



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

PAT MCCRORY  
GOVERNOR

ANTHONY J. TATA  
SECRETARY

**ADDENDUM NO. 4**

October 7, 2014

RE: NCDOT Ferry Division – Swan Quarter Ferry Facility, Swan Quarter, NC  
SCO ID No. 11-09078-01A

PREPARED BY: Facilities Design, NCDOT

The following clarifications, changes, additions and/or deducts shall be made to the Working Drawings and Specifications of the above-referenced project. These changes shall be included in the Contract Amount for the Construction Work as indicated below:

**Drawings:**

<u>Item</u>	<u>Sheet No.</u>	<u>Description:</u>
1.	C502	Refer to Drawing C502 "Utilities Plan South Area". At the intersection of the 3" DI line from the Ferry loading ramps, there are 3-3" check valves. These valves are simply buried, and each is a simple DI body swing check valve.
2.	C506	Refer to Drawing C506 "Utility Plan and Profile – Main P.S. to Road". The note reading "2" DDCV in box on service line in R/W" shall be corrected to read "2" Ball Valve and Gate Valve in box on service line in R/W ". The attached sketches of the site plan and detail show the sewer connection design and sizing of box around this assembly. See Attachments 'A' and 'B'.
3.	C707	Refer to Drawing C707 "Details". The flow meter vault may be downsized for the smaller size mag meter as called out on the plans; however, the bypass line needs to remain within the vault assembly with clearance dimensions as noted. A standard concentric manhole may be provided instead. Material for this assembly shall be HDPE with a DR of 9 or less to match the pipe in this area. See Attachments 'C' and 'D'.

4. C707 Refer to Drawing C707 "Details". Two-inch (2") ball valves may be used in place of plug valves and gate valves in the meter and flush valve assemblies, but they must be of type HDPE, if within the right of way.
  
5. A3.1, A3.2 & A3.3 Refer to Drawings A3.1, A3.2 & A3.3. In various wall sections and details, delete references to R-25 min. for polyisocyanurate rigid board roof deck insulation. Provide minimum R-19 polyisocyanurate rigid board roof deck insulation. The total thickness of roof edge wood blocking shall match thickness of rigid board insulation. Total roof insulation system (rigid & batt combined) shall provide minimum R-38 as indicated per Specification Section 07 2100 "Thermal Insulation", paragraph 2.03 and configured as detailed.
  
6. A6.1 Refer to Drawing A6.1 – "Door and Window Details" and all related sections and details. Exposed metal flashings shall match the finish of the window frames and shall have a minimum thickness of 24 gauge. Flashings at the heads of openings shall be installed behind finish trim and supporting nailers and blocking and shall have a vertical leg not less than 3". Lap water resistive air barriers over and seal to flashing vertical leg. Note that flashing at cast stone water table is continuous.
  
7. E2.1 Refer to Drawing E2.1 – "Electrical – Equipment, Fire Alarm, & Systems". Change circuit numbers for condensing units CU-2 and CU-3 as follows:
  - CU-2: P1D - 38, 40, 42;
  - CU-3: P1D - 25, 27, 29.
  
8. E4.0 Refer to Drawing E4.0 – "Electrical – Schedules", Panelboard 'P1D'. Change circuits for condensing units CU-2 and CU-3 as follows:
  - CU-2: connect to 3P – 40A circuit breaker at poles 38, 40, 42 in panelboard P1D, 3#6, 1#8 G, 1"C.
  - CU-3: connect to 3P – 60A circuit breaker at poles 25, 27, 29 in panelboard P1D, 3#6, 1#8 G, 1"C.
  - Change Breakers at pole numbers 14 and 16 to be 1P/20A spares.
  
9. FP1.0 Refer to drawing FP1.0 – "Fire Protection Floor Plan". Under "Fire Protection Storage Tank Specification", Revise "7000 gallon" to "6000 gallon". Provide exterior ladder to man way access with safety guards and tank level gauge board in accordance with NFPA-22.
  
10. FP1.0 Refer to drawing FP1.0 – "Fire Protection Floor Plan". Provide

tank heater as specified. Manufacturer calculations, based on 20 deg. F ambient and 45 deg F operating temperature, indicates a 2KW heater is required for this location to be in compliance with NPFA-22.

**Specifications:**

Item    Sheet No.

Description:

