL12 T 12 (w/mouseholes)	NP-2
Meter Box (Staff Use)	Oldcastle	Unit, FL30 P	NP-2
Meter Box (Staff Use)	DFW	DFW1324XX-12-AF1PT MUE	NP-2
Meter Box	DFW	DFW37F5-12-AF5PT MUE	NP-2
Meter Box	DFW	DFW1324F5-12-AF5PT MUE	NP-2
Flow Meter, Magnetic	Mueller		
Meter, Non-Potable Propeller			
Pedestal Housing	Endress+Hauser	W400	NP-1/NP-E2
Pedestal Housing	McCrometer	Water Specialties No. ML-04-X with 4-20 MA Output Transmitter, TR-16	NP-1/NP-E2
Pedestal Housing	Channel	CCWD Signature Series SPH14206C1B1L01	NP-4
Rain Gauge	Water Plus Corp	131632	NP-4
Service Wye	PenCell Plastics	AV142034HDHS001009	NP-4
Service Wye	ISCO	674	NP-E5
Service Wye	Ford	Y44-264-NL	NP-2
Surge Suppression	A.Y. McDonald	708YS22	NP-2
Surge Suppression	Mueller	P-15343N	NP-2
Surge Suppression, Main Service	Edco	SS65 Series	NP-E6/NP-E7
Tapping Saddle/ Hot taps	CITEL	TSP15M	NP-E6/NP-E7
Valve, Air Release	Lea	USP-M Series	NP-E5
Valve, Air Release	Powerseal	P3490MJ Series	NP-2
Valve, Air Release	A.R.I.	D-040	NP-4

**Collier County Public Utilities Department
County Approved Product List
Irrigation Quality (IQ) Systems**

NOTES:			
1) Substitutions for any item listed below shall be submitted using the "Vendor and Manufacturer Approval Application Form," Appendix E, and reviewed to be considered an equal.			
2) If a product is not listed, refer to the Specifications for performance standards.			
Item	Manufacturer	Model(s)	Location in Standards Manual
Valve, Air Release	A.R.I.	D-040 SS	NP-4
Valve, Rising Stem Gate/ OS&Y	GA Industries	942SS	NP-4
Valve, V-Port Ball	GA Industries	Combination	Section 1 2.7/NP-1/NP-4/NP-E2
Valve, V-Port Ball - Motor (Actuator)	Rotork	IQTM	NP-E2
	American Flow Control	AFC-2500 SERIES	NP-1/NP-E2
	DeZurik	VPB - flanged, type 317 stainless, and Teflon seat and bearings	NP-1

**Collier County Public Utilities Department
County Approved Product List
Wastewater Systems**

NOTES:

- 1) Substitutions for any item listed below shall be submitted using the "Vendor and Manufacturer Approval Application Form," Appendix E, and reviewed to be considered an equal.
- 2) If a product is not listed, refer to the Specifications for performance standards.

Item	Manufacturer	Model(s)	Location in Standards Manual
Access Frame (Pump Station)	U.S. Foundry	AHD	WW-7/WW-8
Access Hatch, Aluminum	Bilco	J-AL H20 (5-1/2" depth)	WW-8/WW-8A/WW-8B
Access Hatch, Aluminum	Halliday	H1W (3-1/2" depth)	WW-8/WW-8A/WW-8B
Access Hatch, Aluminum	U.S. Foundry	AHS (5" depth)	WW-8/WW-8A/WW-8B
Antenna Subsystem	Data Flow Systems, Inc.	RTA209 Yagi Antenna	Section 333200, Page 4, 2.1 J/WW-17
Biofiltration Odor Control System	Evoqua	Zabocs (pre-engineered)	Section 333200, Page 5, 2.1 P
Ceramic Epoxy Lining	Vulcan Painters	Protecto 401 Coating	Section 330504, Page 3, 2.1.B
Chimney Seal	Cretex		Section 333913, Page 4, 2.2 K/WW-3/WW-4/WW-5
Chimney Seal	Trelleborg		Section 333913, Page 4, 2.2 K/WW-3/WW-4/WW-5
Coaxial Cable	Data Flow Systems, Inc.	RTC 400	Section 333200, Page 2.1 J/WW-17
Diaphragm Seals	Ashcroft		Section 333313, Page 8, 2.2 G
Diaphragm Seals	Mansfield and Green	Type SB	Section 333313, Page 8, 2.2 G
Diaphragm Seals	Trerice		Section 333313, Page 8, 2.2 G
Flanged Adapter Connections	EBAA Iron Sales	E2100 SERIES	Section 333313, Page 8, 2.2 F.1.c.
Flanged Adapter Connections	Victaulic	Vic Flange Style 741	Section 333313, Page 8, 2.2 F.1.c.
Flow Meter	Endress-Hauser	Promag W400	Section 333313, Page 9, 2.2 M.1
Generator Receptacle and Angle Adapter	Crouse-Hinds	AR2042 with S22 option, and an AJA1 angle adaptor	WW-7/WW-9
Grass Covered Porous Pavement	Invisible Structures	Grasspave2	WW-8/WW-8A/WW-8B
Inflow Protector, Stainless Steel	Sewer Shield, Inc. Maitland, FL		Section 333913, Page 4, 2.2 K
Inflow Protector, Stainless Steel	Rainstopper LLC.		Section 333913, Page 4, 2.2 K
Inflow Protector, Stainless Steel	L.F. Manufacturing, Inc.		Section 333913, Page 4, 2.2 K
Internal Protection	IET Systems	IET Coating System	Section 333913, Page 5, 3.1 F/Section 099723/WW-3/WW-4/WW-5/WW-7

**Collier County Public Utilities Department County
Approved Product List
Wastewater Systems**

NOTES:
 1) Substitutions for any item listed below shall be submitted using the "Vendor and Manufacturer Approval Application Form," Appendix E, and reviewed to be considered an equal.
 2) If a product is not listed, refer to the Specifications for performance standards.

Item	Manufacturer	Model(s)	Location in Standards Manual
Internal Protection	Raven Lining Systems - Broken Arrow, OK	Raven 405	Section 333913, Page 5, 3.1F/Section 099723/WW-3/WW-4/WW-5/WW-7
Internal Protection	Kerneos - Chesapeake, VA	Sewpercoat Lining System	Section 333913, Page 5, 3.1F/Section 099723/WW-3/WW-4/WW-5/WW-7
Junction Box	Hoffman	A12106NFSS	WW-9
Lightning Arrestor	Square D	SDSA-1175 for 1-phase	Section 333200, Page 5, 2.1 O/WW-9
Lightning Arrestor	Square D	SDSA-3650 for 3-phase	Section 333200, Page 5, 2.1 O/WW-9
Liquid Level Regulators (Float Switch)	Roto-Float		WW-7/WW-8
Liquid Level Regulator (Float Switch)	Dura-Float	2900 Series B4	WW-7/WW-8
Pipe Interior Lining	Permax CTF	Ceramic Epoxy Lining	Section 330504, Page 3, 2.1 B
Plastic Joint Sealing Compound	Hamilton Kent, Toronto/Ontario, Canada	Kent-Seal	Section 333913, Pages 2, 2.1 A/WW-3/WW-4/WW-5/WW-6/WW-7/WW-18
Plastic Joint Sealing Compound	Henry	Ram-Nek	Section 333913, Pages 2, 2.1 A/WW-3/WW-4/WW-5/WW-6/WW-7/WW-18
Polymer Concrete Manholes	US Composite Pipe, Inc.		Section 034100, Page 5, 2.2 D
Polymer Concrete Manholes	Armorock		Section 034100, Page 5, 2.2 D
Power Distribution Blocks	Schneider (Square D)	Class 9080 Power Distribution Blocks	WW-9/WW-9A/WW-9B
Pump Control Panel	ECS		Section 333200, Page 43, 2.1 I/WW-7/WW-9
Pump Control Panel	Suncoast Hydraulic		Section 333200, Page 43, 2.1 I/WW-7/WW-9
Pump Controller	Data Flow Systems, Inc.	TCU	Section 333200, Page 3, 2.1 J
Riser Ring, HDPE/EPP	Ladtech/Cretex(EPP)	Riser Ring	Section 333913, Page 4, 2.2 L
Sealing Compound	Crouse-Hindz	Chico Sealing Compound	WW-9/WW-9A/WW-9B

**Collier County Public Utilities Department County
Approved Product List
Wastewater Systems**

NOTES:

- 1) Substitutions for any item listed below shall be submitted using the "Vendor and Manufacturer Approval Application Form," Appendix E, and reviewed to be considered an equal.
2) If a product is not listed, refer to the Specifications for performance standards.

Item	Manufacturer	Model(s)	Location in Standards Manual
Sealing Element	GPT	Link-Seal	Section 333313, Page 9, 2.2 I.1/WW-18
Sewage Pump	Flygt	N-Series	Section 333200, Page 2, 2.1 D
Sewer Clean-Out Rim and Cover	U.S. Foundry	7621	WW-11
Sewer Manhole Ring and Cover	U.S. Foundry		WW-3, WW-4, WW-5, WW-6, Section 333913
Sewer Manhole Frame and Covers	Pamrex		WW-5
Sewer Manhole Frame and Covers	U.S. Foundry	105M	WW-2
Sewer Manhole Frame and Covers	U.S. Foundry	420-C-ORS	Section 333913, Page 2, 2.1A/WW-3/WW-4/WW-5/WW-6/WW-18
Sleeve Type Couplings	Powerseal	STYLE 3501	Section 333313, Page 8, 2.2 F.1.d.
Sleeve Type Couplings	Dresser	Style 38	Section 333313, Page 8, 2.2 F.1.d.
Sleeve Type Couplings	Smith Blair	Style 413	Section 333313, Page 8, 2.2 F.1.d.
Tower	Rohn		WW-17
Valve Box	Brooks		WW-9
Valve, 3-Way Plug (Staff Use)	Milliken Valve Co.	Model M604	WW-7/WW-8
Valve, 3-Way Plug (Staff Use)	Dezurik	Model D202	WW-7/WW-8
Valve, Air Release	HTECH	2" SS MODEL # 8889860041	WW-13/Section 333313, Page 7, 2.2 D.11
Valve, Air Release	A.R.I.	D-025	WW-5/Section 333313, Page 7, 2.2 D.11
Valve, Check	Kennedy Valve Manufacturing Co.	MODEL 1106LW/106LW	WW-7/WW-8/Section 333313, Page 5, 2.2 C
Valve, Check	Mueller	A-2600, A2602	WW-7/WW-8, Section 333313, Page 5, 2.2 C
Valve, Check	Milliken Valve Co.	8001	WW-7/WW-8, Section 333313, Page 5, 2.2 C
Valve, Check	GA Industries	340-W	WW-7/WW-8, Section 333313, Page 5, 2.2 C
Valve, Check	VSI Waterworks	CVIX AWWA C508	Section 333313

**Collier County Public Utilities Department County
Approved Product List
Wastewater Systems**

NOTES:			
1) Substitutions for any item listed below shall be submitted using the "Vendor and Manufacturer Approval Application Form," Appendix E, and reviewed to be considered an equal.			
2) If a product is not listed, refer to the Specifications for performance standards.			
Item	Manufacturer	Model(s)	Location in Standards Manual
Valve, Duckbill (Staff Use)	Red Valve Co., Inc. Longwood, FL	"Tideflex"	WW-7
Valves, Plug	DeZurik	Model PEC & PEF (MJ & Flange)	WW-7/WW-8(A)(B)/Section 333313, Page 2, 2.2 A.1
Valves, Plug	Milliken Valve Co.	Model M600 & M601 (MJ & Flange)	WW-7/WW-8(A)(B)/Section 333313, Page 2, 2.2 A.1
Valves, Plug	Cam-Centric	55XX, 56XXF, 57XXF, 58XXR, 59XXR (TN, N, TL, XF)	WW-7/WW-8(A)(B)/Section 333313, Page 2, 2.2 A.1
Valves, Plug	VSI Waterworks	PVII & PVIF AWWA C517	Section 333313

**Collier County Public Utilities Department
County Approved Contract List**

NOTES:

- 1) Substitutions for any item listed below shall be submitted using the "Vendor and Manufacturer Approval Application Form," Appendix E, and reviewed to be considered an equal.
- 2) If a product is not listed, refer to the Specifications for performance standards.

Item	Vendor	Contract #	Applicability
Epoxytech CPP Epoxy coating, equipment and services	Florida Service Painting, Inc.	23-8169	Water, Wastewater, and Irrigation Quality (IQ) Systems
Commodities and services for utility plant operations	John Mader Enterprises, Inc.	PB-421	Water, Wastewater, and Irrigation Quality (IQ) Systems

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**Collier County Public Utilities Department
County Approved Waiver List
Single/ Sole Source**

NOTES:

- 1) Substitutions for any item listed below shall be submitted using the "Vendor and Manufacturer Approval Application Form," Appendix E, and reviewed to be considered an equal.
2) If a product is not listed, refer to the Specifications for performance standards.

Item	Vendor	Division	Applicability
Teledyne ISCO Refrigerated Autosampler, sampler bottles, tubing, spare and replacement parts and services.	Accutech Instrumentation, Inc.	Wastewater	Wastewater Systems
Belt Press Dewatering Equipment & Services	Alfa Laval	Engineering & Project Management	Water Systems
McCrometer meters, repair, parts, and services	Avanti Inc.	Wastewater	Wastewater Systems
HOMA submersible sewage pumps and services	Barney's Pump Inc.	Engineering & Project Management	Water, Wastewater, and Irrigation Quality (IQ) Systems
NOV/Moyno progressive cavity pumps and services	Carl Eric Johnson	Engineering & Project Management	Water, Wastewater, and Irrigation Quality (IQ) Systems
Flowserve vertical turbine pumps and services	Carter & Verplanck	Engineering & Project Management	Water, Wastewater, and Irrigation Quality (IQ) Systems
Chemtrac's HydroAct Residual Chlorine Analyzer	ChemTrac	Water	Water Systems
CROM utility storage tanks and services	CROM Coatings and Restorations (CCR)	Engineering & Project Management	Water, Wastewater, and Irrigation Quality (IQ) Systems
Contractor shall provide Supervisory Control and Data Acquisition equipment and software (SCADA) as well as technical support.	Data Flow Systems, Inc.	Wastewater	Water, Wastewater, and Irrigation Quality (IQ) Systems
Master Meter Flow Meter and software	Empire Pipe and Supply Company Inc.	Wastewater	Wastewater Systems

**Collier County Public Utilities Department
County Approved Waiver List
Single/ Sole Source**

NOTES:			
1) Substitutions for any item listed below shall be submitted using the "Vendor and Manufacturer Approval Application Form," Appendix E, and reviewed to be considered an equal.			
2) If a product is not listed, refer to the Specifications for performance standards.			
Item	Vendor	Division	Applicability
Promag Electromagnet Flow Meters, Analyzers, Level Transmitters, replacement parts, and service	Endress Hauser	Wastewater	Wastewater Systems
Aqua-Aerobic Systems Cloth Media, Traveling Bridge Filtration equipment, parts and services	EnviroSales of Florida, Inc.	Engineering & Project Management	Water, Wastewater, and Irrigation Quality (IQ) Systems
NozzTeq nozzles and services	Evervac Equipment	Wastewater	Wastewater Systems
Chemicals, components, services, etc.	Evoqua Water Technologies	Wastewater	Water, Wastewater, and Irrigation Quality (IQ) Systems
Centrifugal/Chopper/Conditioning Pumps and Services	FJ Nugent & Associates, Inc.	Wastewater	Wastewater Systems
Replacement parts, maintenance, and equipment.	Fluid Control Specialties, Inc (Rosemount)	Wastewater	Water, Wastewater, and Irrigation Quality (IQ) Systems
Rotork valve actuators, replacement parts and repair services.	Fluid Control Specialties, Inc (Rotork)	Wastewater	Water, Wastewater, and Irrigation Quality (IQ) Systems
Aeration Blower & Service	Gardner Denver Nash	Wastewater	Wastewater Systems
License, service, and support for the SCADA System	GE Digital LLC	Engineering & Project Management	Water, Wastewater, and Irrigation Quality (IQ) Systems
Siemens Level Sensor - Ultrasonic and services	Gilson Engineering Sales of Florida	Wastewater	Wastewater Systems
Service, and support for the SCADA System, including licensing for supporting applications	Gray Matter Systems	Engineering & Project Management	Water, Wastewater, and Irrigation Quality (IQ) Systems

**Collier County Public Utilities Department
County Approved Waiver List
Single/ Sole Source**

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Item	Vendor	Division	Applicability
Laboratory Equipment, Supplies, and Materials, Testing Services, etc.	Hach Company	Water	Equipment, Chemicals, & Services
Parts, Services, and Repairs for Sand Separator	HC Warner	Water	Water Systems
Screening and Screening Handling and services	Hydra Service Inc.	Engineering & Project Management	Water, Wastewater, and Irrigation Quality (IQ) Systems
Grit Removal System	Hydro International & Huber	Engineering & Project Management	Water, Wastewater, and Irrigation Quality (IQ) Systems
Laboratory parts, supplies, and services	IDEXX Distribution, Inc.	Wastewater	Laboratory Parts, Supplies, & Services
Valve Exercise / Operator and services	Illinois Tool Works dba E.H. WACHS	Water	Water Systems
Belt Press Parts and Services	Komline-Sanderson	Engineering & Project Management	Wastewater Systems
Service Agreement and Updates	Labworks, LLC	Water/ Wastewater	Water, Wastewater, and Irrigation Quality (IQ) Systems
HF Scientific equipment, parts, and services	Lazenby & Associates, Inc.	Wastewater	Water, Wastewater, and Irrigation Quality (IQ) Systems
Lime Feed and Slaker system and services	Merrick Industries, Inc.	Water	Water Systems
Xylem- Sanitaire Diffused Aeration Equipment and UGSI Chemical Feed, Inc. Liquid Polymer Dosing System	Moss Kelley/MKI Services, Inc.	Engineering & Project Management	Water, Wastewater, and Irrigation Quality (IQ) Systems
Grit Removal Equipment, Clarifiers parts, sludge thickener parts, and service	Ovivo USA, LLC	Engineering & Project Management	Water, Wastewater, and Irrigation Quality (IQ) Systems

**Collier County Public Utilities Department
County Approved Waiver List
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Item	Vendor	Division	Applicability
Aqua Guard Self Cleaning Bar/Filter Screen	Parkson Corporation	Engineering & Project Management	Water, Wastewater, and Irrigation Quality (IQ) Systems
New York Blower Odor Control Blowers and services	Pero Engineering & Sales Co.	Engineering & Project Management	Water, Wastewater, and Irrigation Quality (IQ) Systems
ASME pressure valves and replacement parts	Protec Arisawa	Water	Water, Wastewater, and Irrigation Quality (IQ) Systems
SCADA components, parts, panels, etc.	Rexel USA, Inc	Engineering & Project Management	Water, Wastewater, and Irrigation Quality (IQ) Systems
Service Agreement, Parts and Supplies	Seal Analytical, Inc.	Water/ Wastewater	Water, Wastewater, and Irrigation Quality (IQ) Systems
Seepex Progressive Cavity Pumps, and services	Tencarva/Hudson Pumps	Engineering & Project Management	Water, Wastewater, and Irrigation Quality (IQ) Systems
Service/ Repair of CO2 Tanks	TOMCO2 Systems	Water	Water, Wastewater, and Irrigation Quality (IQ) Systems
Telog Software, Pressure Sensor, Recorders and Services.	Trimble, Inc.	Engineering & Project Management	Water, Wastewater, and Irrigation Quality (IQ) Systems
ProMinent Equipment, Parts, and Services	TriNova Inc	Wastewater	Water, Wastewater, and Irrigation Quality (IQ) Systems
Trillium Flow Technologies Grit Pumping, Sludge Pumping, Grit Separation Equipment, and services	TSC-Jacobs South	Engineering & Project Management	Water, Wastewater, and Irrigation Quality (IQ) Systems
Component parts, equipment, software and support to maintain the Itron meter systems.	United Systems and Software Inc	Water	Water, Wastewater, and Irrigation Quality (IQ) Systems

**Collier County Public Utilities Department
County Approved Waiver List
Single/ Sole Source**

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Limiterque Valve Actuators and Services	Valve & Actuation Service	Water	Water, Wastewater, and Irrigation Quality (IQ) Systems
ATI Analytical Products	Volition Controls Corp	Water/ Wastewater	Water, Wastewater, and Irrigation Quality (IQ) Systems
Internal Recycling Dry Pit Submersible Pumps, Repair/Replacement Parts, and services.	Xylem Water Solutions U.S.A.	Water/ Wastewater	Wastewater Systems

**Collier County Public Utilities Department
County Approved Waiver Product List**

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Item	Vendor / Manufacturer	Model(s)	Applicability
Analog Control Module (ACM002)	Data Flow Systems, Inc.	DFS-00350-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
Analog Monitor Module (AMM002)	Data Flow Systems, Inc.	DFS-00240-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
Bus Extender Module	Data Flow Systems, Inc.	DFS-00223-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
Digital Control Module (DCM003-01) AC 8DO, 4DI	Data Flow Systems, Inc.	DFS-00297-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
Digital Control Module (DCM003-02) AC 4DO, 8DI	Data Flow Systems, Inc.	DFS-00297-008-02	Water, Wastewater, and Irrigation Quality (IQ) Systems
Digital Control Module (DCM003-03) AC/DC 8DO, 4DI (Requires the use of snubbers 007-0084)	Data Flow Systems, Inc.	DFS-00297-008-03	Water, Wastewater, and Irrigation Quality (IQ) Systems
Digital Control Module (DCM003-04) AC/DC 4DO, 8DI (AC Requires the use of snubbers 007-0084 / DC requires 006-0019)	Data Flow Systems, Inc.	DFS-00297-008-04	Water, Wastewater, and Irrigation Quality (IQ) Systems
Digital Control Module (DCM003-05) DC 8DO, 4DI	Data Flow Systems, Inc.	DFS-00297-008-05	Water, Wastewater, and Irrigation Quality (IQ) Systems
Digital Control Module (DCM003-06) DC 4DO, 8DI	Data Flow Systems, Inc.	DFS-00297-008-06	Water, Wastewater, and Irrigation Quality (IQ) Systems
Digital Monitor Module (DMM003)	Data Flow Systems, Inc.	DFS-00518-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
Power Supply Module (PSM003-1, 100W)	Data Flow Systems, Inc.	DFS-00296-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
Solar Power Module (SPM002)	Data Flow Systems, Inc.	DFS-00517-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
Programmable Logic Controller (PLC001)	Data Flow Systems, Inc.	DFS-00213-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems

**Collier County Public Utilities Department
County Approved Waiver Product List**

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Item	Vendor / Manufacturer	Model(s)	Applicability
Programmable Logic Controller (PLC800) w/PMT	Data Flow Systems, Inc.	DFS-00539-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
PLC Bypass Card (PBC001)	Data Flow Systems, Inc.	DFS-00309-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
TIM007-34 (VDR002-01, 217-220 MHz)	Data Flow Systems, Inc.	DFS-00513-008-34	Water, Wastewater, and Irrigation Quality (IQ) Systems
TIM007 Board-Only (no radio, all TIM007 versions)	Data Flow Systems, Inc.	DFS-00513-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
VDR002-01 (for TIM007-34, 217-220 MHz)	Data Flow Systems, Inc.	DFS-00530-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
Network Interface Module - (NIM001)	Data Flow Systems, Inc.	DFS-00375-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
Switch Interface Module (SIM001, 5 PORT)	Data Flow Systems, Inc.	DFS-00375-008-13	Water, Wastewater, and Irrigation Quality (IQ) Systems
Network Switch Module - (NSM001, 8 PORT)	Data Flow Systems, Inc.	DFS-00375-008-16	Water, Wastewater, and Irrigation Quality (IQ) Systems
Network Switch (5-Port, Prosafe, -04 NSM & SIM)	Data Flow Systems, Inc.	002-0567	Water, Wastewater, and Irrigation Quality (IQ) Systems
Network Switch (8-Port, Prosafe, -16 NSM)	Data Flow Systems, Inc.	002-0568	Water, Wastewater, and Irrigation Quality (IQ) Systems
Fiber Interface Module - (FIM001-10/100)	Data Flow Systems, Inc.	DFS-00375-008-09	Water, Wastewater, and Irrigation Quality (IQ) Systems
Network Fiber Module - (NFM001-10/100)	Data Flow Systems, Inc.	DFS-00375-008-10	Water, Wastewater, and Irrigation Quality (IQ) Systems
Media Converter 10/100 (AT-MMC200/ST) This part is used on the FIM001 and NFM001	Data Flow Systems, Inc.	002-0566	Water, Wastewater, and Irrigation Quality (IQ) Systems
NFM Cable - For connecting extra NFM's in an HSS	Data Flow Systems, Inc.	002-0268	Water, Wastewater, and Irrigation Quality (IQ) Systems

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Network Cell-Router Module - (NCM001)	Data Flow Systems, Inc.	DFS-00375-008-15	Water, Wastewater, and Irrigation Quality (IQ) Systems
Hyper Server Module (HSM003)	Data Flow Systems, Inc.	DFS-00543-008-02	Water, Wastewater, and Irrigation Quality (IQ) Systems
RTU202 Assembly- includes: (1) Fiberglass Enclosure, (1) MBP202, (1) PSM003-1, (1) Polyphaser, (1) SPS00l, (1) RF Pigtail, (1) 2.6 aH Battery DEDUCT DFS-00349-008-04 for NO Tower Mount Brackets DEDUCT DFS-00392-008-01 for Network	Data Flow Systems, Inc.	DFS-00349-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
RTU202 "CUT FOR PLC" includes: (1) Fiberglass Enclosure, (1) MBP202-3, (1) PSM003-1, (1) Polyphaser, (1) SPS00l, (1) RF Pigtail, (1) 2.6 aH Battery DEDUCT DFS-00349 008-04 for NO Tower Mount Brackets DEDUCT DFS-00392-008-01 for Network	Data Flow Systems, Inc.	DFS-00349-008-03	Water, Wastewater, and Irrigation Quality (IQ) Systems
RTU202 "Solar" Assembly- includes 18 X 16 Fiberglass Enclosure with backplate, MBP202-2, Solar PSM, Polyphaser Coaxial Surge Protector, RF Pigtail, & 12V 18Amp Battery DEDUCT DFS-00349-008-04 for NO Tower Mount Brackets	Data Flow Systems, Inc.	DFS-00349-008-02	Water, Wastewater, and Irrigation Quality (IQ) Systems

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RTU204 w/MBP001 - includes: (1) 204 316SS NEMA 4X Enclosure, (1) MBP001, (1) PSM003-1, (1) Polyphaser Coaxial Surge Protector, (1) SPS001, (1) RF Pigtail, (1) 2.6 Ah Battery, (1) I0A Breaker. DEDUCT DFS-00392-008-01 for Network (NO Polyphaser/Pigtail) 16.5" Din-Rail space	Data Flow Systems, Inc.	DFS-00280-008-02	Water, Wastewater, and Irrigation Quality (IQ) Systems
RTU204 w/MBP002 (the rest is same as 204 above)	Data Flow Systems, Inc.	DFS-00280-008-03	Water, Wastewater, and Irrigation Quality (IQ) Systems
RTU204 w/MBP001-3 for PLC (the rest is same as 204 above) Add PLC Backplane Switch Options	Data Flow Systems, Inc.	DFS-00280-008-04	Water, Wastewater, and Irrigation Quality (IQ) Systems
RTU204 w/MBP001-4 for FTU - includes: (1) 204 Enclosure, (1) MBP001- 4, (1) PSM003-1, (2) Polyphaser Coaxial Surge Protector, (1) SPS001, (2) RF Pigtail, (1) 2.6 Ah Battery	Data Flow Systems, Inc.	DFS-00280-008-05	Water, Wastewater, and Irrigation Quality (IQ) Systems
RTU210/216 - Special Quote Required from Systems Engineering	Data Flow Systems, Inc.		Water, Wastewater, and Irrigation Quality (IQ) Systems
RTU202 Fiberglass Enclosure (MBP NOT INCLUDED) 14"h 12"w 811d	Data Flow Systems, Inc.	038-0053	Water, Wastewater, and Irrigation Quality (IQ) Systems
RTU202 Modular Backplane, MBP202-01	Data Flow Systems, Inc.	DFS-00348-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems

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Item	Vendor / Manufacturer	Model(s)	Applicability
RTU202 Modular Backplane, MBP202-02 (CUT FOR SOLAR)	Data Flow Systems, Inc.	DFS-00348-008-02	Water, Wastewater, and Irrigation Quality (IQ) Systems
RTU202 Modular Backplane, MBP202-03 (CUT FOR PLC)	Data Flow Systems, Inc.	DFS-00348-008-03	Water, Wastewater, and Irrigation Quality (IQ) Systems
Aluminum Plate for 202 Enclosure 14x 12 (BP1412AL)	Data Flow Systems, Inc.	039-0135	Water, Wastewater, and Irrigation Quality (IQ) Systems
RTU204 Enclosure (MBP NOT INCLUDED) 15.5"h 23"w 7.5"d	Data Flow Systems, Inc.	DFS-00280-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
Modular Backplane (MBP00I-1) (for single backplane use)	Data Flow Systems, Inc.	DFS-00279-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
Modular Backplane (MBP00I-2) (2nd & 3rd for 210, 216)	Data Flow Systems, Inc.	DFS-00279-008-02	Water, Wastewater, and Irrigation Quality (IQ) Systems
Modular Backplane (MBP00I-3) (for PLC use)	Data Flow Systems, Inc.	DFS-00279-008-03	Water, Wastewater, and Irrigation Quality (IQ) Systems
Modular Backplane (MBP00I-4 for Solar Power Module SPM)	Data Flow Systems, Inc.	DFS-00279-008-04	Water, Wastewater, and Irrigation Quality (IQ) Systems
Modular Backplane (MBP00I-5 for FTU - requires 2 RIMs)	Data Flow Systems, Inc.	DFS-00279-008-05	Water, Wastewater, and Irrigation Quality (IQ) Systems
Tower Mount Bracket "Pair" for RTU202 & TAC Pack Enclosures	Data Flow Systems, Inc.	DFS-00349-008-04	Water, Wastewater, and Irrigation Quality (IQ) Systems
Telemetry Control Unit (TCU00I) - No Radio, controller only (add P3 and P4 connectors for Mod bus application)	Data Flow Systems, Inc.	DFS-00367-008-03	Water, Wastewater, and Irrigation Quality (IQ) Systems
TAC Pack TCU w/VDR002 (217-220 MHz)	Data Flow Systems, Inc.	DFS-00367-008-21	Water, Wastewater, and Irrigation Quality (IQ) Systems

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Item	Vendor / Manufacturer	Model(s)	Applicability
TCU800 - NO RADIO, MODBUS CONFIG	Data Flow Systems, Inc.	DFS-00540-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
TCU800 - NO RADIO, SERIAL FOR EXTERNAL RADIO	Data Flow Systems, Inc.	DFS-00540-008-03	Water, Wastewater, and Irrigation Quality (IQ) Systems
TCU800-IP - NETWORK INTERFACE (NO RADIO)	Data Flow Systems, Inc.	DFS-00540-008-16	Water, Wastewater, and Irrigation Quality (IQ) Systems
TCU800 w/VDR002 (217-220 MHz)	Data Flow Systems, Inc.	DFS-00540-008-21	Water, Wastewater, and Irrigation Quality (IQ) Systems
TCU800 w/DUAL COMMS (VDR002 217-220 MHz & NETWORK)	Data Flow Systems, Inc.	DFS-00540-008-31	Water, Wastewater, and Irrigation Quality (IQ) Systems
TCU001 "Basic Snap-In" Installation Kit - Includes: snap-in mounting bracket, spring loaded connectors, Wago terminals for resistors and fuses only, SPS00I, 10A Circuit Breaker, TFS, TFS Install kit for TCU, 2.6 aH Battery.	Data Flow Systems, Inc.	DFS-00392-008-09	Water, Wastewater, and Irrigation Quality (IQ) Systems
TCU001 "Deluxe Snap-In" Installation Kit WITH WIRE HARNESS & ADDED COMPONENTS- Includes: snap-in mounting bracket, spring loaded connectors, Wago terminals for every wire termination, (1) EDCO DRS036 Analog Surge Protector, SPS00I, 10A Circuit Breaker, TFS, TFS.	Data Flow Systems, Inc.	DFS-00396-008-02	Water, Wastewater, and Irrigation Quality (IQ) Systems

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Item	Vendor / Manufacturer	Model(s)	Applicability
TCU001 "Basic Front-Mount" Installation Kit- Includes dead-front mounting bracket, spring loaded connectors, Wago terminals for resistors and fuses only, SPS001, 10A Circuit Breaker, TFS, TFS Install kit for TCU, 2.6 aH Battery. (Add 3-Phase Surge Protector & Polyphaser Kit)	Data Flow Systems, Inc.	DFS-00392-008-05	Water, Wastewater, and Irrigation Quality (IQ) Systems
TCU001 "Deluxe Front-Mount" Installation Kit WITH WIRE HARNESS & ADDED COMPONENTS - Includes: dead-front mounting bracket, spring loaded connectors, Wago terminals for every wire termination, (1) EDCO DRS036 Analog Surge Protector, SPS001, 10A Circuit Breaker, TFS, TFS Install kit for TCU, 2.6 aH Battery. (Add 3-Phase Surge Protector & Polyphaser Kit)	Data Flow Systems, Inc.	DFS-00396-008-03	Water, Wastewater, and Irrigation Quality (IQ) Systems
TCU001 Harness Upgrade Kit for TCU800, Includes: 002-0596 USB, 002-0597 USB Cover, 019-0174 USB Lanyard, 016-0270 20 pin P3 Connector	Data Flow Systems, Inc.	DFS-00540-108-07	Water, Wastewater, and Irrigation Quality (IQ) Systems

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TCU800 "Basic Snap-In" Installation Kit - Includes: snap-in mounting bracket, PI/P2/P3 spring loaded connectors, Wago terminals for resistors and fuses only, SPS00I, 10A Circuit Breaker, TFS, TFS Install kit for TCU, 7aH Battery. (Add 3-Phase Surge Protector & Polyphaser Kit)	Data Flow Systems, Inc.	DFS-00552-008-08	Water, Wastewater, and Irrigation Quality (IQ) Systems
TCU800 "Deluxe Snap-In" Installation Kit WITH WIRE HARNESS & ADDED COMPONENTS - Includes: snap-in mounting bracket, PI/P2/P3 spring loaded connectors, Wago terminals for every wire termination, (4) ASI Analog Surge Protectors, SPS00I, 10A Circuit Breaker, TFS, TFS Install kit for TCU, 7aH Battery. (Add 3-Phase Surge Protector & Polyphaser Kit)	Data Flow Systems, Inc.	DFS-00552-008-09	Water, Wastewater, and Irrigation Quality (IQ) Systems
TCU800 "Basic Front-Mount" Installation Kit - Includes dead-front mounting bracket, PI/P2/P3 spring loaded connectors, Wago terminals for resistors and fuses only, SPS00I, 10A Circuit Breaker, TFS, TFS Install kit for TCU, 7aH Battery. (Add 3-Phase)	Data Flow Systems, Inc.	DFS-00552-008-10	Water, Wastewater, and Irrigation Quality (IQ) Systems

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Item	Vendor / Manufacturer	Model(s)	Applicability
TCU800 "Deluxe Front-Mount" Installation Kit WITH WIRE HARNESS & ADDED COMPONENTS - Includes: dead-front mounting bracket, PI/P2/P3 spring loaded connectors, Wago terminals for every wire termination, (4) ASI Analog Surge Protectors, SPS00I, 10A Circuit Breaker, TFS, TFS Install kit for TCU, 7aH Battery. (Add 3-Phase Surge Protector & Polyphaser Kit)	Data Flow Systems, Inc.	DFS-00552-008-11	Water, Wastewater, and Irrigation Quality (IQ) Systems
TCU800 HARNESS 480V 3-PHASE UPGRADE KIT. (Use this 480V upgrade if purchasing a Deluxe Installation Kit)	Data Flow Systems, Inc.	DFS-00393-008-05	Water, Wastewater, and Irrigation Quality (IQ) Systems
TCU PI,P2 Connector (Wire Enters Top, Snap-In, 24-Pin) Each	Data Flow Systems, Inc.	016-0154	Water, Wastewater, and Irrigation Quality (IQ) Systems
TCU PI,P2 Connector (Wire Enters Rear, Front Mount, 24-Pin) Each	Data Flow Systems, Inc.	016-0182	Water, Wastewater, and Irrigation Quality (IQ) Systems
TCU00I ONLY- P3 Connector (Configuration/ Address Board)	Data Flow Systems, Inc.	DFS-00391-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
TCU800 ONLY- P3 Connector (Added 1/0)	Data Flow Systems, Inc.	016-0270	Water, Wastewater, and Irrigation Quality (IQ) Systems

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Item	Vendor / Manufacturer	Model(s)	Applicability
TCU P4 Connector (RS-232 / R-S485) - Spring-Load Terminal (Not included with Installation Kits - Required for RIO and Modbus Interface)	Data Flow Systems, Inc.	016-0156	Water, Wastewater, and Irrigation Quality (IQ) Systems
TCU P4 Connector (RS-232 / R-S485) - Spring-Load Terminal (Not included with Installation Kits - Required for RIO and Modbus Interface) - FOR FRONT-MOUNTED TCU	Data Flow Systems, Inc.	016-0184	Water, Wastewater, and Irrigation Quality (IQ) Systems
TCU Snap-in Mounting Bracket	Data Flow Systems, Inc.	DFS-00370-008-10	Water, Wastewater, and Irrigation Quality (IQ) Systems
Adjustable Depth (4.5") Bracket (Short), Snap-In Bracket Req'd For 6-8" deep enclosure	Data Flow Systems, Inc.	DFS-00394-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
Adjustable Depth (8.75") Bracket (Medium), Snap-In Bracket Req'd For 10-12" deep enclosure	Data Flow Systems, Inc.	DFS-00394-008-02	Water, Wastewater, and Irrigation Quality (IQ) Systems
Adjustable Depth (12.25") Bracket (Tall), Snap-In Bracket Req'd For 14-18" deep enclosure	Data Flow Systems, Inc.	DFS-00394-008-03	Water, Wastewater, and Irrigation Quality (IQ) Systems
Accu-CT split-core current transformer (20A), ACTL-0750-020 (EACH)	Data Flow Systems, Inc.	008-0076	Water, Wastewater, and Irrigation Quality (IQ) Systems
Accu-CT split-core current transformer (50A), ACTL-0750-050 (EACH) NOTE: 50A is TCU800 default setting	Data Flow Systems, Inc.	008-0077	Water, Wastewater, and Irrigation Quality (IQ) Systems

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Item	Vendor / Manufacturer	Model(s)	Applicability
Accu-CT split-core current transformer (IO0A), ACTL-0750-100 (EACH)	Data Flow Systems, Inc.	008-0078	Water, Wastewater, and Irrigation Quality (IQ) Systems
Fiberglass Enclosure Assembly for TAC Pack TCU Includes: (1) Fiberglass 18x16 Enclosure w/Backplate, (1) Snap-In Install Kit w/240V 3-Phase protector, Polyphaser & RF Pigtail. ADD 480V 3-PHASE KIT UPGRADE IF REQUIRED	Data Flow Systems, Inc.	DFS-00275-008-04	Water, Wastewater, and Irrigation Quality (IQ) Systems
316 SS Enclosure Assembly for TAC Pack TCU Includes: (1) 316 SS 18x16 Enclosure, (1) Snap-In Install Kit w/240V 3- Phase protector, Polyphaser & RF Pigtail. ADD 480V 3-PHASE KIT UPGRADE IF REQUIRED	Data Flow Systems, Inc.	DFS-00275-008-05	Water, Wastewater, and Irrigation Quality (IQ) Systems
TCU00I Harness Upgrade Kit for TCU800, Includes: 002-0596 USB, 002-0597 USB Cover, 019-0174 USB Lanyard, 016-0270 20 pin P3 Connector	Data Flow Systems, Inc.	DFS-00540-108-07	Water, Wastewater, and Irrigation Quality (IQ) Systems
TCU00I SS Enclosure - ENCL ONLY 18"h 16"w 10"d	Data Flow Systems, Inc.	038-0012	Water, Wastewater, and Irrigation Quality (IQ) Systems
TCU00I Fiberglass Enclosure - ENCL ONLY 18"h 16"w 8"d	Data Flow Systems, Inc.	038-0051	Water, Wastewater, and Irrigation Quality (IQ) Systems

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TCU00118x16 Enclosure Plate (CUSTOM - RAW PLATE ONLY)	Data Flow Systems, Inc.	039-0127	Water, Wastewater, and Irrigation Quality (IQ) Systems
Tower Mount Bracket "Pair" for RTU202 & TCU Enclosures	Data Flow Systems, Inc.	DFS-00349-008-04	Water, Wastewater, and Irrigation Quality (IQ) Systems
Fiberglass Enclosure Assembly for TCU800 (with radio) Includes: (1) Fiberglass 24Hx20W Enclosure w/Backplate, (1) Snap-In Install Kit w/Harness, 240V 3-Phase protector, 7aH battery, Polyphaser & RF Pigtail. ADD price of DFS-00393-008-03 480V 3-PHASE KIT IF REQUIRED	Data Flow Systems, Inc.	DFS-00552-008-06	Water, Wastewater, and Irrigation Quality (IQ) Systems
316 SS Enclosure Assembly for TCU800 (with radio) Includes: (1) 316 SS 24Hx20W Enclosure w/Backplate, (1) Snap-In Install Kit w/Harness, 240V 3-Phase protector, 7aH battery, Polyphaser & RF Pigtail. ADD price of DFS-00393-008-03 480V 3-PHASE KIT IF REQUIRED	Data Flow Systems, Inc.	DFS-00552-008-07	Water, Wastewater, and Irrigation Quality (IQ) Systems
TCU800 HARNESS RELAY ADDER (adds interposing relays for all outputs)	Data Flow Systems, Inc.	DFS-00552-008-04	Water, Wastewater, and Irrigation Quality (IQ) Systems
TCU800 SS Enclosure- ENCL ONLY 24"h 20"w 10"d	Data Flow Systems, Inc.	038-0197	Water, Wastewater, and Irrigation Quality (IQ) Systems
TCU800 Fiberglass Enclosure - ENCL ONLY 24"h 20"w 10"d	Data Flow Systems, Inc.	038-0206	Water, Wastewater, and Irrigation Quality (IQ) Systems

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Item	Vendor / Manufacturer	Model(s)	Applicability
TCU800 24x20 Enclosure Plate (CUSTOM - RAW PLATE ONLY)	Data Flow Systems, Inc.	039-0337	Water, Wastewater, and Irrigation Quality (IQ) Systems
Tower Mount Bracket "Pair" for RTU202 & TCU Enclosures	Data Flow Systems, Inc.	DFS-00349-008-04	Water, Wastewater, and Irrigation Quality (IQ) Systems
2.6 aH Battery (12V Battery w/Leads)	Data Flow Systems, Inc.	DFS-00363-008-02	Water, Wastewater, and Irrigation Quality (IQ) Systems
7 aH Battery 12V Battery w/Leads)	Data Flow Systems, Inc.	DFS-00363-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
18aH Battery (12V battery as used in RTU202 solar assembly) No leads - Universal Battery, Part# UB12180	Data Flow Systems, Inc.	023-0045	Water, Wastewater, and Irrigation Quality (IQ) Systems
Battery Lead (battery-side for 2.6, 3.0 and 7.0 aH)	Data Flow Systems, Inc.	DFS-00165-008-04	Water, Wastewater, and Irrigation Quality (IQ) Systems
Battery Cable, RTU204/202, 12"	Data Flow Systems, Inc.	DFS-00165-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
Battery Cable, RTU210, 36"	Data Flow Systems, Inc.	DFS-00165-008-02	Water, Wastewater, and Irrigation Quality (IQ) Systems
Battery Cable, TCU/TAC PACK, 48"	Data Flow Systems, Inc.	DFS-00165-008-05	Water, Wastewater, and Irrigation Quality (IQ) Systems
Battery Cable, TCU/TAC PACK, 72"	Data Flow Systems, Inc.	DFS-00165-008-07	Water, Wastewater, and Irrigation Quality (IQ) Systems
10' Big-Ass Battery Cable Assembly (see Battery White Paper)	Data Flow Systems, Inc.	DFS-00501-008-02	Water, Wastewater, and Irrigation Quality (IQ) Systems
Battery Shelf (for 2.6, 3.0 and 7.0 aH batteries only)	Data Flow Systems, Inc.	039-0018	Water, Wastewater, and Irrigation Quality (IQ) Systems

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RTU Surge Protection Kit includes: the following: (1) Polyphaser Coaxial Surge Protector, (1) SPS001, (1) TFS.	Data Flow Systems, Inc.	DFS-00364-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
TCU Surge Protection Kit includes: (1) SPS001120V, (1) TFS, (1) TFS Install Kit for TCU (Add 3-Phase Surge Protector per below)	Data Flow Systems, Inc.	DFS-00364-008-02	Water, Wastewater, and Irrigation Quality (IQ) Systems
SPS001, 120VAC Single-Phase Surge Protector	Data Flow Systems, Inc.	005-0061	Water, Wastewater, and Irrigation Quality (IQ) Systems
TCU 240VAC 1-Phase Surge Protector {Ditek, UL LISTED} (Also 208VAC)	Data Flow Systems, Inc.	005-0120	Water, Wastewater, and Irrigation Quality (IQ) Systems
TCU 240VAC 3-Phase Surge Protector (Ditek, UL LISTED)	Data Flow Systems, Inc.	005-0062	Water, Wastewater, and Irrigation Quality (IQ) Systems
TCU 480VAC 3-Phase Surge Protector {Ditek, UL LISTED}	Data Flow Systems, Inc.	005-0063	Water, Wastewater, and Irrigation Quality (IQ) Systems
TCU 480VAC 3-Phase Surge Protector KIT (Ditek, UL LISTED)	Data Flow Systems, Inc.	DFS-00393-008-05	Water, Wastewater, and Irrigation Quality (IQ) Systems
Polyphaser Kit- includes Polyphaser and RF Pigtail (specify length)	Data Flow Systems, Inc.	DFS-00392-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
Polyphaser Coax Surge Protector (Standard, BS0LN-C2)	Data Flow Systems, Inc.	005-0058	Water, Wastewater, and Irrigation Quality (IQ) Systems
Edco DRS-036 (DIN MOUNT ANALOG SURGE PROTECTOR)	Data Flow Systems, Inc.	022-0231	Water, Wastewater, and Irrigation Quality (IQ) Systems
Edco PC-642C-036 {MODULE}	Data Flow Systems, Inc.	022-0056	Water, Wastewater, and Irrigation Quality (IQ) Systems

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Item	Vendor / Manufacturer	Model(s)	Applicability
Edco PC-642C (BASE)	Data Flow Systems, Inc.	012-0011	Water, Wastewater, and Irrigation Quality (IQ) Systems
Edco PH-036 (MODULE)	Data Flow Systems, Inc.	022-0129	Water, Wastewater, and Irrigation Quality (IQ) Systems
Edco PH-036 (BASE)	Data Flow Systems, Inc.	012-0011	Water, Wastewater, and Irrigation Quality (IQ) Systems
API ANALOG LOOP ISOLATOR {API-4380-G-D)	Data Flow Systems, Inc.	022-0268	Water, Wastewater, and Irrigation Quality (IQ) Systems
API OCTAL BASE (NDS-8)	Data Flow Systems, Inc.	012-0019	Water, Wastewater, and Irrigation Quality (IQ) Systems
Zone Barrier CATS/CAT6 Network Surge Protector (Network RTU/TCU/HSS)	Data Flow Systems, Inc.	002-0584	Water, Wastewater, and Irrigation Quality (IQ) Systems
Transient Filter Shield - TFS00I-2	Data Flow Systems, Inc.	DFS-00306-008-02	Water, Wastewater, and Irrigation Quality (IQ) Systems
TFS Install Kit for TCU and TAC Pack TCU	Data Flow Systems, Inc.	DFS-00319-008-03	Water, Wastewater, and Irrigation Quality (IQ) Systems
TFS Install Kit for RTU2XX with PCM001	Data Flow Systems, Inc.	DFS-00319-008-05	Water, Wastewater, and Irrigation Quality (IQ) Systems
10 Amp Breaker (Din Mount)	Data Flow Systems, Inc.	014-0010	Water, Wastewater, and Irrigation Quality (IQ) Systems
B&B Converter, RS-232 to RS-485	Data Flow Systems, Inc.	022-0340	Water, Wastewater, and Irrigation Quality (IQ) Systems
B&B RS485 Surge Protector (typical for TCU P4 / Modbus)	Data Flow Systems, Inc.	005-0165	Water, Wastewater, and Irrigation Quality (IQ) Systems
Tripp-Lite DTEL2 "Inline" Telephone Line Surge Protector (replaces both Edco PCTEL MODULE & BASE)	Data Flow Systems, Inc.	002-0605	Water, Wastewater, and Irrigation Quality (IQ) Systems

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Item	Vendor / Manufacturer	Model(s)	Applicability
Wago Operating Tool (Wago Bone)	Data Flow Systems, Inc.	026-0003	Water, Wastewater, and Irrigation Quality (IQ) Systems
1 Amp fuse holder assembly (mounts to din-rail)	Data Flow Systems, Inc.	DFS-00271-008-09	Water, Wastewater, and Irrigation Quality (IQ) Systems
2 Amp fuse holder assembly (mounts to din-rail)	Data Flow Systems, Inc.	DFS-00271-008-10	Water, Wastewater, and Irrigation Quality (IQ) Systems
¼ Amp fuse holder assembly (mounts to din-rail)	Data Flow Systems, Inc.	DFS-00271-008-11	Water, Wastewater, and Irrigation Quality (IQ) Systems
FUSE BLOCK, MIDGET, 3 POS,30A,600V (for 480V 3PH kit) (add fuses)	Data Flow Systems, Inc.	040-0044	Water, Wastewater, and Irrigation Quality (IQ) Systems
IA FUSE, MIDGET, TIME DELAY, 600 VAC, KTQ (for 480V 3PH kit)	Data Flow Systems, Inc.	040-0043	Water, Wastewater, and Irrigation Quality (IQ) Systems
47K RESISTOR 2 COND WAGO TERMINAL	Data Flow Systems, Inc.	DFS-00271-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
249 Ohm RESISTOR 2 COND WAGO TERMINAL	Data Flow Systems, Inc.	DFS-00271-008-02	Water, Wastewater, and Irrigation Quality (IQ) Systems
100K IW RESISTOR 2 COND WAGO TERMINAL	Data Flow Systems, Inc.	DFS-00271-008-07	Water, Wastewater, and Irrigation Quality (IQ) Systems
200K 2W RESISTOR 2 COND WAGO TERMINAL	Data Flow Systems, Inc.	DFS-00271-008-08	Water, Wastewater, and Irrigation Quality (IQ) Systems
100K 1/2W,0.1% RESISTOR (for old "pre-2020" 480V 3PH kit)	Data Flow Systems, Inc.	DFS-00271-008-14	Water, Wastewater, and Irrigation Quality (IQ) Systems
49.9K RESISTOR 2 COND WAGO TERMINAL (for new 480V 3PH kit)	Data Flow Systems, Inc.	DFS-00271-008-24	Water, Wastewater, and Irrigation Quality (IQ) Systems
4 COND WAGO THRU BLOCK (feed through, 4 hole)	Data Flow Systems, Inc.	026-0063	Water, Wastewater, and Irrigation Quality (IQ) Systems

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Item	Vendor / Manufacturer	Model(s)	Applicability
3 COND WAGO THRU BLOCK (feed through, 3 hole)	Data Flow Systems, Inc.	026-0062	Water, Wastewater, and Irrigation Quality (IQ) Systems
2 COND WAGO THRU BLOCK (feed through, 2 hole)	Data Flow Systems, Inc.	026-0061	Water, Wastewater, and Irrigation Quality (IQ) Systems
WAGO 2 COND END PLATE (GREY)	Data Flow Systems, Inc.	026-0021	Water, Wastewater, and Irrigation Quality (IQ) Systems
WAGO 2 COND END PLATE (ORANGE)	Data Flow Systems, Inc.	026-0022	Water, Wastewater, and Irrigation Quality (IQ) Systems
WAGO END STOP (Qty 50 in package)	Data Flow Systems, Inc.	026-0002	Water, Wastewater, and Irrigation Quality (IQ) Systems
WAGO JUMPER-ADJACENT GREY	Data Flow Systems, Inc.	026-0034	Water, Wastewater, and Irrigation Quality (IQ) Systems
WAGO JUMPER-ALTERNATE GREY	Data Flow Systems, Inc.	026-0035	Water, Wastewater, and Irrigation Quality (IQ) Systems
IDEC SLIM POWER RELAY, 120VAC, SPDT	Data Flow Systems, Inc.	012-0063	Water, Wastewater, and Irrigation Quality (IQ) Systems
IDEC SLIM POWER RELAY, 12VDC, SPDT	Data Flow Systems, Inc.	012-0064	Water, Wastewater, and Irrigation Quality (IQ) Systems
IDEC RJ SLIM POWER RELAY BASE	Data Flow Systems, Inc.	012-0065	Water, Wastewater, and Irrigation Quality (IQ) Systems
OMRON/AAE OCTAL RELAY, 120 VAC COIL, DPDT (use 012-0019 base)	Data Flow Systems, Inc.	012-0002	Water, Wastewater, and Irrigation Quality (IQ) Systems
OMRON/AAE OCTAL RELAY, 24 VDC COIL, DPDT (use 012-0019 base)	Data Flow Systems, Inc.	012-0023	Water, Wastewater, and Irrigation Quality (IQ) Systems
OMRON/AAE OCTAL RELAY BASE (NDS-8)	Data Flow Systems, Inc.	012-0019	Water, Wastewater, and Irrigation Quality (IQ) Systems

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SNUBBER,0.1UF,47 OHM,1/2WATT	Data Flow Systems, Inc.	007-0084	Water, Wastewater, and Irrigation Quality (IQ) Systems
.375A, SLOW BLOW FUSE FOR TCU, 1.25"x.25"	Data Flow Systems, Inc.	040-0042	Water, Wastewater, and Irrigation Quality (IQ) Systems
WIN-RTU / PLC Test Kit- includes: (1) Resource CD, (1) RIM/ PLC Service Interface Cable (6'), (1) Serial Male to USB Male Adapter	Data Flow Systems, Inc.	DFS-00242-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
TCU / PCU Test Kit - includes: (1) Resource CD, (1) TCU / PCU Service Interface Cable (6'), (1) Serial Male to USB Male Adapter	Data Flow Systems, Inc.	DFS-00242-008-02	Water, Wastewater, and Irrigation Quality (IQ) Systems
RETROFIT KIT, BIRD 4300-400 PEAK POWER (use with high speed TIM)	Data Flow Systems, Inc.	035-0037	Water, Wastewater, and Irrigation Quality (IQ) Systems
36" RG-58 cable w/BNC Connector (Watt Meter & Attenuator to radio)	Data Flow Systems, Inc.	DFS-00125-008-16	Water, Wastewater, and Irrigation Quality (IQ) Systems
RIM/PLC Service Port Cable, 9-Pin Female "D" to PLC	Data Flow Systems, Inc.	DFS-00128-008-02	Water, Wastewater, and Irrigation Quality (IQ) Systems
7' TCU/PCU Service Port Cable, 9-Pin to Telephone Style	Data Flow Systems, Inc.	DFS-00128-008-05	Water, Wastewater, and Irrigation Quality (IQ) Systems
GENDER CHANGER,25PIN FEMALE TO FEMALE	Data Flow Systems, Inc.	016-0020	Water, Wastewater, and Irrigation Quality (IQ) Systems
TCU Panel Simulation Fixture (aka TCU Test Fixture/ TCU Demo Box)	Data Flow Systems, Inc.	DFS-00243-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
RTA209 -VHF (217-220 MHz) 9.2 db Yagi	Data Flow Systems, Inc.	DFS-00303-008-03	Water, Wastewater, and Irrigation Quality (IQ) Systems

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Item	Vendor / Manufacturer	Model(s)	Applicability
LAA217 - 217 MHz "0 dB" Grounded Antenna (Length: 68 inches)	Data Flow Systems, Inc.	DFS-00322-008-13	Water, Wastewater, and Irrigation Quality (IQ) Systems
CTA209 Dipole (4 lobes)- (217-220 MHz) (Telewave ANT220D6-9) - Assembled antenna cannot be shipped (requires DFS Delivery@ SQR) TOP-MOUNT ASSEMBLIES:DFS-00322-008-04: CTA209, 200MHZ, 9DB OFFSET (TOP) DFS-00322-008-07: CTA209, 200MHZ, 9DB CARDIOID (20") (TOP) DFS-00322-008-11: CTA209, 200MHZ, 9DB BIDIRECTIONAL (TOP) SIDE-MOUNT ASSEMBLIES: DFS-00322-008-19: CTA209, 200MHZ, 9DB OFFSET (SIDE) DFS-00322-008-20: CTA209, 200MHZ, 9DB CARDIOID (20") (SIDE) DFS-00322-008-21: CTA209,200MHZ, 9DB BIDIRECTIONAL (SIDE)	Data Flow Systems, Inc.	DFS-00322-008-XX	Water, Wastewater, and Irrigation Quality (IQ) Systems
CTA206 Dipole (2 lobes)- (217-220 MHz) (Telewave ANT220D3) Assembled antenna cannot be shipped (requires DFS Delivery@ SQR)	Data Flow Systems, Inc.	DFS-00322-008-12 (CAN'T SHIP)	Water, Wastewater, and Irrigation Quality (IQ) Systems
CTA203 Dipole (1 lobe)-(217-220 MHz) (Telewave ANT220D)	Data Flow Systems, Inc.	005-0118 (CAN'T SHIP)	Water, Wastewater, and Irrigation Quality (IQ) Systems

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Item	Vendor / Manufacturer	Model(s)	Applicability
Rubber Duck for 217-220 MHz - Antennex BEXB000BN NOTE: Connector type is BNC, may require a BNC to N-Type Adapter	Data Flow Systems, Inc.	005-0074	Water, Wastewater, and Irrigation Quality (IQ) Systems
BNC to N-Type Adapter (Female BNC to Male N-Type)	Data Flow Systems, Inc.	016-0059	Water, Wastewater, and Irrigation Quality (IQ) Systems
RF Pigtails (BNC to N-Type)	Data Flow Systems, Inc.		Water, Wastewater, and Irrigation Quality (IQ) Systems
811 RF Pigtail - (used in RTU202 and 204)	Data Flow Systems, Inc.	DFS-00125-008-09	Water, Wastewater, and Irrigation Quality (IQ) Systems
20" RF Pigtail - (used in TAC Pack Enclosure)	Data Flow Systems, Inc.	DFS-00125-008-10	Water, Wastewater, and Irrigation Quality (IQ) Systems
33" RF Pigtail - (used in RTU210)	Data Flow Systems, Inc.	DFS-00125-008-11	Water, Wastewater, and Irrigation Quality (IQ) Systems
46" RF Pigtail - (used in large RTU panels & TCU control panels)	Data Flow Systems, Inc.	DFS-00125-008-12	Water, Wastewater, and Irrigation Quality (IQ) Systems
72" RF Pigtail - (used in large RTU panels & TCU control panels)	Data Flow Systems, Inc.	DFS-00125-008-18	Water, Wastewater, and Irrigation Quality (IQ) Systems
DFS RTC-400 Pre-assembled 23' with connectors	Data Flow Systems, Inc.	DFS-00316-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
DFS RTC-400 (price per foot) LMR400-DB (500' Roll)	Data Flow Systems, Inc.	019-0063	Water, Wastewater, and Irrigation Quality (IQ) Systems
DFS RTC-400 coax connectors (RFN-1006-3I) (crimp pin)	Data Flow Systems, Inc.	016-0058	Water, Wastewater, and Irrigation Quality (IQ) Systems
DFS RTC-600 (price per foot) LMR600-DB	Data Flow Systems, Inc.	019-0084	Water, Wastewater, and Irrigation Quality (IQ) Systems

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DFS RTC-600 N-Type Male coax connector (crimp pin) 3190-1268	Data Flow Systems, Inc.	016-0123	Water, Wastewater, and Irrigation Quality (IQ) Systems
DFS RTC-600 N-Type Female coax conn (unique, crimp pin) 3190-616	Data Flow Systems, Inc.	016-0147	Water, Wastewater, and Irrigation Quality (IQ) Systems
Band-it 9" coated SS cable tie (100 in bag)	Data Flow Systems, Inc.	020-0016	Water, Wastewater, and Irrigation Quality (IQ) Systems
Band-it 18" coated SS cable tie	Data Flow Systems, Inc.	020-0050	Water, Wastewater, and Irrigation Quality (IQ) Systems
1" Glue-Type Heat Shrink, LIST PRICE IS PER FOOT (comes in 4' lengths)	Data Flow Systems, Inc.	020-0001	Water, Wastewater, and Irrigation Quality (IQ) Systems
N-Type Barrel Connector (female-to-female)	Data Flow Systems, Inc.	016-0094	Water, Wastewater, and Irrigation Quality (IQ) Systems
Anatech Filter	Data Flow Systems, Inc.	005-0084	Water, Wastewater, and Irrigation Quality (IQ) Systems
Analog Control Module (ACM001) obsolete	Data Flow Systems, Inc.	DFS-00185-009-XX	Water, Wastewater, and Irrigation Quality (IQ) Systems
Analog Control Module (ACM002)	Data Flow Systems, Inc.	DFS-00350-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
Analog Monitor Module (AMM001) obsolete	Data Flow Systems, Inc.	DFS-00108-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
Analog Monitor Module (AMM002)	Data Flow Systems, Inc.	DFS-00240-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
Bus Extender Module	Data Flow Systems, Inc.	DFS-00223-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
Digital Control Module (DCM001) (obsolete)	Data Flow Systems, Inc.	DFS-00101-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
Digital Control Module (DCM002) (obsolete)	Data Flow Systems, Inc.	DFS-00211-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems

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Item	Vendor / Manufacturer	Model(s)	Applicability
Digital Control Module (DCM003-01, -03, -OS)	Data Flow Systems, Inc.	DFS-00297-008-0X	Water, Wastewater, and Irrigation Quality (IQ) Systems
Digital Control Module (DCM003-02, -04, -06)	Data Flow Systems, Inc.	DFS-00297-008-0X	Water, Wastewater, and Irrigation Quality (IQ) Systems
Digital Monitor Module (DMM001) (obsolete)	Data Flow Systems, Inc.	DFS-00100-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
Digital Monitor Module (DMM002) (obsolete)	Data Flow Systems, Inc.	DFS-00285-008-0X	Water, Wastewater, and Irrigation Quality (IQ) Systems
Digital Monitor Module (DMM003)	Data Flow Systems, Inc.	DFS-00518-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
Power Supply Module (PSM002, S0w) (obsolete)	Data Flow Systems, Inc.	DFS-00209-008-02	Water, Wastewater, and Irrigation Quality (IQ) Systems
Power Supply Module (PSM003-1, 100W)	Data Flow Systems, Inc.	DFS-00296-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
Solar Power Module (SPM001) (obsolete)	Data Flow Systems, Inc.	DFS-00260-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
Solar Power Module (SPM002)	Data Flow Systems, Inc.	DFS-00517-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
Programmable Logic Controller (PLC001)	Data Flow Systems, Inc.	DFS-00213-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
Programmable Logic Controller (PLC033)	Data Flow Systems, Inc.	DFS-00507-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
Programmable Logic Controller (PLC800) w/PMT	Data Flow Systems, Inc.	DFS-00539-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
Modular Backplane (MBP001-XX) (all versions)	Data Flow Systems, Inc.	DFS-00279-008-XX	Water, Wastewater, and Irrigation Quality (IQ) Systems
RTU202 Modular Backplane (all versions)	Data Flow Systems, Inc.	DFS-00348-008-XX	Water, Wastewater, and Irrigation Quality (IQ) Systems

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Item	Vendor / Manufacturer	Model(s)	Applicability
RIM006 Module (no radio)	Data Flow Systems, Inc.	DFS-00295-008-26	Water, Wastewater, and Irrigation Quality (IQ) Systems
TIM007 Board-Only (no radio, all TIM007 versions)	Data Flow Systems, Inc.	DFS-00513-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
Back Pack Radio (BPR) Board-Set (no radio)	Data Flow Systems, Inc.	DFS-00264-008-XX	Water, Wastewater, and Irrigation Quality (IQ) Systems
VDR002-01, -02, 217-220 2W Radio (for TIM or TCU)	Data Flow Systems, Inc.	024-0040	Water, Wastewater, and Irrigation Quality (IQ) Systems
VDR002-03, 450-470 2W Radio (for TIM or TCU)	Data Flow Systems, Inc.	024-0042	Water, Wastewater, and Irrigation Quality (IQ) Systems
Integrated Network Adapter (for TCU00I-IP)	Data Flow Systems, Inc.		Water, Wastewater, and Irrigation Quality (IQ) Systems
Integrated Network Adapter (for TCU800-IP)	Data Flow Systems, Inc.		Water, Wastewater, and Irrigation Quality (IQ) Systems
Pump Control Unit (PCU00I) (no radio)	Data Flow Systems, Inc.	DFS-00219-008-02	Water, Wastewater, and Irrigation Quality (IQ) Systems
Telemetry Control Unit (TCU00I) (no radio,IP,AD,C)	Data Flow Systems, Inc.	DFS-00367-008-03	Water, Wastewater, and Irrigation Quality (IQ) Systems
Telemetry Control Unit (TCU800) (no radio,IP,AD,C)	Data Flow Systems, Inc.	DFS-00540-008-03	Water, Wastewater, and Irrigation Quality (IQ) Systems
Network Interface Module - (NIM00I)	Data Flow Systems, Inc.	DFS-00375-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
Switch Interface Module - (SIM00I)	Data Flow Systems, Inc.	DFS-00375-008-13	Water, Wastewater, and Irrigation Quality (IQ) Systems
Network Switch Module - (NSM00I)	Data Flow Systems, Inc.	DFS-00375-008-04	Water, Wastewater, and Irrigation Quality (IQ) Systems
Fiber Interface Module - (FIM00I-10/100)	Data Flow Systems, Inc.	DFS-00375-008-09	Water, Wastewater, and Irrigation Quality (IQ) Systems

**Collier County Public Utilities Department
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Item	Vendor / Manufacturer	Model(s)	Applicability
Network Fiber Module- (NFM001-10/100)	Data Flow Systems, Inc.	DFS-00375-008-10	Water, Wastewater, and Irrigation Quality (IQ) Systems
Hyper Server Module-HSM003 (STANDARD REPAIR)	Data Flow Systems, Inc.	DFS-00525-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
HSM003 (REPLACE DRIVE - REPAIR ADDER)	Data Flow Systems, Inc.		Water, Wastewater, and Irrigation Quality (IQ) Systems
HSM003 (REPLACE PROCESSOR- REPAIR ADDER)	Data Flow Systems, Inc.		Water, Wastewater, and Irrigation Quality (IQ) Systems
RIO-128 Input/ Output Device	Data Flow Systems, Inc.	DFS-00398-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
RIO-032 Input/ Output Device	Data Flow Systems, Inc.	DFS-00408-008-01	Water, Wastewater, and Irrigation Quality (IQ) Systems
ZABOCS Hybrid Biological Odor Control Units	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
MIDAS OCM Carbon Odor Control Units	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
LOPRO Chemical Scrubber Odor Control Units	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
BTF Bio-trickling Odor Control Scrubbers	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
Bioxide	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
Bioxide Plus 71	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
Bioxide AE	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
Odophos	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems

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Odophos Plus	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
Ferric Sulfate (9%)	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
50% Hydrogen Peroxide	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
VX-456 (Bulk Tanker)	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
VX-456 (Tote)	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
Aktivox (Full Truck)	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
Aktivox (Partial Load)	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
Perox Pus	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
Alkaqen AO	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
ZB-30 Mini	Evoqua Water Technologies LLC	Biofilter	Water, Wastewater, and Irrigation Quality (IQ) Systems
ZB-42 Mini	Evoqua Water Technologies LLC	Biofilter	Water, Wastewater, and Irrigation Quality (IQ) Systems
ZB-54 Mini	Evoqua Water Technologies LLC	Biofilter	Water, Wastewater, and Irrigation Quality (IQ) Systems
ZABOCS-4000	Evoqua Water Technologies LLC	Biofilter	Water, Wastewater, and Irrigation Quality (IQ) Systems
ZABOCS-5000	Evoqua Water Technologies LLC	Biofilter	Water, Wastewater, and Irrigation Quality (IQ) Systems

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ZABOCS-6000	Evoqua Water Technologies LLC	Biofilter	Water, Wastewater, and Irrigation Quality (IQ) Systems
ZABOCS-7000	Evoqua Water Technologies LLC	Biofilter	Water, Wastewater, and Irrigation Quality (IQ) Systems
ZABOCS-7010	Evoqua Water Technologies LLC	Biofilter	Water, Wastewater, and Irrigation Quality (IQ) Systems
ZABOCS-7012	Evoqua Water Technologies LLC	Biofilter	Water, Wastewater, and Irrigation Quality (IQ) Systems
ZABOCS-7015	Evoqua Water Technologies LLC	Biofilter	Water, Wastewater, and Irrigation Quality (IQ) Systems
ZABOCS-7018	Evoqua Water Technologies LLC	Biofilter	Water, Wastewater, and Irrigation Quality (IQ) Systems
ZABOCS-7020	Evoqua Water Technologies LLC	Biofilter	Water, Wastewater, and Irrigation Quality (IQ) Systems
ZABOCS-7025	Evoqua Water Technologies LLC	Biofilter	Water, Wastewater, and Irrigation Quality (IQ) Systems
ZABOCS-8025	Evoqua Water Technologies LLC	Biofilter	Water, Wastewater, and Irrigation Quality (IQ) Systems
RJMC-0150	Evoqua Water Technologies LLC	Carbon	Water, Wastewater, and Irrigation Quality (IQ) Systems
RJMC-0200	Evoqua Water Technologies LLC	Carbon	Water, Wastewater, and Irrigation Quality (IQ) Systems
RJMC-0250	Evoqua Water Technologies LLC	Carbon	Water, Wastewater, and Irrigation Quality (IQ) Systems
RJMC-0300	Evoqua Water Technologies LLC	Carbon	Water, Wastewater, and Irrigation Quality (IQ) Systems
RJMC-0350	Evoqua Water Technologies LLC	Carbon	Water, Wastewater, and Irrigation Quality (IQ) Systems

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Item	Vendor / Manufacturer	Model(s)	Applicability
RJMC-0400	Evoqua Water Technologies LLC	Carbon	Water, Wastewater, and Irrigation Quality (IQ) Systems
RJMC-0450	Evoqua Water Technologies LLC	Carbon	Water, Wastewater, and Irrigation Quality (IQ) Systems
RJMC-0500	Evoqua Water Technologies LLC	Carbon	Water, Wastewater, and Irrigation Quality (IQ) Systems
VoCarb P60 Supersack	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
VoCarb P60 Bag	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
VoCarb 36C Supersack	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
VoCarb 36C Bag	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
MIDAS C20 (coconut based) Supersack	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
MIDAS C30 (coconut based) Supersack	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
MIDAS OCM (coal based) Supersack	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
MIDAS OCM (coal based) Bag	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
Biofilter Nutrient 8-2-8 (5-Drum Quantity)	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
Biofilter Nutrient 8-2-8 (5-Gallon Minimum)	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
Bioglas Media	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems

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Item	Vendor / Manufacturer	Model(s)	Applicability
AcruLog 0-50 ppm Logger	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
AcruLog 0-200 ppm Logger	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
AcruLog 0-1000 ppm Logger	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
LRSS-2 Sampling System	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
CEM Single Point	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
CEM Two Point	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
CEM Three Point	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
DiCom Perimeter Monitor	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
AcruLog Differential Pressure Logger	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
AcruLog IPX Logger	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
AcruLog PPB Logger	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
AcruLog Dilution Logger	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
AcruLog NH3 Logger	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
AcruLog Shelter	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems

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Item	Vendor / Manufacturer	Model(s)	Applicability
Calibration Gas Kit	Evoqua Water Technologies LLC		Water, Wastewater, and Irrigation Quality (IQ) Systems
Rotork valve actuators, replacement parts and repair services	Fluid Control Specialties, LLC (Rotork)		Water, Wastewater, and Irrigation Quality (IQ) Systems
Process & Lab instruments & accessories	Hach Company		Equipment, Chemicals, & Services
Chemistries, reagents, and solutions	Hach Company		Equipment, Chemicals, & Services
Service contracts	Hach Company		Equipment, Chemicals, & Services
Hach Samplers	Hach Company		Equipment, Chemicals, & Services
Belt Filter Press equipment, parts and services	Komline- Sanderson		Wastewater Systems
MTOL+ IR 0-100 AUTO CLN	Lazenby & Associates	28052	Water, Wastewater, and Irrigation Quality (IQ) Systems
MTOL+ WL 0-100 AUTO CLN	Lazenby & Associates	28053	Water, Wastewater, and Irrigation Quality (IQ) Systems
FLOW THRU ASSY, MICRO 200/M-TOL	Lazenby & Associates	50125	Water, Wastewater, and Irrigation Quality (IQ) Systems
LAMP ASSY I/R MTOL	Lazenby & Associates	21396S	Water, Wastewater, and Irrigation Quality (IQ) Systems
DESICCANT REFILL FOR MTOL/M200	Lazenby & Associates	21555R	Water, Wastewater, and Irrigation Quality (IQ) Systems
LAMP ASSY WT/LT MTOL	Lazenby & Associates	24082S	Water, Wastewater, and Irrigation Quality (IQ) Systems
STILLING CHAMBER	Lazenby & Associates	20106	Water, Wastewater, and Irrigation Quality (IQ) Systems
CUVETTE AUTO CLN TOL3 & 4	Lazenby & Associates	24166S	Water, Wastewater, and Irrigation Quality (IQ) Systems

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Item	Vendor / Manufacturer	Model(s)	Applicability
KIT TUBING, VALVE, FTGS M200TOL	Lazenby & Associates	21062	Water, Wastewater, and Irrigation Quality (IQ) Systems
CAL KIT.02,1,10 NTU MTOL LR	Lazenby & Associates	H-39950	Water, Wastewater, and Irrigation Quality (IQ) Systems
CAL KIT.02,10,100 NTU TOL3 H/P	Lazenby & Associates	39953	Water, Wastewater, and Irrigation Quality (IQ) Systems
CALKIT 02,10,1000 M100/TOL H/P	Lazenby & Associates	39957	Water, Wastewater, and Irrigation Quality (IQ) Systems
PRESSURE REGULATOR MTOL	Lazenby & Associates	24306S	Water, Wastewater, and Irrigation Quality (IQ) Systems
KIT MTOL+ EASY MOUNT ADAPTER PLATE	Lazenby & Associates	28157	Water, Wastewater, and Irrigation Quality (IQ) Systems
O-RING & SEAL KIT	Lazenby & Associates	28168S	Water, Wastewater, and Irrigation Quality (IQ) Systems
CUVETTE FLOW THRU 28MM 3/PK	Lazenby & Associates	50036	Water, Wastewater, and Irrigation Quality (IQ) Systems
SPANNER WRENCH	Lazenby & Associates	50122S	Water, Wastewater, and Irrigation Quality (IQ) Systems
CORD POWER SET OF 2 120/240V	Lazenby & Associates	20779S	Water, Wastewater, and Irrigation Quality (IQ) Systems
REPLACEMENT JCT BOX POWER SUPL	Lazenby & Associates	24017S	Water, Wastewater, and Irrigation Quality (IQ) Systems
ELECTRONIC SERVICE MODULE MTOL+ WL	Lazenby & Associates	02853	Water, Wastewater, and Irrigation Quality (IQ) Systems
ELECTRONIC SERVICE MODULE MTOL+ IR	Lazenby & Associates	02852	Water, Wastewater, and Irrigation Quality (IQ) Systems
KEYPAD KIT	Lazenby & Associates	29240S	Water, Wastewater, and Irrigation Quality (IQ) Systems

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Item	Vendor / Manufacturer	Model(s)	Applicability
M100+ WL LAB TURBIDIMETER 0-4000	Lazenby & Associates	28060	Water, Wastewater, and Irrigation Quality (IQ) Systems
M100+ IR LAB TURBIDIMETER 0-4000	Lazenby & Associates	28061	Water, Wastewater, and Irrigation Quality (IQ) Systems
ProCal Calibration Kit (0-4000 NTU), W/L	Lazenby & Associates	39940	Water, Wastewater, and Irrigation Quality (IQ) Systems
ProCal Calibration Kit (0-4000 NTU), IR	Lazenby & Associates	39941	Water, Wastewater, and Irrigation Quality (IQ) Systems
REPLACEMENT LAMP ASSEMBLY, W/L	Lazenby & Associates	24082S	Water, Wastewater, and Irrigation Quality (IQ) Systems
REPLACEMENT LAMP ASSEMBLY, IR	Lazenby & Associates	21396S	Water, Wastewater, and Irrigation Quality (IQ) Systems
LAMP MD FOR MICRO 100/1000 WL	Lazenby & Associates	19972	Water, Wastewater, and Irrigation Quality (IQ) Systems
KIT TUBING, VALVE, FTGS M200TOL	Lazenby & Associates	21062	Water, Wastewater, and Irrigation Quality (IQ) Systems
CUVETTE SAMPLE 28MM 3/PK	Lazenby & Associates	50051	Water, Wastewater, and Irrigation Quality (IQ) Systems
CUVETTE SAMPLE 28MM 10/PK	Lazenby & Associates	50052	Water, Wastewater, and Irrigation Quality (IQ) Systems
Kit, Formazin Stock Solution	Lazenby & Associates	50040	Water, Wastewater, and Irrigation Quality (IQ) Systems
STD, 1000 NTU 1LT HF PRIMARY	Lazenby & Associates	53070	Water, Wastewater, and Irrigation Quality (IQ) Systems
STD, .02 NTU 125ML HF PRIMARY	Lazenby & Associates	53090	Water, Wastewater, and Irrigation Quality (IQ) Systems
STD, .02 NTU 1LT HF PRIMARY	Lazenby & Associates	53030	Water, Wastewater, and Irrigation Quality (IQ) Systems

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Item	Vendor / Manufacturer	Model(s)	Applicability
STD, 4 NTU 1LT HF PRIMARY	Lazenby & Associates	53040	Water, Wastewater, and Irrigation Quality (IQ) Systems
STD, 0.5 NTU 125ML HF PRIMARY	Lazenby & Associates	H-53120	Water, Wastewater, and Irrigation Quality (IQ) Systems
STD, 1.0 NTU 125ML HF PRIMARY	Lazenby & Associates	H-53130	Water, Wastewater, and Irrigation Quality (IQ) Systems
STD, 1000 NTU 125ML HF PRIMARY	Lazenby & Associates	53140	Water, Wastewater, and Irrigation Quality (IQ) Systems
STD, 0.1 NTU 125ML HF PRIMARY	Lazenby & Associates	53380	Water, Wastewater, and Irrigation Quality (IQ) Systems
STD, 5.0 NTU 125ML HF PRIMARY	Lazenby & Associates	H-53420	Water, Wastewater, and Irrigation Quality (IQ) Systems
CAL STD, 10 NTU 1LT HF PRIMARY	Lazenby & Associates	53000	Water, Wastewater, and Irrigation Quality (IQ) Systems
STD, .02 NTU 1LT HF PRIMARY	Lazenby & Associates	53030	Water, Wastewater, and Irrigation Quality (IQ) Systems
STD, 4 NTU 1LT HF PRIMARY	Lazenby & Associates	53040	Water, Wastewater, and Irrigation Quality (IQ) Systems
STD, 100 NTU 1LT HF PRIMARY	Lazenby & Associates	53050	Water, Wastewater, and Irrigation Quality (IQ) Systems
STD, 20 NTU 1LT HF PRIMARY	Lazenby & Associates	53060	Water, Wastewater, and Irrigation Quality (IQ) Systems
STD, 1000 NTU 1LT HF PRIMARY	Lazenby & Associates	53070	Water, Wastewater, and Irrigation Quality (IQ) Systems
STD, 1.0 NTU 1LT HF PRIMARY	Lazenby & Associates	53080	Water, Wastewater, and Irrigation Quality (IQ) Systems
STD, 0.5 NTU 1LT HF PRIMARY	Lazenby & Associates	53170	Water, Wastewater, and Irrigation Quality (IQ) Systems

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Item	Vendor / Manufacturer	Model(s)	Applicability
STD, 5.0 NTU 1LT HF PRIMARY	Lazenby & Associates	53180	Water, Wastewater, and Irrigation Quality (IQ) Systems
STD, .02 NTU 500ML HF PRIMARY	Lazenby & Associates	53240	Water, Wastewater, and Irrigation Quality (IQ) Systems
STD, 2.0 NTU 500ML HF PRIMARY	Lazenby & Associates	53250	Water, Wastewater, and Irrigation Quality (IQ) Systems
STD, 10 NTU 500ML HF PRIMARY	Lazenby & Associates	53260	Water, Wastewater, and Irrigation Quality (IQ) Systems
STD, 50 NTU 1 LITER HF PRIMARY	Lazenby & Associates	53280	Water, Wastewater, and Irrigation Quality (IQ) Systems
STD, 0.02 NTU 1GL HF PRIMARY	Lazenby & Associates	53290	Water, Wastewater, and Irrigation Quality (IQ) Systems
STD, 10 NTU 1GL HF PRIMARY	Lazenby & Associates	53300	Water, Wastewater, and Irrigation Quality (IQ) Systems
STD, 100 NTU 1GL HF PRIMARY	Lazenby & Associates	53310	Water, Wastewater, and Irrigation Quality (IQ) Systems
STD, 1000 NTU 500ML HF PRIM	Lazenby & Associates	53340	Water, Wastewater, and Irrigation Quality (IQ) Systems
STD, 20 NTU 1GL HF PRIMARY	Lazenby & Associates	53370	Water, Wastewater, and Irrigation Quality (IQ) Systems
STD, 100 NTU 500ML HF PRIM	Lazenby & Associates	53390	Water, Wastewater, and Irrigation Quality (IQ) Systems
STD, 1.0 NTU 500ML HF PRIM	Lazenby & Associates	53400	Water, Wastewater, and Irrigation Quality (IQ) Systems
CAL STD.10000NTU WL HF PRO CAL	Lazenby & Associates	39938	Water, Wastewater, and Irrigation Quality (IQ) Systems
CAL STD.10000NTU IR HF PRO CAL	Lazenby & Associates	39939	Water, Wastewater, and Irrigation Quality (IQ) Systems

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Item	Vendor / Manufacturer	Model(s)	Applicability
CAL STANDARD 4000 NTU PRO CAL	Lazenby & Associates	53410	Water, Wastewater, and Irrigation Quality (IQ) Systems
CAL STD 100 NTU, 125ML HF PRIMARY	Lazenby & Associates	39824	Water, Wastewater, and Irrigation Quality (IQ) Systems
CAL STD 10 NTU, 125ML HF PRIMARY	Lazenby & Associates	39825	Water, Wastewater, and Irrigation Quality (IQ) Systems
39845+M-TPW PORTABLE TURB W	Lazenby & Associates	20000	Water, Wastewater, and Irrigation Quality (IQ) Systems
39845+M-TPI PORTABLE TURB	Lazenby & Associates	20008	Water, Wastewater, and Irrigation Quality (IQ) Systems
CUVETTE MICROTPI 3 PK	Lazenby & Associates	19856	Water, Wastewater, and Irrigation Quality (IQ) Systems
CAL SET POCKET TPI/TPW HF POL	Lazenby & Associates	39845	Water, Wastewater, and Irrigation Quality (IQ) Systems
ELECTRONIC MDL TOL3 IR	Lazenby & Associates	02056	Water, Wastewater, and Irrigation Quality (IQ) Systems
ELECTRONIC MDL TOL4 W/L	Lazenby & Associates	02063	Water, Wastewater, and Irrigation Quality (IQ) Systems
ELECTRONIC MDL TOL 5 W/L	Lazenby & Associates	04060	Water, Wastewater, and Irrigation Quality (IQ) Systems
SPANNER WRENCH	Lazenby & Associates	50122S	Water, Wastewater, and Irrigation Quality (IQ) Systems
CUVETTE STAND	Lazenby & Associates	19981	Water, Wastewater, and Irrigation Quality (IQ) Systems
CORD POWER SET OF 2 120/240V	Lazenby & Associates	20779S	Water, Wastewater, and Irrigation Quality (IQ) Systems
TUBING,BLK TYG R3400 50FT ROLL	Lazenby & Associates	21201S	Water, Wastewater, and Irrigation Quality (IQ) Systems

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Item	Vendor / Manufacturer	Model(s)	Applicability
LAMP MODULE IR M100	Lazenby & Associates	22423S	Water, Wastewater, and Irrigation Quality (IQ) Systems
FLOW THRU ASSY NYLON TOL/ACCUV	Lazenby & Associates	24165S	Water, Wastewater, and Irrigation Quality (IQ) Systems
PRESSURE REGULATOR MTOL	Lazenby & Associates	24306S	Water, Wastewater, and Irrigation Quality (IQ) Systems
REPLACEMENT JCT BOX POWER SUPL	Lazenby & Associates	24017S	Water, Wastewater, and Irrigation Quality (IQ) Systems
LAMP MD FOR MICRO 1000 IR	Lazenby & Associates	24547S	Water, Wastewater, and Irrigation Quality (IQ) Systems
DETECTOR ASSY LAMP TOL REPLACE	Lazenby & Associates	28332S	Water, Wastewater, and Irrigation Quality (IQ) Systems
PLC Hardware - ControlLogix, CompactLogix	Rexel		Water, Wastewater, and Irrigation Quality (IQ) Systems
Micro Control System	Rexel		Water, Wastewater, and Irrigation Quality (IQ) Systems
I/O Devices	Rexel		Water, Wastewater, and Irrigation Quality (IQ) Systems
Operator Interface- Panelview Plus, Versa views, Power monitors, Optix, ASEM Cmptrs & Mntrs	Rexel		Water, Wastewater, and Irrigation Quality (IQ) Systems
Power Monitoring Equipment	Rexel		Water, Wastewater, and Irrigation Quality (IQ) Systems
Low Voltage Drives & Medium Voltage Drive Parts	Rexel		Water, Wastewater, and Irrigation Quality (IQ) Systems
Industrial Controls	Rexel		Water, Wastewater, and Irrigation Quality (IQ) Systems
Ethernet Switches Stratix Family	Rexel		Water, Wastewater, and Irrigation Quality (IQ) Systems

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Drives & Accessories	Rexel		Water, Wastewater, and Irrigation Quality (IQ) Systems
End of Life Products (EOL)	Rexel		Water, Wastewater, and Irrigation Quality (IQ) Systems
Software	Rexel		Water, Wastewater, and Irrigation Quality (IQ) Systems
Custom Support Services & Equipment	Rexel		Water, Wastewater, and Irrigation Quality (IQ) Systems
Refrigerated Autosampler Products and Services	Teledyne ISCO		Wastewater Systems
67 I 2FR Refrigerated Sampler (120 V AC, 60 Hz).	Teledyne ISCO	68-6710-072	Wastewater Systems
1-bottle Configuration.	Teledyne ISCO	68-6700-038	Wastewater Systems
3/8-inch ID x 25 ft. long vinyl suction line with standard weighted polypropylene strainer. Includes tubing coupler.	Teledyne ISCO	60-9004-379	Wastewater Systems
Temperature Sensor	Teledyne ISCO	60-9004-226	Wastewater Systems
Evaporator Sensor	Teledyne ISCO	60-9004-240	Wastewater Systems
BLZZRD Package with 14 x 950ml poly bottle configuration and 3/8-inch ID x 25 ft. long vinyl suction line standard weighted polypropylene strainer	Teledyne ISCO	68-2960-028	Wastewater Systems
BLZZRD 14-bottle configuration. Includes 14 polypropylene 950-mL bottles with caps, two discharge tubes, bottle carrier and adapter.	Teledyne ISCO	68-2960-020	Wastewater Systems

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Item	Vendor / Manufacturer	Model(s)	Applicability
BLZZRD 2.5-gal (10 liter) glass bottle with PTFE lined caps	Teledyne ISCO	68-2960-021	Wastewater Systems
2.5-gallon (9.5-liter) glass round bottle with PTFE lined cap	Teledyne ISCO	68-2700-005	Wastewater Systems
BLZZRD Mobility Kit	Teledyne ISCO	60-2974-048	Wastewater Systems
3/8-inch vinyl suction line - 500 ft.	Teledyne ISCO	68-1680-059	Wastewater Systems
Discharge tubing for 5800/4700 and 6700 Series/Avalanche Sampler, pump tubing for 3800 series, GLS, and Glacier Samplers	Teledyne ISCO	60-6700-047	Wastewater Systems
Tubing coupler, 3/8 inch. One-piece, clampless coupler made of stainless steel.	Teledyne ISCO	60-3709-002	Wastewater Systems
3/8-inch stainless steel strainer, low flow.	Teledyne ISCO	69-2903-138	Wastewater Systems
Distributer arm	Teledyne ISCO	60-2974-025	Wastewater Systems
Model 913 High-Capacity Power Pack. Converts 120 V AC, 50/60 Hz to 12 VDC	Teledyne ISCO	60-1684-088	Wastewater Systems
Model 934 Nickel-Cadmium Battery. Rechargeable, 12 VDC, 4 amp-hours	Teledyne ISCO	60-1684-040	Wastewater Systems
Flygt Pumps	Xylem Water Solutions U.S.A.		Wastewater Systems
Flygt Parts	Xylem Water Solutions U.S.A.		Wastewater Systems

Approved Backflow Devices

VENDOR	SIZE	MODEL NO.	TYPE	USE
Ames / Watts	3/4" - 2"	LF4000B / LF009	RP	Residential or commercial potable water locations
Watts	3/4" - 2"	LF919	RP	Residential or commercial potable water locations
Wilkins	3/4" - 2"	975XL	RP	Residential or commercial potable water locations
Ames / Watts	2.5" - 10"	C400 / 957	RP	Large size meter - potable water for commercial or residential applications
Watts	2.5" - 10"	LF909	RP	Large size meter - potable water for commercial or residential applications
Wilkins	2.5" - 10"	375 or 375AST	RP	Large size meter - potable water for commercial or residential applications
Ames	3/4" - 2"	LF4000B	RP	Combo services: fire and domestic lines
Watts	3/4" - 2"	LF009	RP	Combo services: fire and domestic lines
Wilkins	3/4" - 2"	975XL	RP	Combo services: fire and domestic lines
Ames Colt	2.5" - 10"	C400 (w/OSY)	RP	Combo services: fire and domestic lines
Watts	2.5" - 10"	LF909 (w/OSY)	RP	Combo services: fire and domestic lines
Wilkins	2.5" - 10"	375 or 375AST (w/OSY)	RP	Combo services: fire and domestic lines
Ames	2"	3000B	DCDA	Fire Lines - Standard
Watts	2" - 3"	007DCDA	DCDA	Fire Lines - Standard
Wilkins	2"	950XLTDA	DCDA	Fire Lines - Standard
Ames	2.5" - 10"	C300/M300	DCDA	Fire Lines - Standard
Watts	3" - 10"	709DCDA	DCDA	Fire Lines - Standard
Wilkins	2.5" - 12"	350DA or 350ASTDA	DCDA	Fire Lines - Standard
Wilkins	4" - 10"	450DA or 450STDA (N-Shape)	DCDA	Fire Lines - Standard
<p>Note: All fire line Backflow Devices shall be UL or FM approved for fire service installation. Above is a small list, others may be used if requirements are met and information is provided</p>				



Appendix H

Basic User Application & Agreement for Delivery and Reuse of Irrigation Quality (IQ) Water

1. Property & Customer Information

Property Owner Name:	Date:
Mailing Address:	Phone Number:
Service Address:	Email Address:
Section _____ Township _____ Range _____	Folio (Parcel) Number:
Total Property Acres:	Acres irrigated by IQ Water only:

2. Irrigation Information

Total Number of Zones:

Each Zones Gallons per Minute-Use another sheet if necessary		
Zone 1 =	Zone 6 =	Zone 11 =
Zone 2 =	Zone 7 =	Zone 12 =
Zone 3 =	Zone 8 =	Zone 13 =
Zone 4 =	Zone 9 =	Zone 14 =
Zone 5 =	Zone 10 =	Zone 15 =
Maximum number of zones running at once =		

3. Do you have a backflow prevention device installed on your potable (drinking) water line?

Yes	No	Unknown
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4. For what purpose are you using IQ Water? Please select all that apply.

<input type="checkbox"/>	Golf Course Irrigation
<input type="checkbox"/>	Common Area Irrigation (i.e. condo associations, parks, schools, medians)
<input type="checkbox"/>	Single Family Home landscape irrigation
<input type="checkbox"/>	Cooling Tower
<input type="checkbox"/>	Other, please specify _____

5. How many total individual dwelling units will this serve? Please enter a number or N/A. A single family home = 1, a condo with 20 units = 20

<input type="checkbox"/>	Golf Course Irrigation
<input type="checkbox"/>	Common Area Irrigation (i.e. condo associations, parks, schools, medians)

6. What is your estimated average and maximum IQ Water usage in gallons per day?



I, _____, (property owner) have read, understand, and shall abide Collier County Ordinance, No. 2013-48 as amended; Collier County Ordinance No. 1997-33, as amended; Ordinance No. 2001-73, as amended, the Federal, State, and local laws, rules, and regulations that pertain to the use of IQ Water.

I understand that due to the composition of IQ water, it may not be suitable for the irrigation of certain susceptible vegetation, and I agree that the District will not be held liable for damages that may occur to susceptible vegetation or any damages that may occur due to the uses of IQ Water, and agree to defend and hold harmless the Collier County Water-Sewer District (District) from all claims and judgments arising therefrom against the District by any person. It is further agreed that submission of this application does not ensure IQ water delivery and the Owner further agrees that the County shall not be liable to the Owner for any damages or expenses incurred by the Owner as a result of the District's failure to deliver IQ Water.

It is further agreed that District employees or authorized agents shall have the right to enter the applicant's property served by the District with IQ Water to inspect the IQ Water System and shall have the right to discontinue IQ Water service should any infraction exist.

Sign and return the completed application, an 8.5"X11" drawing of property detailing desired meter location, and the Legal Property Description to: Reuse Manager, 4370 Mercantile Ave, Naples, FL 34104.

Printed Name: _____ Signed: _____ Date: _____

Frequently Asked Questions

1. Where can I find the applicable Ordinances? www.municode.com
2. Where can I find my Legal Property Description? On your deed which may be found at www.collierappraiser.com
3. Where can I find applicable State laws regarding IQ/reclaimed water? www.dep.state.fl.us/water/reuse
4. Where do I find billing information? www.colliercountyfl.gov
5. How do I report IQ water, potable water, or sewer issues? **Call (239) 252-2600 for IQ water and wastewater and (239) 252-6245 for potable water.**
6. What are irrigated acres? **The acres that are irrigated, you can calculate irrigated acres by subtracting non irrigated areas such as ponds, mulched areas, etc; from the site's pervious acres.**

For District Use Only

Service Level:	Bulk	Pressurized	Pressurized & Distributed
User Type:	Major User	Basic User	
Base Charge:	Allocation Based	Meter Based Charge	

Peak GPM for proposed system _____ Minimum Meter Size Required _____

Existing Service Tap/Tap Fee \$ _____ Existing Customer _____

Meter Hang Fee \$ _____ Total Fees \$ _____

Approved by: _____ Date: _____

Notes: _____

SECTION 3

SUPPLEMENTAL SPECIFICATIONS

PELICAN BAY PHASE 1 WATER MAIN IMPROVEMENTS

3.1 MEASUREMENT AND PAYMENT

- A. This section describes the method used to determine quantities of Work performed or materials supplied for which a price is given in the Bid. It establishes the basis upon which payment will be made for Payment Items.
- B. Subject to the provisions in General Conditions, all Work and payment for the Work is represented by Payment Items and associated unit prices.

PAYMENT

- A. Subject to all other contract requirements, the Contractor shall be paid for “as-built” quantities of Work for which a price is given in the bid.
- B. Quantities on the Bid Schedule are estimated and may be increased or decreased without limit and without changes to the unit prices.
- C. No separate payment will be made for one Payment Item as Work incidentally required to complete the Work of another.
- D. Payment for Work performed shall be made in accordance with the unit prices in the Bid.
- E. Contractor’s payment applications approval is subject to all conditions of the Contract, Collier County requirements and of the receipt and approval (by the County, EOR, and/or CEI) of following from the Contractor:
 - 1. Up-to-date monthly Project Schedule.
 - 2. Up-to-date Two Week Look-a-Head schedules (every 2 weeks).
 - 3. Up-to-date weekly vibration monitoring reports (signed and sealed).
 - 4. Preconstruction Assessment Forms.
 - 5. Preconstruction Videos (wet and dry).
 - 6. Existing utility location reports (horizontal and vertical pot holing or soft digging of all existing utilities), including existing sewer laterals).
 - 7. As-built red lines of completed work.
 - 8. Compliance with staging/storage lot(s) conditions/restrictions per the Special Project Provisions.

MEASUREMENT FOR PAYMENT

A. Methods of Measurement:

1. Measurements of lengths, widths, slope angles, and depths or elevations shall be made to determine “as-built” quantities of lengths, areas and volumes pertinent to Payment Items.
 - a. Unless otherwise specified, all lengths shall be horizontal distances.
 - b. Slope angles and elevations shall be measured using land surveying equipment.
2. Graphic representations of measured quantities shall be drafted to scale using the Drawings where convenient and appropriate. Additional drawings shall be drafted if required.
 - a. Irregular shapes representing areas and volumes shall be measured using a compensating polar planimeter or a computer digitizer.
 - b. Regular shapes shall be scaled.
3. Use of Drawings:

Unless otherwise agreed upon between the Contractor and Owner, the Drawings shall be used as the basis to establish existing grades and other existing topographic features.

PAYMENT ITEMS

A. No separate payment will be made for the following Work, and its cost shall be included in the Bid Price of the Payment Item to which it is associated:

1. Trench excavation, sheeting, shoring and bracing.
2. Dewatering and associated water quality testing as stipulated in the South Florida Water Management District Permit.
3. Best management practices and controls required to meet dewatering discharge water quality standards.
4. Erosion and sedimentation control and turbidity screening.
5. Excavation, fill, backfill, pipe bedding (including 57 stone), compaction, and grading, including furnishing and installing imported material as required.
6. Excavation of all material encountered, including rock, organic, inorganic, and unsuitable material and all material transportation and disposal.
7. Right-of-way (ROW), site, and all disturbed area restoration including grading, sod, mulch, plantings, trees, landscape, etc. Sod type shall be determined by the type of sod that constitutes 50% or more of the property to be restored.
8. Final and temporary restoration.
9. Removal and temporary replacement of driveways and roadways disturbed during construction to maintain stable condition until permanent restoration is completed.
10. Tree trimming (within the ROW and outside the ROW) and removal (within the ROW).
11. Removal, repair, and replacement of existing irrigation located within the ROW.
12. Maintaining irrigation systems operable during construction.

13. Removal and disposal of existing water mains and associated appurtenances (other than AC water main piping), including concrete thrust blocks.
14. Removal and disposal of existing stormwater pipes, culverts, mitered ends, headwalls, and associated structures.
15. Removal and replacement of existing bollards (wooden, metal, or concrete).
16. Cleanup and site dust control, including daily sweeping and watering and as needed to maintain a clean work area and daily collecting and disposal of all trash and debris within the project site.
17. Testing, including all materials, fees, certifications, and equipment.
18. Maintenance of utility service.
19. Appurtenant work.
20. Removal and replacement of fencing and other structures within the ROW.
21. Saw cutting.
22. Coordination with other contractors for work within the ROW and/or private property.
23. All transportation, storage, and labor.
24. Notifications to property owners of construction schedule and service interruptions.
25. Hiring of power company to relocate or support power poles as required.
26. Contractor Project Manager or Supervisor on-site during any construction activity.
27. Temporary bacteriological sample points.

B. Measurement and Payment Items as listed in the Bid Schedule:

SECTION 1: GENERAL REQUIREMENTS

1. Mobilization/Demobilization

- A. Measurement for various items covered under Mobilization/Demobilization will not be made for payment, and all items shall be included in the contract lump sum price.
- B. Payment for mobilization and demobilization will be made at the Contract lump sum price and shall include all necessary meetings for the project, including but not limited to: meetings with property owners, home owners associations, and other interested parties, all meetings deemed necessary by Collier County, the attendance of the Contractor's field superintendent(s) at all progress meetings, and all other public meetings required to complete the project in accordance with the contract documents, preparatory work and operations in mobilizing for beginning work on the Project and demobilizing for ending work on the Project. Additionally, this item shall include locating and potholing all existing utilities (including existing sanitary sewer laterals at the ROW line, water meters and backflow devices) a minimum of two (2) weeks prior to beginning work and providing the required report and notification to the Engineer of Record and County of any discrepancies found; the establishment of safety equipment, first aid supplies, sanitary and other facilities, as required by these specifications, State and local laws and any other preconstruction expense necessary for the state of the Work, insurance and bonds, the cost of field engineering, including permits and fees, construction schedules (updated schedules are required monthly and 2-week look-a-heads every 2 weeks), shop drawings, temporary facilities, lay down staging/storage area/lots, construction aids, work associated with Contractor support during Owner/Engineer testing, reviews and inspection, re-inspection and any rework resulting from same, cleaning, and project records documents. This payment item cannot exceed more than 5% of the subtotal base bid (without allowances) for each Avenue.

2. Maintenance of Traffic

- A. Measurement for various items covered under Maintenance of Traffic will not be made for payment, and all items shall be included in the contract lump sum price.
- B. Payment for Maintenance of Traffic will be made at the Contract lump sum price for the item, which price and payment shall be full compensation for permitting, construction, and maintenance of any necessary detour facilities; the providing of necessary facilities for access to residences, business, etc., along the project; the furnishing, installing and maintaining of traffic control, barricades, railings, signs, temporary pavement markings, message boards (VMS), warning lights, and other safety devices during construction, the control of dust (daily and as further needed), providing the services of uniformed off-duty police officers, flag men, watchmen, and other special requirements for the safe and expeditious movements of traffic per County and FDOT standards.

3. Survey Layout & Record Drawings

- A. Measurement for various items covered under Survey Layout & Record Drawings will not be made for payment, and all items shall be included in the contract lump sum price.
- B. Payment for providing all survey and record drawings will be made at the contract lump sum price for the item, which price and payment shall be full compensation for project stake-out, completion of an as-built survey, contractor's hand-drawn redlines, and the delivery of five (5) sets of signed and sealed record drawings by a professional land surveyor, licensed and registered in the State of Florida and an electronic copy submitted to the County upon Contract close-out per County standards. Electronic (CAD) files shall be provided to the Engineer of Record. Up-to-date Contractor redlines shall be provided with every pay request. Pay requests submitted without up-to-date Contractor redlines shall be rejected.

4. Pre-Construction Video

- A. Measurement for various items covered under Pre-Construction Video will not be made for payment, and all items shall be included in the contract lump sum price.
- B. Payment for providing pre-construction videos will be made at the full lump sum contract price for the item, which price and payment shall be full compensation for individual property assessments with a minimum of three pictures per lot to document pre-construction conditions, including, but not limited to, sod type, driveway condition, driveway condition outside of the ROW, and private irrigation system details documented on the Pre-Construction Condition Form specified herein; a wet weather video (in addition to a dry weather video) to document flood conditions that will take place during normal business hours. If documentation of the wet weather condition is not possible by a precipitation event, this shall include the cost to flood the ROW with a water truck to document stormwater drainage conditions. Preconstruction videos and pictures shall be re-taken individually for each phase a maximum of 30 days prior to commencement of construction in a new corresponding phase. This pay item includes performing a preconstruction video(s) and pre-assessment forms for all Contractor staging/storage lots.

SECTION 2: WATER MAIN SYSTEM

5a. 8-inch PVC DR18 Water Main Pipelines (Via Open-Cut)

- A. Measurement for water main pipelines, except as otherwise specified, will be based on the laying length of the pipe in linear feet actually placed as measured along the centerline of the completed pipe, including length of fittings measured along the centerline measured to the nearest foot, between the limits shown on the Drawings and restraint of pipe as required by contract documents.
- B. Payment for furnishing and installing water main pipelines will be made at the Contract unit price per linear foot for the pipe in place, which price and payment shall be full compensation for all work associated with the water main pipeline installation. Payment shall also include furnishing and installation of all pipe fittings, sidewalk and driveway removal and replacement (not included in another pay item), asphalt removal and replacement, curb and gutter removal and replacement, restraints, detectable tape, pretesting, flushing/filling of main, joint restraints, temporary connections (including jumpers, temporary meters, and abandonment once clearance is obtained), temporary facilities for blow-offs, pressure testing, disinfection and sterilization, bacteriological testing and sampling assemblies, silt fencing, insulated conducting wire, connections to existing water main (not included in a separate pay item) including restraint of existing pipe on all sides of the tie in, support of existing main, keeping existing main in service, removal and temporary replacement of driveways and roadways disturbed during construction to maintain usable condition until permanent restoration is completed; landscape and/or sodding not designated in bid as necessary, coordination with other contractors, stubs and valves for future connections to existing pipes, clean-up, all cost to clean, repair new or existing piping and appurtenances, and all equipment and all other work necessary to complete the installation as specified. Contractor to assume all existing pipe is unrestrained at connection points and restrain existing pipes per Collier County standards.

6a. 8-inch HDPE DR11 Water Main Pipelines (Via Horizontal Directional Drill)

- i. Katemore Lane (181 LF)
 - ii. Lismore Lane (208 LF)
 - iii. Ardmore Lane (313 LF)
- A. Measurement for water main pipelines will not be made for payment and all items shall be included in the contract lump sum price.
 - B. Payment for furnishing and installing water main pipelines will be made at the full lump sum contract price for the item, which price and payment shall be full compensation for all work associated with horizontal directional drill of the water main pipeline installation. Payment shall also include furnishing and installation of all pipe fittings, sidewalk and driveway removal and replacement (not included in another pay item), asphalt removal and replacement, curb and gutter removal and replacement, restraints, detectable tape, pretesting, flushing/filling of main, joint restraints, temporary connections (including jumpers, temporary meters, and abandonment once clearance is obtained), temporary facilities for blow-offs, pressure testing, disinfection and sterilization, bacteriological testing and sampling assemblies, silt fencing, insulated

conducting wire, connections to existing water main (not included in a separate pay item) including restraint of existing pipe on all sides of the tie in, support of existing main, keeping existing main in service, removal and temporary replacement of driveways and roadways disturbed during construction to maintain usable condition until permanent restoration is completed; landscape and/or sodding not designated in bid as necessary, coordination with other contractors, stubs and valves for future connections to existing pipes, clean-up, all cost to clean, repair new or existing piping and appurtenances, and all equipment and all other work necessary to complete the installation as specified. Contractor to assume all existing pipe is unrestrained at connection points and restrain existing pipes per Collier County standards.

7a. Connect to Existing 8-inch PVC Water Main

- A. Measurement for connections to existing PVC water mains, except as otherwise specified, will be based on the number of connections actually installed and accepted.
- B. Payment for connecting the newly constructed PVC water main to the existing PVC water mains will be made at the appropriate Contract unit price per each connection acceptably installed which price and payment shall be full compensation to furnish and install all fittings, connections, insert valves and line stops (not included in a separate pay item), tapping sleeve and valve with valve box, blow-offs, miscellaneous piping not included under a separate bid item; restraining existing and proposed piping, removal and replacement of existing restraints as necessary, concrete work, field measurements, protection of existing utilities and facilities, bacteriological sample points testing, and all other work required for a complete installation. This pay item does not include connections not listed in the bid schedule under this bid item, additional connections to existing/newly installed water mains shall be included in the Water Main Pipelines unit cost.

7b. Connect to Existing 8-inch HDPE Water Main

- A. Measurement for connections to existing HDPE water mains, except as otherwise specified, will be based on the number of connections actually installed and accepted.
- B. Payment for connecting the newly constructed HDPE water main to the existing HDPE water mains will be made at the appropriate Contract unit price per each connection acceptably installed which price and payment shall be full compensation to furnish and install all fittings, connections, insert valves and line stops (not included in a separate pay item), tapping sleeve and valve with valve box, blow-offs, miscellaneous piping not included under a separate bid item; restraining existing and proposed piping, removal and replacement of existing restraints as necessary, concrete work, field measurements, protection of existing utilities and facilities, bacteriological sample points testing, and all other work required for a complete installation. This pay item does not include connections not listed in the bid schedule under this bid item, additional connections to existing/newly installed water mains shall be included in the Water Main Pipelines unit cost.

8. Air Release Valve

- A. Measurement for Air Release Valves, except as otherwise specified, will be based on the number of air release valves installed and accepted on the potable water main.
- B. Payment for furnishing and installing air release valves will be made at the appropriate contract unit price per each air release valve installed and accepted which price and payment shall be full compensation to furnish and install the valve, complete with tapping saddle, ballcorp, curb stop, supports, vents, vault, footing, frame, cover, access lid, piping, fitting and bends, enclosures, deflections under/over existing or proposed utilities, swales, or stormwater improvements, and other appurtenances. Air release valves shall be placed at the ROW line unless otherwise directed by the County. The necessity of air release valves shall be field determined by the Contractor, EOR, Owner, and CEI.

9. Fire Hydrant Assembly

- A. Measurement for Fire Hydrant Assembly, except as otherwise specified, will be based on the number of fire hydrants installed and accepted.
- B. Payment for furnishing and installing the fire hydrant assemblies will be made at the appropriate contract unit price per fire hydrant assembly installed which price and payment shall be full compensation for all labor and materials required to furnish and install the tee on the utility main, all necessary fittings, joint restraint from the valve to the tee, necessary piping from the tee to the hydrant location with the installation of barrel (riser) section to meet finished grade at the locations depicted in the drawings, and deflections under/over existing or proposed utilities, swales, or stormwater improvements; control gate valve, valve box, pavement marker, coordination with the fire department, chains, and any concrete work. Contractor is responsible to set the hydrant to grade in accordance with the details shown on the Plans and the Collier County Specifications.

10a. 8-inch Gate Valve

- A. Measurement for Gate Valves, except as otherwise specified, will be based on the number of actual gate valves installed and accepted.
- B. Payment for furnishing and installing gate valves/insert valves/line stops will be made at the appropriate contract unit price per gate valve/insert valve/line stop installed which price and payment shall be full compensation for all labor and materials associated with furnishing, installing and testing the valve/line stop, valve stem, mechanical restraints (not listed in a separate pay item), restraint of existing mains, valve nut with extension, tie rods, valve box, valve box adjustments or extensions, valve concrete pad, valve disk, valve cover, and required marker balls. This item also includes the installation of base material below the valve/line stop and the removal and reinstallation of line stop as required in accordance with Collier County standards.

11a. Install ‘NEW’ Water Service and Meter Box – Single Long Side 2” Water Service and Meter Box

- A. Measurement for Install New Water Service and Meter Box –single long side 2” water service and meter box, except as otherwise specified, will be based on the number of water services and meter box actually installed and accepted.
- B. Payment for furnishing and installing new water services and meter boxes will be made at the appropriate Contract unit price per each polyethylene short side and long side service (single and double) from the water main to and including the curb stop within the meter box acceptably installed which price and payment shall be full compensation for all labor, materials, and equipment to install all necessary pipe, fittings, connections, conduits/casings, meter stops, stainless steel tapping saddles, tapping sleeves, curb stops, electronic marker at curb stop and water main connection, locking curb stops at vacant properties as specified on the drawings, deflections, water meter/meter box adjustments (not included in a separate pay item), connection to existing meters, protection of existing utilities and facilities, removal of asphalt along utility corridor, placement of temporary asphalt along the utility corridor, removal and replacement of shrubs, pavement, culverts and storm sewers, sidewalks and other surface materials not specifically designated in the Bid, and all other work required for a complete installation.

11b. Install ‘NEW’ Water Service and Meter Box – Single Short Side 2” Water Service and Meter Box

- A. Measurement for Install New Water Service and Meter Box –single short side 2” water service and meter box, except as otherwise specified, will be based on the number of water services and meter box actually installed and accepted.
- B. Payment for furnishing and installing new water services and meter boxes will be made at the appropriate Contract unit price per each polyethylene short side and long side service (single and double) from the water main to and including the curb stop within the meter box acceptably installed which price and payment shall be full compensation for all labor, materials, and equipment to install all necessary pipe, fittings, connections, conduits/casings, meter stops, stainless steel tapping saddles, tapping sleeves, curb stops, electronic marker at curb stop and water main connection, locking curb stops at vacant properties as specified on the drawings, deflections, water meter/meter box adjustments (not included in a separate pay item), connection to existing meters, protection of existing utilities and facilities, removal of asphalt along utility corridor, placement of temporary asphalt along the utility corridor, removal and replacement of shrubs, pavement, culverts and storm sewers, sidewalks and other surface materials not specifically designated in the Bid, and all other work required for a complete installation.

12. Install Permanent Bacteriological Sample Point

- A. Measurement for furnishing and installing bacteriological sample points will be based on the number of permanent bacteriological sample points installed and accepted.
- B. Payment for furnishing and installing permanent bacteriological sample points will be made at the appropriate contract unit price per each bacteriological sample point installed and accepted which price and payment shall be full compensation to furnish and install all valves, tubing, fittings, saddles, enclosure, all concrete, removal existing sample points, and incidentals necessary for a complete installation as shown on the drawings and as specified herein.

SECTION 3: RESTORATION

13. General Restoration

- A. Measurement for various items covered under General Restoration will be based on the total linear feet of material actually placed as field measured and shown on as-built drawings.
- A. Payment for general restoration will be made at the appropriate Contract unit price per linear foot, from edge of pavement to right-of-way line, of project alignment that is acceptably restored. This item includes all labor, equipment and materials required for final grading and sod placement within the working area as directed by Collier County. Project clean-up of sidewalks, mailboxes, culverts, storm sewers, private property streetscape encroachments, irrigation, impacts to private property, and other surface materials not specifically designated in the Bid.

14. Remove & Replace Concrete Walk

- A. Measurement for removing, disposal, and replacing concrete sidewalks will be based on the total square yard of material actually placed as field measured and shown on as-built drawings.
- B. Payment for removing and replacing existing concrete walk be made at the appropriate Contract unit price per square yard. This item includes all labor, materials, and equipment to remove and replace concrete sidewalk in accordance with Collier County Specifications and the Plans.

15. Remove & Replace Concrete Crosswalk (Across Roadway)

- A. Measurement for removing, disposal, and replacing concrete crosswalks across a roadway will be based on the total square yard of material actually placed as field measured and shown on as-built drawings.
- B. Payment for removing and replacing existing concrete crosswalk across a roadway will be made at the appropriate Contract unit price per square yard. This item includes all labor, materials, and equipment to remove and replace concrete crosswalk in accordance with Collier County Specifications and the Plans.

16. Remove & Replace Concrete Curbing

- B. Measurement for removing, disposal, and replacing concrete curbs will be based on the total linear feet of material actually placed as field measured and shown on as-built drawings.
- C. Payment for removing and replacing existing concrete curbing will be made at the appropriate Contract unit price per linear foot. This item includes all labor, materials, and equipment to remove and replace concrete curbs in accordance with Collier County Specifications and the Plans.

17. Abandon and Grout 4” DIP Water Main

- A. Measurement to abandon and grout existing 4” DIP Water mains, except as otherwise specified, will be based on the actual length of 4” pipeline filled with grout to abandon the existing pipeline, measured to the nearest linear foot.
- B. Payment to abandon and grout the existing 4” DIP water main will be made at the Contract Unit price per linear foot of pipeline actually filled with grout which price and payment shall be full compensation to furnish all labor and materials necessary to abandon and grout the existing DIP water main, field measurements, protection of existing facilities, excavation, compaction, surface restoration, cleanup, disconnections, fittings, caps, plugs, grout point piping, grout material in accordance with the Collier County Technical Specifications and the Details in the Plans, and all other work required for a complete abandonment. The grout points shall be located in the field by the contractor. The grout points shall be located so that the grout and can be pumped to entirely fill the existing 4” AC pipeline within the limits of the abandonment. This pay item includes the Contractor preparing and submitting a written work plan identifying the work and activities to abandon and grout the existing DIP water main, including grout point locations. The plan shall be submitted to the COUNTY and EOR for review and acceptance, prior to proceeding with the work.

SECTION 4: ALLOWANCE

18. General Allowance

- A. Measurement for general allowance for unforeseen conditions will be made by the County dependent on amount of time and material needed for unforeseen conditions not written in the bid items.
- B. Payment for the general allowance will be made at the contract price for time and materials. The Contractors time and material rate sheets included in the Contract must be used. Use of allowance must be approved by Collier County prior to execution of the work. There is no guarantee the Contractor may use these funds, or a portion of these funds.

END OF SECTION

SECTION 4

SPECIAL PROJECT PROVISIONS

PELICAN BAY PHASE 1 WATER MAIN IMPROVEMENTS

1. Storage of material within the right-of-way is not allowed, unless approved by Collier County. If allowed, no material shall be stored within the roadway clear zone.
2. The Contractor shall be responsible for obtaining equipment and material staging/storage lots/areas and all necessary permits, ROW, and temporary construction access. For storage areas, the Contractor shall:
 - a. Provide a copy of all Agreement to the County and Engineer of Record.
 - b. Obtain a ROW permit for the storage area.
 - c. Obtain a Temporary Use Permit for the storage area.

Additional conditions/restrictions of staging/storage lot(s):

- d. No storage of excavated material (pipe, structure, concrete, asphalt) in/on staging/ storage lot(s).
 - e. No demolition activities including but not limited to processing, sorting, consolidating of pipe, structure, concrete, or asphalt material in/ on staging/ storage lot(s).
 - f. Storage/ staging lot(s) shall meet the following minimum requirements:
 - i. Twenty- four (24) feet wide temporary asphalt driveway from the EOP to at least fifty (50) feet into the property. Asphalt driveway shall be 1" of SP 9. 5 with Optional Base Group 1 (4" of limerock). The contractor shall maintain the temporary surface throughout the duration of the project.
 - ii. Six (6) feet tall chain link fence installed around the entire staging area with five (5) feet setback from side and rear property lines (no setback required at ROW line) and continuous 72" tall privacy/wind barrier/screen (green or black) on all sides, including front and gate. The contractor shall maintain the fence and privacy screen throughout the duration of the project.
 - iii. Lockable access gate.
 - iv. Accessing/utilizing the storage/ staging lot(s) only between 7 am and 7 pm Monday - Saturday), except for emergency work.
 - v. No after hour access. All materials for Owner approved work between 7 pm and 7 am shall be delivered to the work site between 7 am and 7 pm, except for emergency work.
 - vi. Maintained daily including, but not limited to: mowing and weeding, litter removal, fence and screen repair as needed, and daily sweeping and dust control.
3. Two (2) weeks prior to beginning construction, the Contractor shall locate by pot holing or soft digging all utilities within the limits of the project (including sanitary sewer laterals at the ROW line) and provide the County, EOR, and CEI a report (before construction) of the findings at each location that includes the station and offset, location, utility type, depth from grade, size, material, date, time, and a minimum of two (2) pictures (an overall site picture and a picture of

the utility found). The Contractor shall mark the found utility with a wooden lath and ribbon, with the utility type found, size, and depth written on the lath. This shall be reviewed with the County and Engineer to allow adjustment of mains as required to minimize conflicts. If the Contractor fails to complete this requirement, Contractor payment applications will not be approved.

4. The Contractor shall assume **full responsibility** for the protection, preservation, and restoration of all brick paver areas impacted directly or indirectly by construction operations. Any damage, staining, settlement, displacement, or deterioration of brick paver surfaces resulting from the Contractor's operations shall be repaired or replaced by the Contractor at **no additional cost to the Owner**.
5. The Contractor shall install protective systems over brick paver areas **prior to commencement of work** in the vicinity. Protection measures shall be designed to prevent structural damage, surface abrasion, staining or discoloration, and settlement or loss of interlock. Acceptable protective systems include, but are not limited to: Steel plates, Timber mats, Heavy-duty plywood, and Composite or synthetic protection panels. The method of protection shall be subject to **Collier County approval**, but approval shall not relieve the Contractor of responsibility for performance.
6. **Tracked construction equipment is strictly prohibited** from crossing, operating on, or staging upon any brick paver surface. Equipment staging, material stockpiling, and parking on brick paver areas are prohibited. Wheeled equipment shall not traverse brick paver areas unless approved protection is installed and such access is unavoidable. Any violation of these restrictions shall be grounds for **immediate suspension of work** in affected areas.
7. The Contractor shall prevent the release of any substance that could damage or alter brick paver surfaces, including but not limited to: Fuel and petroleum products, Hydraulic fluids, Drilling fluids and slurry, Concrete washout materials, and Grout, mortar, or chemical agents. The use of brick paver areas for refueling, equipment maintenance, or material mixing is prohibited. Any contamination shall be immediately reported to the Engineer and fully remediated using methods approved by the Engineer. Cleaning methods that result in bleaching, etching, or surface alteration shall not be unacceptable.
8. Upon completion of construction activities, all brick paver areas shall be restored to **pre-construction conditions or better**, as determined by Collier County. Restoration shall include, as required: Removal and replacement of damaged or stained pavers, Correction of settlement or uneven surfaces, Replacement of bedding sand, base materials, and joint sand, and Reinstallation of edge restraints. Replacement materials shall match existing pavers in **size, color, texture, and pattern** to the satisfaction of the Collier County. Spot repairs that result in a non-uniform appearance shall not be accepted.
9. The Contractor shall photograph all brick paver areas prior to the start of construction to establish baseline conditions. Final acceptance shall be subject to inspection by the Engineer and Collier County. Any deficiencies shall be corrected prior to final acceptance and final payment.

10. No separate measurement or payment shall be made for protection, maintenance, repair, or restoration of brick paver areas. All associated costs shall be **incidental to the Contract**.
11. All driveways shall be restored to their previous condition or better, according to Collier County Standards. Gravel, dirt, and concrete driveways shall be replaced with reinforced concrete to the edge of the right-of-way and asphalt driveways shall be replaced with asphalt to the edge of the right-of-way, unless otherwise specified on the plans. Concrete driveways shall have a thickened apron and reinforcements on the apron as shown in the plans to prevent cracking. Existing brick pavers shall be placed on pallets, wrapped, and stored onsite to prevent damage. If additional brick pavers are required for restoration, the Contractor shall coordinate with the property owner, County, and CEI to ensure an acceptable matching brick paver is ordered by the Contractor. Decorative and colored concrete driveways shall be restored with color and pattern matching the existing driveway. If a matching color or stamp is unavailable, the contractor shall coordinate with the property owner, County, and CEI to ensure an acceptable (by the property owner, County, and CEI) substitute is used.
12. During construction, the Contractor shall keep one lane of traffic open at all times on all affected roads. Flagmen shall be utilized to assist traffic through the construction zone when two lanes of travel are not provided. Flaggers shall possess a Temporary Traffic Control (TTC) Basic Flagger Certificate per requirements set forth by the Florida Department of Transportation. Access onto existing streets and drives shall be maintained to local traffic, emergency vehicles, delivery vehicles, postal vehicles, public transportation, solid waste and recycling vehicles, and property owners. At all times, access must be provided to existing fire hydrants, valves, meters/backflow devices, manholes, and cleanouts.
13. After the first lift of asphalt is installed, all manholes shall be provided with a 1:1 (max) asphalt bevel around the ring to provide a slope for vehicle tires over the manholes.
14. After final paving, Contractor shall grade, as necessary, and re-sod any areas disturbed by construction activity.
15. Notification of road closures must be provided in writing to the Collier County Sherriff's Office and the North Collier Fire Rescue District at least 72 hours in advance of the road closures. Road Closure notification forms shall be submitted to the Collier County Growth Management Department each week. Access to each residence and business shall be maintained for emergency vehicles at all times. At no time may a roadway be blocked at two locations within one block. Contractor must provide a road closure plan and schedule for review by the County, EOR, and CEI 7 days prior to all proposed road closures.
16. The Contractor shall coordinate with the following agencies, above and beyond the Collier County Road Alert, throughout the duration of construction: USPS, Collier County Sherriff's Office, Fire Department and EMS, Waste Management (garbage and recycling), and Collier County Public Schools (school bus routes). Additionally, if required by the USPS, a "mailbox bank" shall be installed by the Contractor at no additional charge.

17. The Contractor shall notify Collier County Utilities Department at least ten (10) calendar days in advance of all planned service interruptions and receive County Project Manager's approval before proceeding with planned interruptions.
18. Contractor shall assume all existing mains are unrestrained at the connection points and will restrain the mains in accordance with the Collier County Water-Sewer District, Utilities Standards Manual.
19. Work shall be limited to 7:00 AM to 7:00 PM Monday through Saturday. Saturday work requires approval by the Collier County Project Manager, the Contractor must request Saturday work by 12:00 PM on the Thursday before Saturday work is proposed. No work shall be permitted on Sundays and County Holidays without prior approval. Please see the following link for Collier County's Holidays:
https://www.colliervotes.gov/Portals/Collier/Documents/pdf/2021-2022%20Elections/Holiday%20Schedule%202022.pdf?ver=dIT_Ra3Jem74KXZZRkkpnA%3D%3D
20. Contractor's site superintendent(s) must attend all meeting relating to the project, including, but not limited to progress meetings, neighborhood information meetings, on-site meetings, and any other meeting deemed necessary by Collier County.
21. All Collier County Water-Sewer District, Utilities Standards (design criteria, specifications, and details) are applicable to this project and are made part of the Contract Documents by reference to current County Utilities Standards, located at the following web address: <https://www.colliercountyfl.gov/government/public-utilities/water-sewer-district/engineering-and-project-management/resources>. In the event of a conflict between any applicable standard and these specifications and drawings, the more stringent requirement shall apply.
22. Contractor shall be responsible for all costs associated with installing and testing of all compact fill materials and road base and sub-base to avoid future settlement. Within paved areas, at a minimum, backfill and compaction shall be per detail FDOT Index 125-001 and Specifications Section 125. Perform compaction density tests at all such backfill areas with spacing not to exceed 100 feet apart and on each compacted layer for paved areas.

For unpaved areas, compaction shall be per FDOT Index 125-001 and testing shall take place a minimum of every 500 feet, or a minimum of one test per every section of pipe laid. Compaction testing density shall be per ASTM D 1557.
23. Contractor shall be responsible for all inspection and testing unless otherwise specified. For tests to be made by the Contractor, the testing personnel shall make the necessary inspections, furnish all material and equipment to properly perform the testing, and furnish all results to Collier County for acceptance of all equipment and installation as required.
24. Contractor shall be responsible for the cost of all testing as required.

25. New water main and service piping (from main to curb stop at meter) shall be constructed, pressure tested, flushed (full bore), and bacteriologically cleared for FDEP clearance.
26. Contractor to pre-test all pressure piping and meet AWWA C600-17 (or current edition) allowable loss standards for a minimum of one hour before commencing the pressure test.
27. The Contractor shall provide for review by the Owner and Engineer a detailed sequence of construction that identifies how new gravity sewer and service laterals will be installed, as well as system testing, while keeping the existing system in service.
28. Clearing and grubbing shall be limited to work areas only. Contractor shall be responsible for restoring all areas disturbed by his work. All disturbed areas shall be restored to pre-construction conditions. Contractor shall be required to water vegetation replaced until established/rooted.
29. Trees and shrubs within the work area shall be removed as directed by Collier County and/or the property owner. Irrigation shall be fully restored from ROW to ROW. No additional payment shall be made for restoration per the ROW standards.
30. All fences damaged/removed outside the limits of the ROW shall be restored to their original conditions.
31. In accordance with the Collier County requirements, a pre-construction video (dry and wet conditions) shall be taken with copies provided to the County and Engineer. Contractor shall supplement these videos with still photographs (in addition to the pictures required in the Pre-Construction Assessment Forms) as necessary to reflect existing conditions. This shall include but not be limited to sod type, driveways and driveway culvert, and driveway conditions from the ROW to the property structure. The Contractor may be required to restore private properties to conditions better than existing, at no additional cost to the County, if the Contractor fails to sufficiently document existing conditions.
32. Prior to beginning construction, the Contractor shall submit for each property a Pre-Construction Assessment Form prior to commencement for the phase of work during which the property will be impacted. The Pre-Construction Assessment Form is included in Section IX of this document. An editable electronic version of the form will be provided to the Contractor. Each form shall be prepared electronically and submitted as an un-editable PDF to the County. The file name shall reflect the property address in the following format: Street Name, Property Number (i.e. Green Tree Drive, xxx.PDF) Duplexes and properties with multiple addresses per legal parcel shall be submitted as separate sheets in the following format: Street Name, Legal Property Number, Type of residence (duplex, apartment, etc.), Street Number on building (i.e. Green Tree Drive xxx, Duplex xxx.PDF).
33. Contractor shall be responsible for all construction layout and preparation of Record Drawings in accordance with County requirements. This shall include but not be limited to water main, valves, fire hydrants and services, gravity sewer laterals, approved changes, and stormwater.

34. Contractor shall contact all utility suppliers, including but not limited to Collier County, Comcast, Summit Broadband, Inc., Florida Power & Light, and CenturyLink for locating of their facilities. Contractor shall coordinate with these utilities for protection and adjustment of their facilities as needed. All costs shall be included in individual bid items.
35. Contractor shall be responsible for all Maintenance of Traffic for the project. Maintenance of Traffic shall be in accordance with the FDOT Standard Index 102-600 series and the Manual of Uniform Traffic Control Devices (MUTCD, Part VI) current edition. Existing traffic conditions may warrant night work. If night work is required, the Contractor will be responsible for proper MOT at no additional cost.
36. All sign related work to be coordinated with Felix Burgos, 239-252-5179, to maintain integrity of our Sign asset database. Contractor to follow Traffic Operations Signing and Pavement Markings Special Provision details which indicate using a 2.5" x 2.5" galvanized metal square tubular sign post.
37. The Contractor shall replace all signs with new signs, posts, and hardware to meet current Collier County and FDOT specifications/standards. All removed signs shall be returned to Collier County Traffic Operations at 2885 Horseshoe Drive South, Naples, FL 34104.
38. Contractor shall replace striping to meet current Collier County and FDOT specifications/standards; all striping shall be thermoplastic.
39. The Contractor shall be responsible for maintaining all work areas in a safe and clean manner as identified in the County Utilities Standards Manual. This shall include but not be limited to daily watering and intermediate watering as needed of bare soil roadways and sweeping of roadway and sidewalk surfaces.
40. Pedestrian access and transit shall be provided at all times during construction and restoration (permanent or temporary) of the sidewalks on the north/south streets must be completed within 7 calendar days of the sidewalk being removed. Temporary sidewalk restoration shall be firm, stable, and slip resistant (compacted limerock or asphalt).
41. If road/driveway dewatering ramps are utilized at roadways/driveways, the contractor shall provide barricades on either side of the ramps to protect/warn vehicles from driving over manifolds/connection sections on either side of all ramps.
42. All excavation shall be unclassified with no additional payment to be made for rock, unsuitable material, dewatering. The Contractor shall be responsible for making his own site observations and exploration to determine site conditions prior to bidding.
43. The Contractor shall prepare and provide for review by the Owner and Engineer an MOT Plan, Asbestos Removal Plan, Tropical Storms and Hurricanes Plan, Sewer Bypass Plan, and Safety Program/Risk Management Program prior to construction commencement.
44. The contractor is responsible for providing a third-party independent consultant to perform vibration monitoring adjacent to existing homes and structures during all construction activities. The monitoring equipment shall be located within the equipment manufacturers

allowable tolerance distance from construction activities at all times. All monitoring shall be done at the limits of the right-of-way. Reports shall include location of the equipment, time, and maximum PPV, either once per day, if the vibration monitor is not relocated, or upon each relocation of the vibration monitoring device. Upon either detecting vibration levels reaching 0.5 inches per second or damage to the structure, immediately stop the source of vibrations, backfill any open excavations, notify the Engineer and provide a corrective action plan for acceptance by the Engineer. Vibration monitoring and reporting shall follow the U.S. Bureau of Mines standards and reports shall be signed and sealed by a State of Florida Professional Engineer and delivered weekly to the County, EOR, and CEI. The Contractor's qualified subcontractor shall be the only party allowed to determine the proper location for monitoring and setting up the vibration monitoring equipment. Vibration monitoring reports, signed and sealed, shall include a statement whether or not the recorded levels met or did not meet 0.5 inches per second and the recommended levels stated in the U.S. Bureau of Mines, R18507 *Structural Response and Damage Produced by Ground Vibration from Blasting*. If at any time a structural damage complaint is received by the County, the Contractor shall, within 2 business days provide, a signed and sealed vibration monitoring report for the affected area.

45. The Contractor is responsible for restoration of areas damaged outside of the work area if the damage is a result of the construction including, but not limited to, detours and construction traffic non-contiguous to the project area, offsite construction storage areas, receiving water bodies, etc.
46. The Contractor shall conform to the requirements in Collier County Ordinance 2019-17: An Ordinance providing for establishment of a water pollution control and prevention ordinance, providing for repeal of Ordinance No. 87-79, as amended, and resolution No. 88-311: providing for inclusion in the Code of Laws and Ordinances; providing for conflict and severability; and providing for an effective date. This includes within the project area and outside of the project area, i.e. storage/staging lot(s).
47. It is recommended that the Contractor review and follow the recommendations for field measuring turbidity in the following FDEP SOP FT1600:
<https://www.youtube.com/watch?v=k6x22q9uoAY&feature=youtu.be>
48. The Contractor shall coordinate with all other Contractors within the project limits for work within the ROW and/or private property and shall make accommodations to not inhibit work by other Contractors.

SECTION 5

PERMITS

PELICAN BAY PHASE 1 WATER MAIN IMPROVEMENTS

- 5.1 Collier County Right of Way Permit
- 5.2 Site Development Plan Insubstantial Change (SDPI)

SECTION 6

ADDITIONAL DOCUMENTATION AND FORMS

PELICAN BAY PHASE 1 WATER MAIN IMPROVEMENTS

- 6.1 Material Deliver Conformation Form
- 6.2 Collier County Asbestos Removal Plan
- 6.3 Wastewater Spill Overflow Contingency Plan
- 6.4 Pre-Construction Assessment Form
- 6.5 Meter and Backflow Change out Procedure
- 6.6 Collier Road Alert Form

SECTION 6.1

MATERIAL DELIVERY/RETURN CONFIRMATION

PELICAN BAY PHASE 1 WATER MAIN IMPROVEMENTS

NOTE: This form is to be completed by Contractor and County Representative at time of all material delivery to site and at time of all pick up of returned materials. All material shall be reviewed for condition, type, size and quantity. Delivery or pick-up tickets should be attached to form.

DATE: _____

COUNTY REPRESENTATIVE: _____

CONTRACTOR REPRESENTATIVE: _____

MATERIAL DELIVERY OR PICKUP: _____

DELIVERED OR PICKED UP BY: _____

MATERIAL (LIST BELOW)

	<u>ITEM</u>	<u>SIZE</u>	<u>QUANTITY</u>	<u>COMMENTS</u>
1.				
2.				
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				

PROVIDE ADDITIONAL COMMENTS AS NECESSARY: _____

County Representative

Contractor Representative

SECTION 6.2

RISK MANAGEMENT DEPARTMENT ASBESTOS REMOVAL PLAN



SUBJECT: ASBESTOS REMOVAL & CONTRACTOR OPERATIONS

REFERENCE: CMA 5902 & ALL APPLICABLE STATE, LOCAL, COUNTY & FEDERAL REGULATIONS

EFFECTIVE DATE: 10/27/10

REVISION DATE: 7/2017

Purpose

This Asbestos Removal and contractor operations Written Plan establishes Collier County's requirements for the safe work practices whenever asbestos containing material and/or suspected asbestos containing material is disturbed. This may include the demolition of buildings, insulation materials, underground piping, etc. This written program applies to all asbestos removal operations performed within Collier County Government where employees may encounter asbestos or suspected asbestos containing material as part of their job duties. This plan also outlines the minimum requirements our contractors must follow when encountering asbestos or suspected asbestos containing material during demolition, insulation removal and/or underground piping repair, replacement or removal.

Scope

The control of asbestos removal via written programs and task procedures, such as JSA's are only one component of assuring "cradle to grave" control over the safe and environmentally responsible removal of asbestos. Therefore, affected departments have the responsibility in conjunction with Risk Management to ensure the work they perform as well as the work performed by contractors is completed according to all applicable OSHA, EPA, FDEP and/or DOT regulations. This plan is intended for Collier County buildings, utilities and property under control of the board of County Commissioners and is not designated for asbestos identification and/or removal activities within public schools operations that are regulated under 40 CFR part 763 Subpart E.

Administrative Duties/Responsibilities

Collier County's Risk Management Department has developed this written plan and maintains the master copy of this asbestos removal plan. This department is responsible for all facets of the master plan and has full authority to make necessary decisions to ensure the success of this plan. Collier County's Safety staff is also qualified, by appropriate training and experience that is commensurate with the complexity of the plan, to administer or oversee our asbestos removal written plan, which includes shutting down any operations that do not meet BCC/Local/State or Federal EHS Regulations, Guidelines or Best Practices.

Department / Site-Specific Plans

The master plan does not contain all site-specific additions to this master plan. Development, maintenance and revision of site-specific plans are the responsibility of each affected department and will vary by department. Site-specific Plans shall be developed using a "Department Insert" to accompany the master copy of this plan.

Records Retention

- Each facility/department is responsible to maintain copies of all forms indefinitely. Where revisions are made to their site-specific plan, the outdated document shall be retained indefinitely.
- Each facility/department is responsible to maintain copies of all employee training lists, waste disposal manifests and any inspection forms indefinitely.

The Risk Management Department maintains a copy of the master plan and copies of completed and submitted site-specific plans. Each affected department is responsible for maintaining the master plan and a site-specific plan and that the Contractor has a copy of the plan.

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Section I Definitions

Asbestos: includes chrysotile, amosite, crocidolite, tremolite asbestos, anthophyllite asbestos, actinolite asbestos, and any of these minerals that has been chemically treated or altered.

Asbestos-Containing Material (ACM): any material containing more than one percent asbestos.

Class I Asbestos Work: the removal of thermal system insulation and/or surfacing material (ACM or PACM).

Class II Asbestos Work: removal of any ACM which is not Class I, such as wallboard, floor tile, ceiling tile, linoleum, transite board, roofing materials and mastics.

Class III Asbestos Work: repair and maintenance operations where ACM is likely to be disturbed.

Class IV Asbestos Work: maintenance and custodial activities during which employees contact but do not disturb ACM, and activities to clean up dust and debris which may be generated by Class I, II, or III work.

Clearance Air Monitoring: Air monitoring conducted by an Asbestos Project Monitor at the conclusion of an asbestos project. Clearance air monitoring includes the successful completion of a final visual inspection for work area debris and the collection and analysis of air samples in accordance with AHERA protocols.

Competent person means, in addition to the definition in 29 CFR 1926.32 (f), one who is capable of identifying existing asbestos hazards in the workplace and selecting the appropriate control strategy for asbestos exposure, who has the authority to take prompt corrective measures to eliminate them, as specified in 29 CFR 1926.32(f): in addition, for Class I and Class II work who is specially trained in a training course which meets the criteria of EPA's Model Accreditation Plan (40 CFR 763) for supervisor, or its equivalent and, for Class III and Class IV work, who is trained in a manner consistent with EPA requirements for training of local education agency maintenance and custodial staff as set forth at 40 CFR 763.92 (a)(2).

Demolition - The wrecking or taking out of any load-supporting structural member of a facility together with any related handling operations or the intentional burning (i.e. practice burns) of any facility.

DOT – U.S. and/or Florida Department of Transportation

EPA – U.S Environmental Protection Agency

FDEP – Florida Department of Environmental Protection

Friable Asbestos Containing Material: any material containing more than one percent asbestos, which when dry, may be crumbled, pulverized or reduced to powder by hand pressure.

High Efficiency Particulate Air (HEPA) Filter: a filter capable of trapping and retaining at least 99.97 percent of all mono-dispersed particles of 0.3 micrometers in diameter.

Negative Exposure Assessment (NEA): a demonstration by the employer, which complies with the criteria in OSHA 29 (CFR) 1926.1101 paragraph (f) (2) (iii), that the employee exposure during the monitored operation is expected to be consistently below the PELs.

Non-Friable Asbestos Containing Material: materials in which asbestos is bound in a matrix which cannot, when dry, be crumbled, pulverized or reduced to powder by hand pressure (such as floor tile and asphaltic building materials).

NESHAP – EPA mandated National Emissions Standards for Hazardous Air Pollutants

OSHA – U.S. Occupational Health and Safety Administration

Permissible Exposure Limits (PELs): (1) Time Weighted Average (TWA): the employer shall ensure that no employee is exposed to an airborne concentration of asbestos in excess of 0.1 fiber per cubic centimeter as an eight (8) hour time weighted average. (2) Excursion Limit (EL): the employer shall ensure that no employee is exposed to an airborne concentration of asbestos in excess of 1.0 fiber per cubic centimeter of air as averaged over a sampling period of thirty (30) minutes.

Presumed Asbestos Containing Material (PACM): thermal system insulation and surfacing material in buildings constructed no later than 1980, are assumed to contain asbestos until it has been analyzed to verify or negate its asbestos content.

Regulated Asbestos Containing Material: (RACM) is (a) friable asbestos material, (b) Category I non-friable ACM that has become friable, (c) Category I non-friable ACM that will be or has been subjected to sanding, grinding, cutting or abrading, or (d) Category II non-friable ACM that has a high probability of becoming or has become crumbled, pulverized, or reduced to powder by the forces expected to act on the material in the course of demolition or renovation operations.

Regulated Area: means an area established by the employer to distinguish areas where airborne concentrations of asbestos exceed or there is a reasonable possibility that they may exceed the permissible exposure limits.

Renovation - Altering a facility or one or more facility components in any way, including the stripping or removal of Regulated Asbestos Containing Materials (RACM) from a facility component. A renovation could be, but not limited to, any interior renovation or remodel not affecting load-supporting structural members or a roof replacement.

Vinyl Asbestos Floor Tile (VAT): vinyl floor tile and in some cases its mastic which contain more than one percent asbestos and must be handled as ACM.

Section II – Applicable Regulatory Requirements

OSHA – 29 CFR 1910.1001 - Worker protection measures-engineering controls, worker training, labeling, respiratory protection, bagging of waste, permissible exposure level.

OSHA – 29 CFR 1926.1101 - Worker protection measures for all construction work involving asbestos, including demolition and renovation-work practices, worker training, bagging of waste, permissible exposure level.

DOT – 49 CFR Parts 171 and 172 - Regulates the transportation of asbestos-containing waste material. Requires waste containment and shipping papers.

EPA – 40 CFR Part 61 Subpart M – Regulates disposal activities in regards to emissions standards for manufacturing and removal of asbestos.

EPA – 40 CFR Part 763 Subpart G - Protects public employees performing asbestos abatement work in States not covered by OSHA asbestos standard.

EPA – 40 CFR Part 763 Subpart E – Sets forth training requirements for asbestos workers performing work in Schools, Public Buildings, or Commercial Buildings.

F.A.C. – 62-257 – Florida Department of Environmental Protection asbestos removal program

FS Section 469 – Licensing Requirements

Section III –Inventory, Surveillance, and Notification

Collier County Departments are required to maintain an Inventory of all asbestos containing material (appendix A). All accessible functional spaces with known or suspected asbestos containing materials other than flooring are required to be visually inspected at a minimum of twice a year. Spaces with known or suspected asbestos containing flooring are inspected once per year. The current condition of the asbestos containing material is evaluated relative to its condition at previous surveys. Deterioration or a change in the condition of any asbestos containing material is documented. If this deterioration results in a significant health risk to building occupants the deteriorated area is scheduled for hazard abatement.

Inspections are performed by individuals who are currently certified as EPA Asbestos Building Inspectors or who have been trained to recognize asbestos hazards. Each affected department is responsible to ensure that properly trained personnel are available for inspections. This person or persons shall be designated on their Department/Site-Specific Insert that accompanies this master plan.

Buildings presumed to contain asbestos containing materials are posted with a notice sign alerting occupants to the presence of asbestos and guidance on where to find further information. These notices are posted inside of the buildings near the entrances.

Contractors performing work on a Collier County Building or utility that contains asbestos are notified about the presence of asbestos containing materials.

An updated asbestos survey, identifying both friable and non-friable asbestos containing materials, must be conducted of any building or section of a building that is scheduled for renovation or demolition. A draft copy of the survey must be reviewed by the Risk Management for completeness prior to accepting the final product. A copy of the updated survey must be kept on site until the renovation or demolition activities are completed. The survey must be conducted under the supervision of a Florida licensed asbestos consultant. Individuals performing asbestos surveys must be certified as EPA asbestos inspectors through a Florida approved training provider.

Occupants of areas adjacent to planned asbestos removal projects must be notified prior to the start of removal activities. This notification may be in writing or by personal communication and must include information pertaining to what material is being removed and what measures are being taken to prevent exposure to asbestos fibers.

Section IV – Training Requirement

There are various levels of training required depending on the type of involvement with asbestos materials. Each department is responsible for ensuring employees are trained for their level of asbestos involvement. Environmental Health and Safety staff can guide and assist in training. Documentation of training activities must be provided to the Risk Management office.

Awareness Training - This is the most basic level of training, and is required for custodial and maintenance employees assigned to a building or utility containing asbestos or presumed asbestos containing materials.

Class I or Class II- Employees who will be removing or disturbing asbestos or presumed asbestos containing materials must be trained equivalent in curriculum, training method and length to the EPA Model Accreditation Plan asbestos abatement worker training. The state of Florida requires at a minimum this course be four days in length.

Class II Cement piping – All workers must have completed an approved 8 hour class II Cement Piping Removal course

Class III or Class IV– Employees must be trained in aspects of asbestos handling appropriate for the nature of the work, to include procedures for setting up glove bags, and mini enclosures, practices for reducing asbestos exposures, use of wet methods, the content of OSHA Construction Standard for Asbestos, and the identification of asbestos. Such training shall include successful completion of a course that is consistent with EPA requirements for training of local educational agency maintenance and custodial staff as set forth at 40 CFR 763.92(a)(2), or equivalent.

Other Requirements – Employees involved in class I, II, or III asbestos work must also have medical clearance, be properly fitted, and instructed in the usage and care of a respirator, be enrolled in the collier county medical surveillance program as outlined in section VI.

Section V - Use of Personal Protective Equipment

Respiratory Protection – Respiratory protection must be worn at all times during any work that may or has the potential to disturb asbestos. At a minimum the respiratory requirements are a 100 percent efficiency HEPA filter.

Eye protection – Goggles must be worn at all times during any work that may or has the potential to disturb asbestos

Protective Clothing – Protective clothing must be worn at all times during asbestos work. At a minimum this includes a Protective suit (i.e. Tyvek), disposal inner and outer gloves, a disposable hood, and boot covers.

Decontamination – All clothing worn during asbestos work must be discarded or decontaminated once the work is complete. All disposed clothing will be wrapped with the asbestos containing material and disposed of in a similar way. At a minimum staff must decontaminate equipment such as tools and respirators with light soap and water.

Example: Contaminated clothing, gloves and material wrapped securely in 6 mil or thicker plastic, and then adequately taped to ensure no contaminated material can escape.

Section VI – Medical Surveillance

It has been determined that Collier County Government does not have any division, department or section/location that performs asbestos work for a combined total of 30 days or more per year or are exposed above the permissible exposure or excursion limit. Therefore, the following medical requirements are only listed should the agency meet the below listed requirements in the future.

Medical examinations and consultations are required for all employees who are engaged in asbestos work for a combined total of 30 or more days per year or; are exposed at or above the permissible exposure limit or excursion limit; and for employees who wear negative pressure respirators. Days when fewer than sixty minutes of asbestos work are completed are not included in the 29-day count.

These examinations are repeated at least annually thereafter. If the examining physician determines that any of the examinations should be provided more frequently than specified, affected employees will be examined at the frequencies specified by the physician.

Medical examinations include a medical and work history, with special emphasis directed to the pulmonary, cardiovascular, and gastrointestinal systems. Along with a pulmonary function test, any examinations or tests deemed necessary by the examining physician will be included. A copy of the medical questionnaire can be found in appendix E.

Information Provided to the Physician

The following information must be provided to the physician by the employee's supervisor before the physical.

- A description of the affected employee's duties as they relate to the employee's exposure.
- The employee's representative exposure level or anticipated exposure level.
- A description of any personal protection equipment to be used by the employee.
- Any information from previous medical examinations of the affected employee that is not otherwise available to the examining physician.

Physician's Written Opinion

The examining physician provides a written statement consisting of the physician's opinion whether the employee has any detected medical conditions that would place the employee at an increased risk of health impairment from exposure to asbestos. Any recommended limitations on the employee, or on the use of personal protective equipment such as respirators, will be noted in the opinion.

The opinion will also include statements that the employee has been informed by the physician of the results of the medical examination, and any medical conditions that may result from asbestos exposure. A statement will also be included that the employee has been informed by the physician of the increased risk of lung cancer attributable to the combined effect of smoking and asbestos exposure.

The physician will not reveal in the written opinion specific findings or diagnoses unrelated to occupational exposure to asbestos. The supervisor will provide a copy of the physician's written opinion to the affected employee within 30 days from its receipt.

Section VII – FDEP Notification Requirements

The Florida Department of Environmental Protection (DEP) administers an asbestos removal program under Chapter 62-257, Florida Administrative Code. The program's intent is to prevent the release of asbestos fibers to the outside air during demolition or renovation activities.

The program requires prior notification to the DEP on the removal of threshold amounts of asbestos from certain types of facilities. These thresholds are noted below under the renovation and demolition sections. In the event that a threshold is met and notification is required there is a 10 day waiting period from the time DEP has been notified to when renovation

can begin. The waiting period is not required if the removal is for emergency purposes, if the removal is an emergency operation then notification shall be provided to the DEP within 24 Hours.

Renovation - Asbestos National Emission Standards for Hazardous Air Pollutants (NESHAP) regulations must be followed for all renovations of facilities with at least 80 linear meters (260 linear feet) of regulated asbestos-containing materials (RACM) on pipes, or 15 square meters (160 square feet) of regulated asbestos-containing materials on other facility components, or at least one cubic meter (35 cubic feet) of regulated asbestos-containing materials on other facility components where the amount of RACM previously removed from pipes and other facility components could not be measured before stripping. These amounts are known as the "threshold" amounts.

Demolition - Asbestos NESHAP regulations must be followed for demolitions of facilities with at least 80 linear meters (260 linear feet) of regulated asbestos-containing materials (RACM) on pipes, 15 square meters (160 square feet) of regulated asbestos-containing materials on other facility components, or at least one cubic meter (35 cubic feet) of regulated asbestos-containing materials on other facility components where the amount of RACM previously removed from pipes and other facility components could not be measured before stripping. However, all demolitions must notify the appropriate regulatory agency, even if no asbestos is present at the site, and all demolitions and renovations are "subject" to the Asbestos NESHAP insofar as owners and operators must determine if and how much asbestos is present at the site.

If Category II non-friable ACM has not crumbled, been pulverized or reduced to powder and will not become so during the course of demolition/renovation operations, it is considered non-friable and therefore is not subject to Asbestos NESHAP or FDEP notification requirements. However, if during the demolition or renovation activity it becomes crumbled, pulverized or reduced to powder, it is covered by the Asbestos NESHAP and FDEP requirements.

Prior to all renovation, demolitions, or removal of asbestos contact the Risk Management Department for further regulatory guidance.

Section VIII – Removal and Handling Requirements

A department/Site-Specific program insert must be developed for each new removal task. Where each task is similar in nature, a common procedure, such as a Job Safety Analysis may suffice for the department/site-specific insert.

Regulated area – The area around where the work is being performed must be marked off as a regulated area and can be accessed by individuals who are trained, qualified, and wearing appropriate PPE. There must be signs posted around the work site that are clearly visible, and state the following:

**DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONEL ONLY**

Where the use of respirators and protective clothing is required in the regulated area the warning sign shall include:

**RESPIRATORS AND PROTECTIVE CLOTHING
ARE REQUIRED IN THIS AREA**

Class I - This is work involving the removal of thermal system insulation, or surfacing material, and typically will not be performed by Collier County employees.

Class II - Where a negative exposure assessment cannot be documented, or where during the job conditions indicate there may be exposure above the PEL, or where the asbestos containing material cannot be removed in a substantially intact state, a negative pressure enclosure must be used. These barriers are necessary to prevent the migration of airborne asbestos from the regulated area. The effectiveness of the barriers should be verified by perimeter area monitoring or visual surveillance. Class II work also may be performed using a method allowed for Class I work, and glove bags and glove boxes are allowed if they fully enclose the Class II material to be removed. Impermeable drop cloths must be placed on surfaces beneath all removal activity. For Class II work the competent person must be specially trained in a course that meets the criteria of EPA's Model Accreditation Plan (40 CFR 763) for project supervisor, or its equivalent.

Specialized Class II Work

Removing Vinyl and Resilient Flooring Materials - This work requires specialized training provided, or approved, by the University of Florida Asbestos Coordinator. Flooring or its backing is not to be sanded, ground abraded or intentionally broken or chipped. Vacuums equipped with High Efficiency Particulate Air (HEPA) filter, disposable dust bag, and metal floor tool (no brush) shall be used to clean floors. Resilient sheeting shall be removed by cutting with wetting of the snip point and wetting during removal. Rip-up of resilient sheet floor material is prohibited. All scraping of residual adhesive and/or backing shall be performed using wet methods. Dry sweeping is prohibited. Mechanical chipping is prohibited unless performed in a negative pressure enclosure. Tiles must be removed substantially intact.

Roofing Material - This work requires specialized training approved by the Risk Management Department. When removing roofing material that contains asbestos, remove the roofing material in an intact state to the extent feasible. Cutting machines shall be continuously misted during use, unless the competent person determines that misting substantially decreases worker safety. All loose dust left by the sawing operation must be HEPA vacuumed immediately. Cutting of cement asbestos (Transite®) is prohibited without permission from the Risk Management Department. Unwrapped or unbagged roofing material must be immediately lowered to the ground by way of covered, dust-tight chute, crane or hoist, or placed in an impermeable waste bag or wrapped in plastic sheeting and lowered to ground by the end of the work shift. Upon being lowered, unwrapped material shall be transferred to a closed receptacle in such manner to preclude the dispersion of dust. Roof level heating and ventilation air intake sources shall be isolated or the ventilation system shall be shut down.

Cement piping – Removal of cement piping for maintenance activities is a common practice in Collier County Public Utilities Division. If the work is being conducted by Collier County Employees then the department specific plan and all required JSA's for such work shall be followed at all times. In the event the work is being conducted by a contractor the contractor is subject to all applicable State, local, and Federal Regulations.

Class III

All class III asbestos work that can include a process that has the potential for disturbing a process must be evaluated by Risk Management prior to work being completed. If it is determined that the work will cause a disturbance then Class II procedures will be followed.

Section IX – Contractor Requirements

Work is to be performed in accordance with the 29 CFR 1926.1101 (OSHA Asbestos Construction Standard), 40 CFR 61 Subpart M (EPA NESHAP Regulations), and any other applicable Federal, State, and County regulations.

All contractors performing asbestos work must be in compliance with all state licensing requirements for the type of work they are performing. Prior to conducting any work on asbestos containing materials contractors must submit proof of qualified personnel, all contract employees must be trained in accordance with OSHA and EPA requirements.

All contractors that will be performing work on any asbestos containing material must submit an Asbestos Abatement Work Plan to the county department work is being performed for and the Risk Management Department for approval. The work plan must include: licensing, employee training, handling, storage, and disposal of asbestos containing material as referenced within the applicable OSHA and EPA/FDEP Regulations. This plan must be approved by the Risk Management Department prior to any work being completed.

For contractors that provide emergency repair services an Asbestos Abatement Plan must be submitted as outlined above on an annual basis.

All contractors must be in compliance with Section X Disposal Requirements.

Section X – Disposal Requirements

All asbestos containing materials that reside on Collier County Property and Utilities are under the ownership of the county. Federal disposal regulations set forth cradle-to-grave responsibility with asbestos as a hazardous material. Therefore the responsibility of proper disposal is ultimately that of Collier County. All shipments and disposal of Asbestos

must be accompanied by and Non-Hazardous Waste Manifest (Appendix B). All disposal of asbestos must be in accordance with State, Local, Federal regulations and Collier County requirements.

Documentation – Documentation of disposal is done by each department or contractor utilizing the Non-Hazardous Waste Manifest. The department that was responsible for the oversight of the asbestos project is responsible for maintaining copies of the manifest. All return documentation of disposal must be received back by the required department within 30 days. If documentation has not been received in 30 days Risk Management must be notified. All documentation for asbestos disposal must be retained by the department conducting disposal. These forms shall be kept on site indefinitely.

Packaging – All Asbestos being disposed must be wetted, concealed tightly, labeled with the amount of asbestos in either cubic ft or linear ft, and the specific location it came from. All packages must be labeled as shown below:

**DANGER
CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND DISEASE HAZARD**

Shipping – Regulated Asbestos shall never be shipped by Collier County Employees in any amount greater than 1000 lbs. Any shipment that exceeds this requirement is subject to Department of Transportation Requirements as a class 9 hazardous material.

Disposal – All asbestos must be delivered and handled by qualified and trained employees. Prior to disposal of asbestos a pre planned landfill disposal site must be determined; the site must have legal authority to accept asbestos containing materials. As soon as disposal is anticipated the department asbestos coordinator should contact the disposal site and schedule a drop of date. Disposal of asbestos is usually conducted at a pre determined time, date, and location, this determination is given by the disposal site. Collier County employees must follow the direction of the disposal site and only deliver materials to a location determined by the site. Prior to leaving Collier County employees must have the landfill operator or representative sign the Non Hazardous Waste Manifest. A copy of the manifest must be returned and filed appropriately.

Contractors – No contractor is to engage in the handling, storage, or disposal of asbestos without prior approval by the Department managing the contract and Risk Management Department.

Section XI – Prohibited Practices

All Collier County Employees are prohibited from performing any work on or around asbestos without proper training, medical clearance, and PPE as required by this document. All department specific written plans, JSA's, and standard operating procedures must be approved by Risk Management prior to being put into place.

Applicable Documents / References

CMA 5902 health and Safety Policy
Water Department Main Break JSA
Respiratory Protection Written Plan
Protective Eyewear Countywide JSA # 1
Site/Project Specific Asbestos Management Plan

Appendix B: Non-Hazardous Waste Manifest

Please print or type
Form designed for use on 8 1/2 x 11 (landscape)

NON-HAZARDOUS WASTE MANIFEST		1. Generator's US EPA ID No.	Manifest Doc. No.	2. Page 1 of
3. Generator's Name and Mailing Address				
4. Generator's Phone ()				
5. Transporter 1 Company Name	6. US EPA ID Number	A. Transporter's Phone		
7. Transporter 2 Company Name	8. US EPA ID Number	B. Transporter's Phone		
9. Designated Facility Name and Site Address	10. US EPA ID Number	C. Facility's Phone		
11. Waste Shipping Name and Description		12. Containers	13. Total	14. Unit
		No.	Quantity	W/Vol
a.		.	.	.
b.		.	.	.
c.		.	.	.
d.		.	.	.
D. Additional Descriptions for Materials Listed Above		E. Handling Codes for Wastes Listed Above		
15. Special Handling Instructions and Additional Information				
16. GENERATOR'S CERTIFICATION: I certify the materials described above on this manifest are not subject to federal regulations for reporting proper disposal of Hazardous Waste.				
Printed/Typed Name		Signature		Month Day Year . . .
17. Transporter 1 Acknowledgement of Receipt of Materials				
Printed/Typed Name		Signature		Month Day Year . . .
18. Transporter 2 Acknowledgement of Receipt of Materials				
Printed/Typed Name		Signature		Month Day Year . . .
19. Discrepancy Indication Space				
20. Facility Owner or Operator: Certification of receipt of waste materials covered by this manifest except as noted in Item 19.				
Printed/Typed Name		Signature		Month Day Year . . .

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Neenah, WI 54957-0368

ORIGINAL – RETURN TO GENERATOR

12-BLS-C6 Rev. 12/98

Appendix C: FDEP Notification Form



Florida Department of Environmental Protection Division of Air Resource Management

DEP Form 62-257-900(1)
 Effective 10-12-08
 Page 1 of 2

NOTICE OF DEMOLITION OR ASBESTOS RENOVATION

TYPE OF NOTICE (CHECK ONE ONLY): ORIGINAL REVISED CANCELLATION COURTESY
TYPE OF PROJECT (CHECK ONE ONLY): DEMOLITION RENOVATION
 IF DEMOLITION, IS IT AN ORDERED DEMOLITION? YES NO
 IF RENOVATION:
 IS IT AN EMERGENCY RENOVATION OPERATION? YES NO
 IS IT A PLANNED RENOVATION OPERATION? YES NO

I. Facility Name _____
 Address _____
 City _____ State _____ Zip _____ County _____
 Site _____ Consultant Inspecting Site _____
 Building Size _____ (Square Feet) # of Floors _____ Building Age in Years _____
 Prior Use: School/College/University Residence Small Business Other _____
 Present Use: School/College/University Residence Small Business Other _____

II. Facility Owner _____ Phone (_____) _____
 Address _____
 City _____ State _____ Zip _____

III. Contractor's Name _____ Phone (_____) _____
 Address _____
 City _____ State _____ Zip _____
 Is the contractor exempt from licensure under section 469.002(4), F.S.? YES NO

IV. Scheduled Dates: (Notice must be postmarked 10 working days before the project start date)
 Asbestos Removal (mm/dd/yy) Start: _____ Finish: _____ Demo/Renovation (mm/dd/yy) Start: _____ Finish: _____

V. Description of planned demolition or renovation work to be performed and methods to be employed, including demolition or renovation techniques to be used and description of affected facility components. _____

Procedures to be Used (Check All That Apply):

<input type="checkbox"/> Strip and Removal	<input type="checkbox"/> Glove Bag	<input type="checkbox"/> Bulldozer	<input type="checkbox"/> Wrecking Ball
<input type="checkbox"/> Wet Method	<input type="checkbox"/> Dry Method	<input type="checkbox"/> Explode	<input type="checkbox"/> Burn Down
OTHER: _____			

VI. Procedures for Unexpected RACM: _____

VII. Asbestos Waste Transporter: Name _____ Phone (_____) _____
 Address _____
 City _____ State _____ Zip _____

VIII. Waste Disposal Site: Name _____ Class _____
 Address _____
 City _____ State _____ Zip _____

IX. RACM or ACM: Procedure, including analytical methods, employed to detect the presence of RACM and Category I and II nonfriable ACM. _____

Amount of RACM or ACM*
 _____ square feet surfacing material
 _____ linear feet pipe
 _____ cubic feet of RACM off facility components
 _____ square feet cementitious material
 _____ square feet resilient flooring
 _____ square feet asphalt roofing

X. Fee Invoice Will Be Sent to Address in Block Below: (Print or Type)

*Identify and describe surfacing material and other materials as applicable:

I certify that the above information is correct and that an individual trained in the provisions of this regulation (40 CFR Part 61, Subpart M) will be on-site during the demolition or renovation and evidence that the required training has been accomplished by this person will be available for inspection during normal business hours.

_____ (Date)
 _____ (Date)
 _____ (Signature of Owner/Operator) _____ (Date)

DEP USE ONLY	Postmark/Date Received	ID#
---------------------	------------------------	-----



Florida Department of Environmental Protection
Division of Air Resource Management

DEP Form 62-257-900(1)
Effective 10-12-08
Page 1 of 2

NOTICE OF DEMOLITION OR ASBESTOS RENOVATION

TYPE OF NOTICE (CHECK ONE ONLY): ORIGINAL REVISED CANCELLATION COURTESY
TYPE OF PROJECT (CHECK ONE ONLY): DEMOLITION RENOVATION
IF DEMOLITION, IS IT AN ORDERED DEMOLITION? YES NO
IF RENOVATION: IS IT AN EMERGENCY RENOVATION OPERATION? YES NO
IS IT A PLANNED RENOVATION OPERATION? YES NO

I. Facility Name
Address
City State Zip County
Site Consultant Inspecting Site
Building Size (Square Feet) # of Floors Building Age in Years
Prior Use: School/College/University Residence Small Business Other
Present Use: School/College/University Residence Small Business Other

II. Facility Owner
Address
City State Zip

III. Contractor's Name
Address
City State Zip

Is the contractor exempt from licensure under section 469.002(4), F.S.? YES NO

IV. Scheduled Dates: (Notice must be postmarked 10 working days before the project start date)
Asbestos Removal (mm/dd/yy) Start: Finish: Demo/Renovation (mm/dd/yy) Start: Finish:

V. Description of planned demolition or renovation work to be performed and methods to be employed, including demolition or renovation techniques to be used and description of affected facility components.

Procedures to be Used (Check All That Apply):

Table with 4 columns: Strip and Removal, Glove Bag, Bulldozer, Wrecking Ball; Wet Method, Dry Method, Explode, Burn Down; OTHER:

VI. Procedures for Unexpected RACM:

VII. Asbestos Waste Transporter: Name Phone
Address
City State Zip

VIII. Waste Disposal Site: Name Class
Address
City State Zip

IX. RACM or ACM: Procedure, including analytical methods, employed to detect the presence of RACM and Category I and II nonfriable ACM.

Amount of RACM or ACM*
square feet surfacing material
linear feet pipe
cubic feet of RACM off facility components
square feet cementitious material
square feet resilient flooring
square feet asphalt roofing

X. Fee Invoice Will Be Sent to Address in Block Below: (Print or Type)

Empty rectangular box for fee invoice address.

*Identify and describe surfacing material and other materials as applicable:

I certify that the above information is correct and that an individual trained in the provisions of this regulation (40 CFR Part 61, Subpart M) will be on-site during the demolition or renovation and evidence that the required training has been accomplished by this person will be available for inspection during normal business hours.

(Print Name of Owner/Operator) (Date)

(Signature of Owner/Operator) (Date)

DEP USE ONLY Postmark/Date Received ID#



**DEPARTMENT / SITE-SPECIFIC
ASBESTOS CONTROL PROGRAM INSERT**

Facility:	Location:
Department:	Division:

RESPONSIBILITY:

_____ is designated as the Asbestos Program Coordinator for this Department/facility. Specific Responsibilities include:

1. Ensuring this department insert remains current.
2. Maintaining a current list of employees that have been properly trained and have been determined as qualified to work with asbestos.
3. Ensuring that all asbestos containing piping is accounted for via a formal tracking mechanism.
4. Ensuring all repairs where asbestos containing material are suspected follow the established safety protocols, JSA's and/or internal procedures as defined within the Collier County Written Plan.
5. Ensuring that all contractors who may perform asbestos removal have provided verification of properly trained employees and that all contracted work follows established guidelines and appropriate disposal procedures.
6. Ensuring all waste disposal forms are completed, properly submitted and a copy maintained to ensure "cradle to grave" accuracy.



**Appendix F:
Phase I - Project Initialization Checklist**

0	Project Name:	Form Completed By:	Proj. #:
1	Who Will conduct the Asbestos Operations?	<input type="checkbox"/> Water Department <input type="checkbox"/> Contractor <input type="checkbox"/> Other	
2	Has a project/site-specific Asbestos Abatement Plan been submitted to the Project Mgr?	<input type="checkbox"/> YES <input type="checkbox"/> NO	
3	Has the Asbestos Abatement Plan Been Approved by the Water, Risk Mgt, Pollution Control and Solid Waste departments?	<input type="checkbox"/> YES <input type="checkbox"/> NO	
4	Where applicable, has the affected department provided all applicable JSA's associated with these work tasks for review?	<input type="checkbox"/> YES <input type="checkbox"/> NO	
5	Has documentation of licensure been provided by the contractor, where necessary?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A	
6	Has documentation of employee training been provided to the Project Mgr?	<input type="checkbox"/> YES <input type="checkbox"/> NO	
7	Does this project require a 3 rd Party Asbestos Consultant? If so, have they been hired and provided with the abatement plan for review?	<input type="checkbox"/> YES <input type="checkbox"/> NO	
8	Does this project require EPA/DEP Notification?	<input type="checkbox"/> YES <input type="checkbox"/> NO	
9	Where EPA/DEP notification is required, has DEP form 62-257-900(1) been completed by the contractor or Project Mgr and submitted to EPA/DEP? (This form is shown as Appendix C in the Risk Management Countywide Plan)	<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A	
10	Where EPA DEP notification has been determined, has approval been received from EPA/DEP (Do not commence project without approval, where necessary)?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A	
11	Has the Project Mgr. Obtained the "Waste Profile" form from WMI? (This form will need to be submitted to WMI for approval prior to disposal of material – There is a 24-48 hour waiting period on approval of this form) Note: Multiple shipments will require multiple form requests and subsequent approvals by WMI	<input type="checkbox"/> YES <input type="checkbox"/> NO	
12	Where necessary, The PUD Public Information Coordinator has been notified, educated on the project in question and is available to address media concerns?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A	
13	Has a Project Pre-Construction Meeting been held to discuss the abatement plan and all roles and responsibilities everyone will be held to?	<input type="checkbox"/> YES <input type="checkbox"/> NO	
14	An account has been established at the landfill for the specific project. Acct# _____ (Utility Billing)	<input type="checkbox"/> YES <input type="checkbox"/> NO	
15	Has the Asbestos Abatement Consultant submitted an air monitoring plan that describes that establishes parameters for personal and ambient air monitoring?	<input type="checkbox"/> YES <input type="checkbox"/> NO	
16	Estimated linear ft and weight of asbestos to be removed _____ Linear Ft		

The signatures below represent the verification of all items above and the subsequent approval of the initiation sequence of this project.

Project Manager - Print Name	Project Manager Signature
Risk Management – Print Name/Title	Risk Management - Signature
Solid & Hazardous Waste – Print Name/Title	Solid & Hazardous Waste - Signature
Water Distribution Manager – Print Name	Water Distribution Manager - Signature
Water Department Director – Print Name	Water Department Director - Signature
Contractor – Print Name	Contractor - Signature

Once all signatures have been obtained, the "Notice to Proceed" may be delivered. This completed form shall be retained by the Water Department, the Project Manager and Risk Management for document control purposes.



**Appendix G:
Phase II - Asbestos Construction/Removal Checklist**
[This checklist to be completed on-site during any Asbestos Removal Project]

0	Project Name:	Form Completed By:	Proj #:
1	The department and/or contractor performing the work has mobilized all necessary equipment to properly remove the Asbestos containing material.		<input type="checkbox"/> YES <input type="checkbox"/> NO
2	A copy of the Asbestos Abatement Plan is on site at all times.		<input type="checkbox"/> YES <input type="checkbox"/> NO
3	Where necessary, A copy of any applicable JSA's are on-site at all times.		<input type="checkbox"/> YES <input type="checkbox"/> NO
4	Where necessary, A copy of the approved DEP Form 62-257-900(1) is on site at all times.		<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A
5	Where necessary, A copy of the contractor's Asbestos License is on site at all times.		<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A
6	The department and/or contractor performing the work has the approved cutting/snapping apparatus on site and ready for use.*		<input type="checkbox"/> YES <input type="checkbox"/> NO
7	The department and/or contractor performing the work has all required equipment to clean up asbestos debris in affected soil or media on-site?*		<input type="checkbox"/> YES <input type="checkbox"/> NO
8	The department and/or contractor performing the work has all required PPE on site and available for all employees that will work within the excavation/removal area.*		<input type="checkbox"/> YES <input type="checkbox"/> NO
9	The department and/or contractor performing the work has all required signage on-site and available and the designated perimeter is established and maintained in place at all times.*		<input type="checkbox"/> YES <input type="checkbox"/> NO
10	The department and/or contractor performing the work has all required "wrapping" material on-site and available at all times.*		<input type="checkbox"/> YES <input type="checkbox"/> NO
11	The department and/or contractor performing the work has adequate "wetting" apparatus on-site and available to ensure material does not become airborne.*		<input type="checkbox"/> YES <input type="checkbox"/> NO
12	The material has been properly wrapped? *		<input type="checkbox"/> YES <input type="checkbox"/> NO
13	The material has been properly labeled? *		<input type="checkbox"/> YES <input type="checkbox"/> NO
14	Properly wrapped and labeled material has been carefully loaded into an approved transportation container. *		<input type="checkbox"/> YES <input type="checkbox"/> NO
15	Transportation container is properly labeled while being stored on site.*		<input type="checkbox"/> YES <input type="checkbox"/> NO
16	The affected department and/or contractor has obtained approval for disposal from WMI using the "Waste Profile" form as required and said form is on site and ready to be sent with the Non-Hazardous Waste manifest. [Timeframe: 48 Hours Min/10 Days Max] Note: Multiple shipments will require multiple requests and subsequent approval by WMI		<input type="checkbox"/> YES <input type="checkbox"/> NO
17	The affected department has scheduled the exact date/time for shipment of material based on WMI approval via the Waste Profile form. Note: Multiple shipments will require multiple requests and subsequent approval by WMI		<input type="checkbox"/> YES <input type="checkbox"/> NO
18	Has the transportation container been covered (tarp) prior to leaving the site?*		<input type="checkbox"/> YES <input type="checkbox"/> NO
19	The shipment has left the construction site and being transported for disposal.		<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A
20	A safety meeting, i.e. short tailgate session is held at the beginning of each work day.		<input type="checkbox"/> YES <input type="checkbox"/> NO
21	Verify and list the amount of pipe removed (in linear feet and weight); _____ Linear Ft.		

***Items require photographs prior to completion of documentation**

The signatures below represent the verification of all items above and the subsequent approvals during the **Construction/Removal Phase** of this project.

Project Manager - Print Name	Project Manager - Signature
Water Dept. Representative- Print Name/Title	Water Dept. Representative - Signature
Field Inspector - Print Name/Title	Field Inspector - Signature
Add. Representative - Print Name/Title	Add. Representative - Signature

This completed form shall be retained by the Water Department, the Project Manager and Risk Management for document control purposes.



**Appendix H:
Asbestos Disposal Checklist**

[To be completed by a trained (authorized) Solid Waste Employee]

1	Who Delivered the Asbestos Shipment? <input type="checkbox"/> Water Department <input type="checkbox"/> Contractor <input type="checkbox"/> Other	
2	Is the correct Waste Profile, completed correctly and approved by Waste Management, delivered to the scalehouse office prior to the date of disposal? (A separate profile is required for friable and non-friable asbestos waste)	<input type="checkbox"/> YES <input type="checkbox"/> NO
3	Are the Non-Hazardous Waste Manifest completed correctly and signed by the hauler and scalehouse attendant?	<input type="checkbox"/> YES <input type="checkbox"/> NO
4	Has an account been established at the scalehouse for this specific project?	<input type="checkbox"/> YES <input type="checkbox"/> NO
5	Did the shipment arrive covered (tarp) prior to disposal?	<input type="checkbox"/> YES <input type="checkbox"/> NO
6	Has the disposal location been properly prepared for acceptance of the material by WMI staff following WMI's established burial parameters? (scale attendant will notify WMI to prepare the disposal site)	<input type="checkbox"/> YES <input type="checkbox"/> NO
7	Is a Waste management Inc. Authorized operator available to meet the hauler at the disposal location?	<input type="checkbox"/> YES <input type="checkbox"/> NO
8	Has a Solid Waste Mgt. employee escorted the hauler to the disposal location and witnessed the placement of material into the WMI established disposal location?	<input type="checkbox"/> YES <input type="checkbox"/> NO
9	Has the shipment been disposed of properly (as defined by WMI parameters) and the entire disposal process verified by an authorized Solid Waste Management representative?	<input type="checkbox"/> YES <input type="checkbox"/> NO
10	Has the Solid Waste Department received copies of the final and completed Non-Hazardous Waste Manifest, GPS coordinates and a copy of the load ticket receipt from WMI?	<input type="checkbox"/> YES <input type="checkbox"/> NO
11	Has Solid Waste Submitted the completed the proper documentation to the Project Manager for documentation control purposes. (manifests, signed load tickets, GPS log and a final report from the scalehouse database)	<input type="checkbox"/> YES <input type="checkbox"/> NO

The signatures below represent the verification of all items above and the subsequent approval of the Completion of the *Disposal Phase* of this project.

Project Manager - Print Name	Project Manager Signature
Solid Waste – Print name/Title	Solid Waste - Signature
Risk Management – Print Name/Title	Risk Management - Signature
Water Department Director – Print Name	Water Department Director - Signature

This completed form shall be retained by the Project Manager and Risk Management for document control purposes.



**Appendix I:
Document Control Checklist**

1	A copy of the Asbestos Abatement Plan has been filed with the Project Manager and Risk Management?	<input type="checkbox"/> YES <input type="checkbox"/> NO
2	A copy of the completed contract has been filed with the Project Manager and Risk Management?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A
3	A copy of the completed DEP form 62-257-900(1) has been filed with the Project Manager and Risk Management?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A
4	A copy of the Non-Hazardous Waste Manifest, landfill ticket, GPS Coordinates, and Waste Profile have been filed with the Project Manager and Risk Management?	<input type="checkbox"/> YES <input type="checkbox"/> NO
5	An AAR and Project Critique have been completed?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A
6	AAR Results and Project Improvement Strategies have been submitted to the affected departments and Risk Management for immediate implementation?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A
7	Department Asbestos Inventory Form has been updated to reflect changes?	<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> N/A

The signatures below represent the verification of all items above and the subsequent approval of the completion of the *Document Control* sequence of this project.

Project Manager - Print Name	Project Manager Signature
Risk Management – Print Name/Title	Risk Management - Signature
Water Department – Print Name/Title	Water Department - Signature
Water Department Director – Print Name	Water Department Director - Signature

This completed form shall be retained by the project manager and Risk Management for document control purposes.

Friable Asbestos Containing Materials Express Profiles



Requested Disposal Facility _____ Profile Number _____
 Renewal for Profile Number _____ Waste Approval Expiration Date _____

A. Waste Generator Facility Information (must reflect location of waste generation/origin)

1. Generator Name: _____
 2. Site Address: _____ 7. Email Address: _____
 3. City/ZIP: _____ 8. Phone: _____ 9. FAX: _____
 4. State: _____ 10. NAICS Code: _____
 5. County: _____ 11. Generator USEPA ID #: _____
 6. Contact Name/Title: _____ 12. State ID# (if applicable): _____

B. Customer Information same as above

P. O. Number: _____

1. Customer Name: _____ 6. Phone: _____ FAX: _____
 2. Billing Address: _____ 7. Transporter Name: _____
 3. City, State and ZIP: _____ 8. Transporter ID # (if appl.): _____
 4. Contact Name: _____ 9. Transporter Address: _____
 5. Contact Email: _____ 10. City, State and ZIP: _____

C. Waste Stream Information

1. DESCRIPTION

a. Common Waste Name: Friable Asbestos containing material (uncontaminated)
 State Waste Code(s): _____

b. Describe Process Generating Waste or Source of Contamination:

Removal of regulated, friable asbestos containing materials from demolition/dismantling or remediation activities. Does not include clean-up wastes, such as soil, that are contaminated with asbestos.

- c. Typical Color(s): Any and all
 d. Strong Odor? Yes No Describe: _____
 e. Physical State at 70°F: Solid Liquid Powder Semi-Solid or Sludge Other: _____
 f. Layers? Single layer Multi-layer NA
 g. Water Reactive? Yes No If Yes, Describe: _____
 h. Free Liquid Range (%): _____ to _____ NA(solid)
 i. pH Range: ≤2 2.1-12.4 ≥12.5 NA(solid) Actual: _____
 j. Liquid Flash Point: < 140°F ≥ 140°F NA(solid) Actual: _____
 k. Flammable Solid: Yes No
 l. Physical Constituents: List all constituents of waste stream - (e.g. Soil 0-80%, Wood 0-20%): (See Attached)

Constituents (Total Composition Must be > 100%)	Lower Range	Unit of Measure	Upper Range	Unit of Measure
1. Demolition debris, asbestos	100	%	100	%
2. _____				
3. _____				
4. _____				
5. _____				
6. _____				

2. ESTIMATED QUANTITY OF WASTE AND SHIPPING INFORMATION

- a. Event Base/Ongoing (Check One)
 b. Estimated Annual Quantity: _____ Tons Cubic Yards Drums Gallons Other (specify): _____
 c. Shipping Frequency: _____ Units per Month Quarter Year One Time Other
 d. Is this a U.S. Department of Transportation (USDOT) Hazardous Material? (If yes, answer e.) Yes No
 e. USDOT Shipping Description (if applicable): RQ Asbestos, Class 9, NA2212, PGIII

3. SAFETY REQUIREMENTS (Handling, PPE, etc.): Respirator - air purifying with HEPA cartridge as required by landfill policy.

Non-Friable Asbestos Containing Materials Express Profile



Requested Disposal Facility _____ Profile Number _____
 Renewal for Profile Number _____ Waste Approval Expiration Date _____

A. Waste Generator Facility Information (must reflect location of waste generation/origin)

1. Generator Name: _____
 2. Site Address: _____ 7. Email Address: _____
 3. City/ZIP: _____ 8. Phone: _____ 9. FAX: _____
 4. State: _____ 10. NAICS Code: _____
 5. County: _____ 11. Generator USEPA ID #: _____
 6. Contact Name/Title: _____ 12. State ID# (if applicable): _____

B. Customer Information same as above

P. O. Number: _____

1. Customer Name: _____ 6. Phone: _____ FAX: _____
 2. Billing Address: _____ 7. Transporter Name: _____
 3. City, State and ZIP: _____ 8. Transporter ID # (if appl.): _____
 4. Contact Name: _____ 9. Transporter Address: _____
 5. Contact Email: _____ 10. City, State and ZIP: _____

C. Waste Stream Information

1. DESCRIPTION

a. Common Waste Name: Non-Friable Asbestos Containing Materials (Uncontaminated)
 State Waste Code(s): _____

b. Describe Process Generating Waste or Source of Contamination:

Demolition/renovation - when dry, cannot be crumbled, pulverized or reduced to powder by hand pressure. Including gaskets, resilient floor coverings and asphalt roofing products (specify in section L). Does not include clean-up wastes, such as soils, that are contaminated with nonfriable asbestos.

c. Typical Color(s): Any and all

d. Strong Odor? Yes No Describe: _____

e. Physical State at 70°F: Solid Liquid Powder Semi-Solid or Sludge Other: _____

f. Layers? Single layer Multi-layer NA

g. Water Reactive? Yes No If Yes, Describe: _____

h. Free Liquid Range (%): _____ to _____ NA(solid)

i. pH Range: ≤2 2.1-12.4 ≥12.5 NA(solid) Actual: _____

j. Liquid Flash Point: < 140°F ≥ 140°F NA(solid) Actual: _____

k. Flammable Solid: Yes No

l. Physical Constituents: List all constituents of waste stream - (e.g. Soil 0-80%, Wood 0-20%): (See Attached)

Constituents (Total Composition Must be > 100%)	Lower Range	Unit of Measure	Upper Range	Unit of Measure
1. <u>Non-friable asbestos-containing materials</u>	100	%	100	%
2. _____	_____	_____	_____	_____
3. _____	_____	_____	_____	_____
4. _____	_____	_____	_____	_____
5. _____	_____	_____	_____	_____
6. _____	_____	_____	_____	_____

2. ESTIMATED QUANTITY OF WASTE AND SHIPPING INFORMATION

a. Event Base/Ongoing (Check One)

b. Estimated Annual Quantity: _____ Tons Cubic Yards Drums Gallons Other (specify): _____

c. Shipping Frequency: _____ Units per Month Quarter Year One Time Other

d. Is this a U.S. Department of Transportation (USDOT) Hazardous Material? (If yes, answer e.) Yes No

e. USDOT Shipping Description (if applicable): _____

3. SAFETY REQUIREMENTS (Handling, PPE, etc.): Normal landfill safety requirements. Manage waste so that it does not become friable.

SECTION 6.3

WASTEWATER SPILL OVERFLOW CONTINGENCY PLAN

PELICAN BAY PHASE 1 WATER MAIN IMPROVEMENTS

The Contractor, due to unforeseen conditions, may encounter or cause a wastewater spill or overflow during his work. The minimum requirements listed below may not address every specific event that could occur. It is the Contractor's responsibility to review the items listed below and expand upon them if or when necessary, in the creation of their contingency planning. The Contractor shall submit a Wastewater Spill/Overflow Contingency Plan to Collier County for review and approval prior to start of construction.

It is critically important to be proactive during construction to reduce the potential for wastewater spills and overflows. Listed below are several proactive actions that should be taken at a minimum:

- Maintain list of emergency wastewater haulers for call out to the site should an emergency arise.
- Maintain pumps on site that can be utilized for relieving wastewater backups and surcharges.
- Maintain heavy plastic sheets on site to be utilized for lining containment areas.
- Maintain an adequate supply of lime on site for treating spill areas.
- Meet with County Wastewater Staff whenever necessary to isolate or turn off pumping facilities in order to develop coordinated Contingency Plan, including pumper trucks, etc.
- Meet with County Wastewater Staff and the project manager whenever necessary to temporarily divert or isolate gravity sewer system in order to develop coordinated Contingency Plan, including pumper trucks, etc.

Actions to be taken in case of a wastewater spill or overflow are listed below. Generally, they are listed in the order to be taken, however dependent upon site conditions they may need to be modified. Most of the activities should occur concurrently.

- Immediately contain spill or overflow by berming a containment area and lining area with plastic.
- Take immediate action to stop or reduce the overflow. This could include, but not be limited to: pumping out of surcharged gravity system; coordinating with County to turn on or off pump station(s) as needed; or in case of a force main break, turning off pump station(s) and isolating main with valves.
- Take action to prevent the flow of the spill to any open waters (lakes, canals, etc.). Do not let other sources of water co-mingle with spilled wastewater.
- Contact County Project Manager (or alternate) and CEI representative on site to coordinate County response from the Collier County Wastewater Collections, staff County Risk Management, and County Pollution Control. As necessary by severity, FDEP and other agencies may need to be contacted and become involved.

- Coordinate the cleanup of the wastewater spill/overflow. This can include the pumping back into the wastewater system directly or by use of vactor truck or other methods. Upon removal of all liquid (and solids as possible) treat area with lime to neutralize and disinfect.
- In coordination with County prepare estimate of spilled wastewater volume in gallons.
- In conjunction with County and as appropriate make immediate notification to FDEP and other agencies. This notification will vary based upon volume of spill.
- In conjunction with County Staff prepare written notification to FDEP and other agencies.
- Participate in After Action Meeting to review: cause of spill/overflow; response and action taken; remedial actions; lessons learned and any additional close out actions.

An emergency 24-hour contact list for the Contractor, County, FDEP and Consultant should be attached. A copy of this Plan, and as may be modified, should be maintained at Project site.

SECTION 6.4

**PRE-CONSTRUCTION ASSESSMENT FORM
Driveway / Replacement Plan / Existing Sod Survey**

PELICAN BAY PHASE 1 WATER MAIN IMPROVEMENTS

Homeowner's Address _____

Existing Condition Photograph(s) _____ Date of Photograph(s): _____

"Photo"	"Photo"
"Photo"	

Driveway Type: _____ Width at Pavement: _____ Width at R/W: _____

Culvert: _____ Yes ___ No ___ Type: _____ Diameter: _____

Sod type: _____ Existing Percentage of Sod Type: _____

Special Notes: _____

Submitted By: _____ Date: _____

SECTION 6.4

**PRE-CONSTRUCTION ASSESSMENT FORM
Driveway / Replacement Plan / Existing Sod Survey**

PELICAN BAY PHASE 1 WATER MAIN IMPROVEMENTS

Homeowner's Address _____

Existing Condition Photograph(s) _____ Date of Photograph(s): _____

"Photo"	"Photo"
"Photo"	

Driveway Type: _____ Width at Pavement: _____ Width at R/W: _____

Culvert: _____ Yes ___ No ___ Type: _____ Diameter: _____

Sod type: _____ Existing Percentage of Sod Type: _____

Special Notes: _____

Submitted By: _____ Date: _____

SECTION 6.5

WATER DISTRIBUTION REPLACEMENT BACKFLOW PREVENTION DEVICE

PELICAN BAY PHASE 1 WATER MAIN IMPROVEMENTS

Upon completion of the new water main construction and its clearance, the new water main connection will be made at the individual services. This shall include new water meter boxes, connection to existing meter and installation of a new County supplied backflow prevention device.

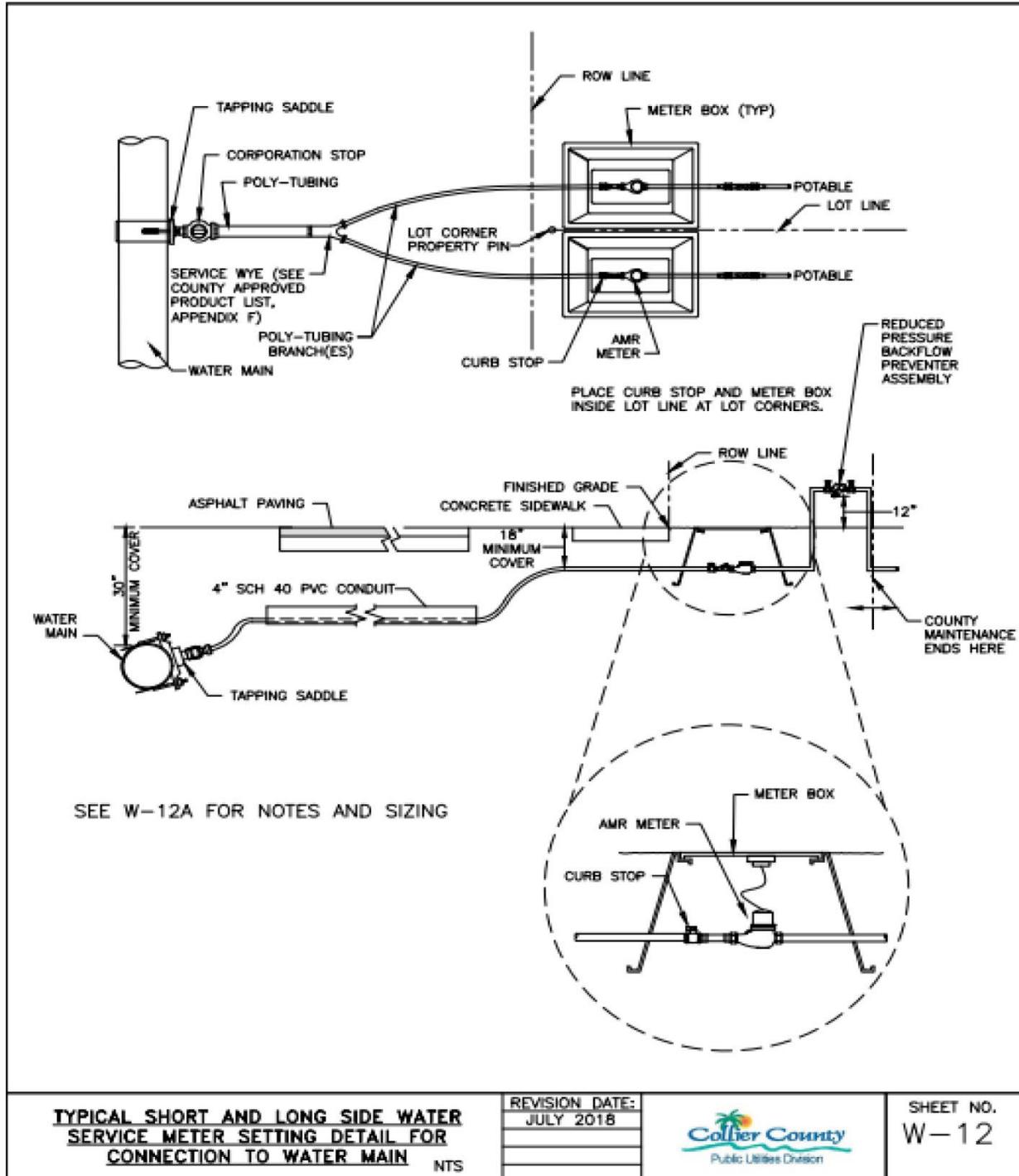
1. The County will give a worksheet to the Contractor to fill out each address. The worksheet has the following information: address, names of personnel completing task, BFP #, meter #, parts used, and signature of competent person responsible for completion of task.
2. The Contractor shall be responsible for coordinating with each property owner / resident for the connection to the new main and installation of the backflow prevention device. This work should ideally be completed on a street-by-street basis.
3. Contractor will be responsible for excavation at each site. It is required that the contractor takes pictures of each site prior to and after the installation. These photos should be attached to the worksheet. The Contractor will not be allowed to start any work until the before pictures are delivered to the Project Manager.
4. Contractor may wish to use customers shut-off on the side of the home to minimize dewatering, but in doing so takes full responsibility should the valve fail in the performance of the task.
5. Contractor is responsible for locates at the individual worksites.
6. The backflow devices shall be picked up by the contractor at the County's Mercantile Facility. A 48 hour advanced notification prior to pick up is required. The Contractor shall provide written receipt of the devices. Upon receipt the Contractor shall be responsible for their security.
7. Installation of the assemblies will be per approved Collier County detail - Attachment B. Attachment A is provided for reference only. Device will be level and plumb. Connections to the customer's side plumbing will be professional and utilize as few parts as possible, but not adding any undue stress to existing piping. No leakage will be acceptable.
8. On completion of backflow preventer installation, the service shall be flushed to the resident's hose bib on incoming side, removing as much air as possible.

9. Collier County will be responsible for the testing of the device, once installed. A complete test report will accompany the work order generated for the task.
10. Contractor will be responsible for back-filling and site repair (grass, plants, concrete, asphalt, etc.) for each address. This includes any repairs to any pre-existing utilities or structures.
11. A completed work form and backflow test report must be submitted for each installation, daily.

METER/BACKFLOW CHANGE-OUT PROCEDURE

1. Contractor shall prepare one (1) week in advance a list (by address) of the meters and backflows to be changed out. This will allow the appropriate work orders to be issued by the County to procure the new meters.
2. Upon receipt of work order, Contractor and Representative are to provide a verbal notification to the resident prior to shut-off of water. (If no one is present, meter should be observed for any unusual water use in the empty residence. If water use is unusual, no work is to be done until a determination can be made concerning potential landscape irrigation or other use.) Work Order should be verified if any special requirements concerning the service exist (i.e. if service has been terminated or locked out).
3. In conjunction with Contractor, the new meter is installed on the new service by County. Contractor installs new backflow at location. Prior to any connection to the existing private service to the house, the County obtains a reading on the existing water meter and records it on the Work Order.
4. Service from existing main is then turned off at curb stop at existing meter location. Existing house service is then disconnected from meter. New service is then connected to the house service by Contractor with County present.
5. Meter reading is then taken by County at new meter. This is recorded on Work Order.
6. Water service is then turned on at the meter and at the same time the closest available house bibb is turned on by the Contractor. This is to allow any potential dirt or debris to be flushed out. House bibb is then shut off. Meter is observed for any unusual water usage. If unusual usage is noted, the resident if present is to be notified immediately. If the resident is not present, the water service should be shut-off at backflow device isolation valve. A notice is to be placed at the front door of the residence and the County customer service group is to be notified of this condition. If there is no usage the service conversion is completed.
7. County typically immediately completes the testing of backflow device and certifies its operation. If not done immediately, the testing is done within 24 hours.

8. At some time following conversion of service from old main to the new main, the existing meters, meter boxes are removed by Contractor and system abandonment is completed.





Model 975XL Reduced Pressure Principle Assembly

Application

Designed for installation on water lines to protect against both backsiphonage and backpressure of contaminated water into the potable water supply. Assembly shall provide protection where a potential health hazard exists. For non-potable applications only.

Standards Compliance

- ASSE® Listed 1013
- IAPMO® Listed
- UL® Classified (less shut-off valves or with OS&Y valves)
- C-UL® Classified
- CSA® Certified B64.4
- AWWA compliant C511
- Approved by the Foundation for Cross Connection Control and Hydraulic Research at the University of Southern California
- NYC MEA 425-89-M VOL 3

Materials

Main valve body	Cast Bronze ASTM B 584
Access covers	Cast Bronze ASTM B 584
Fasteners	Stainless Steel, 300 Series
Elastomers	Silicone Buna Nitrile
Polymers	Noryl™
Springs	Stainless Steel, 300 series

Features

Sizes:	3/4", 1", 1-1/4", 1-1/2", 2"
Maximum working water pressure	175 PSI
Maximum working water temperature	180°F
Hydrostatic test pressure	350 PSI
End connections Threaded	ANSI B1.20.1

Relief Valve discharge port:

3/4" - 1"	-	0.63 sq. in.
1 1/4" - 2"	-	1.19 sq. in.



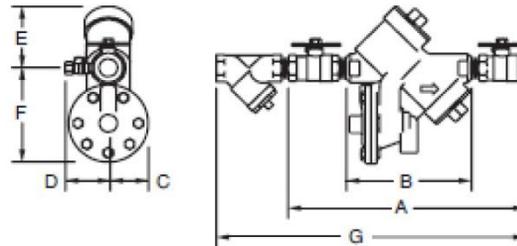
Options

(Suffixes can be combined)

- with full port QT ball valves (standard)
- L - less ball valves, male pipe thread
- U - with union ball valves (3/4" & 1")
- S - with bronze "Y" type strainer
- FDC - with fire hydrant connection; 2" only
- FT - with integral male 45° flare SAE test fitting
- TCU - with test cocks up
- SE - with street elbows (3/4" & 1")

Accessories

- Air gap (Model AG)
- Repair kits
- Thermal expansion tank (Mdl. XT)
- Soft seated check valve (Model 40XL2)
- Shock arrester (Model 1260XL)
- QT-SET Quick Test Fitting Set



Dimensions & Weights (do not include pkg.)

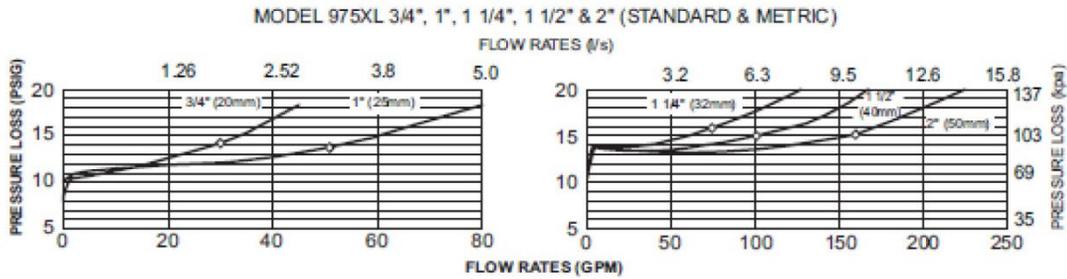
MODEL 975XL SIZE	DIMENSIONS (approximate)																WITH BALL VALVES	
	A		B		C		D		E		F		G		lbs.	kg		
	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm				
3/4	20	12	306	7 3/4	197	2 1/8	54	3	76	3 1/2	89	5	127	16 1/8	410	12	5.5	
1	25	13	330	7 3/4	197	2 1/8	54	3	76	3 1/2	89	5	127	17 3/8	441	14	6.4	
1 1/4	32	17	432	10 15/16	278	2 3/4	70	3 1/2	89	5	127	6 3/4	171	22 9/16	573	28	12.7	
1 1/2	40	17 3/8	441	10 15/16	278	2 3/4	70	3 1/2	89	5	127	6 3/4	171	24 1/16	611	28	12.7	
2	50	18 1/2	470	10 15/16	278	2 3/4	70	3 1/2	89	5	127	6 3/4	171	26 1/2	673	34	15.4	

Zurn Industries, LLC | Wilkins
1747 Commerce Way, Paso Robles, CA U.S.A. 93446 Ph. 855-663-9876, Fax 805-238-5766
In Canada | Zurn Industries Limited
7900 Goreway Drive, Unit 10, Brampton, Ontario L6T 5W6, 877-892-5216
www.zurn.com

Rev. G
Date: 8/20
Document No. EF-975XL
Product No. Model 975XL

Flow Characteristics

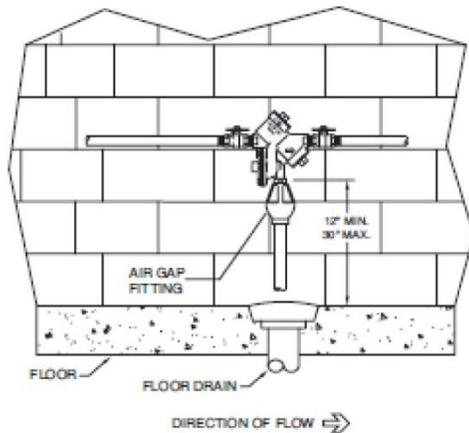
◇ Rated Flow (established by approval agencies)



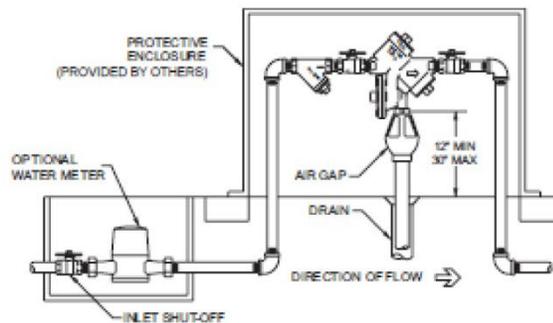
Typical Installation

Local codes shall govern installation requirements. To be installed in accordance with the manufacturers' instructions and the latest edition of the Uniform Plumbing Code. Unless otherwise specified, the assembly shall be mounted at a minimum of 12' (305mm) and a maximum of 30' (762mm) above adequate drains with sufficient side clearance for testing and maintenance. The installation shall be made so that no part of the unit can be submerged.

Capacity thru Schedule 40 Pipe				
Pipe size	5 ft/sec	7.5 ft/sec	10 ft/sec	15 ft/sec
1/8"	1	1	2	3
1/4"	2	2	3	5
3/8"	3	4	6	9
1/2"	5	7	9	14
3/4"	8	12	17	25
1"	13	20	27	40
1 1/4"	23	35	47	70
1 1/2"	32	48	63	95
2"	52	78	105	167



INDOOR INSTALLATION



OUTDOOR INSTALLATION

Specifications

The Reduced Pressure Principle Backflow Preventer shall be ASSE® Listed 1013, rated to 180°F, and supplied with full port ball valves. The main body and access covers shall be bronze (ASTM B 584), the seat ring and all internal polymers shall be Noryl™ and the seat disc elastomers shall be silicone. The first and second checks shall be accessible for maintenance without removing the relief valve or the entire device from the line. If installed indoors, the installation shall be supplied with an air gap adapter. For use in non-potable applications only. The Reduced Pressure Principle Backflow Preventer shall be a ZURN WILKINS Model 975XL.

Zurn Industries, LLC | Wilkins
 1747 Commerce Way, Paso Robles, CA U.S.A. 93446 Ph. 855-663-9876, Fax 805-238-5766
 In Canada | Zurn Industries Limited
 7900 Goreway Drive, Unit 10, Brampton, Ontario L6T 5W6, 877-892-5216
www.zurn.com

Road Alert Notification Form for Lane Closures and Road Closures

ROAD ALERTS and ROAD ALERT UPDATES are prepared by the Collier County Growth Management Department to inform the community about scheduled road construction and road maintenance projects along major roadways in Collier County where lane closures are planned, or traffic flow may be affected. Road Alerts are normally **prepared weekly on Wednesday**.

Complete and return this form by e-mail to: Growth.Management@colliercountyfl.gov and Danielle Bates Danielle.Bates@colliercountyfl.gov and Connie Deane Connie.Deane@colliercountyfl.gov and Desiree Hart Desiree.Hart@colliercountyfl.gov.

Any questions, phone: **239-252-8192** or **239-252-8365**.

Contact Information

- 1) Name of Company/Contractor/CEI (submitting the form): _____
- 2) Contact Name: _____
- 3) Mobile and/or Office Phone: _____
- 4) E-mail: _____
- 5) Subcontracting Company (if any): _____

Type of Work and Permitting Information

- 6) Type of work
 - a. Collier County – County Contact (name and phone): _____
 - b. Utility such as FPL, TECO – Company Name: _____
 - c. Private Company – Company Name: _____
- 7) Collier County Right-of-Way Permit # (required for private company work): _____

Lane Closure Information

- 8) Location of lane closure (select one):
 - a. On Road: _____
between Road #1: _____ Road #2: _____
 - b. Intersection At – Road #1: _____ Road #2: _____
- 9) Dates of lane closure: (Better to overestimate than underestimate)
Start date: _____
End date: _____
- 10) Hours of lane closure: 9 a.m.-3 p.m. 9 a.m.-3:30 p.m. 8 p.m.-6 a.m. (overnight)
 Other (prior approval from County Contact and/or on Permit): _____
- 11) Reason for lane closure: _____
- 12) Direction of work (check all that apply):
 eastbound westbound northbound southbound
- 13) Which lane(s) closed? (check all that apply):
 through lane right turn lane left turn lane roadsides
 inside lane outside lane median sidewalks
 - a.) If you are closing a turn lane can drivers still make the turn from adjacent through lane? yes no
 - b.) Or from other turn lane(s)? yes no
- 14) Type of closure (may check more than one but be clear as to what is planned):
 Intermittent Rolling (moving continuously along the roadway)
 Road Closed to ALL Traffic Road Closed to Through Traffic: _____
 Reduced from: _____ lane(s) to _____ lane(s)
 Other: _____
- Notes: _____
- 15) Detour: _____
- 16) All Maintenance of Traffic (MOT) shall be in accordance with the current year standard plan.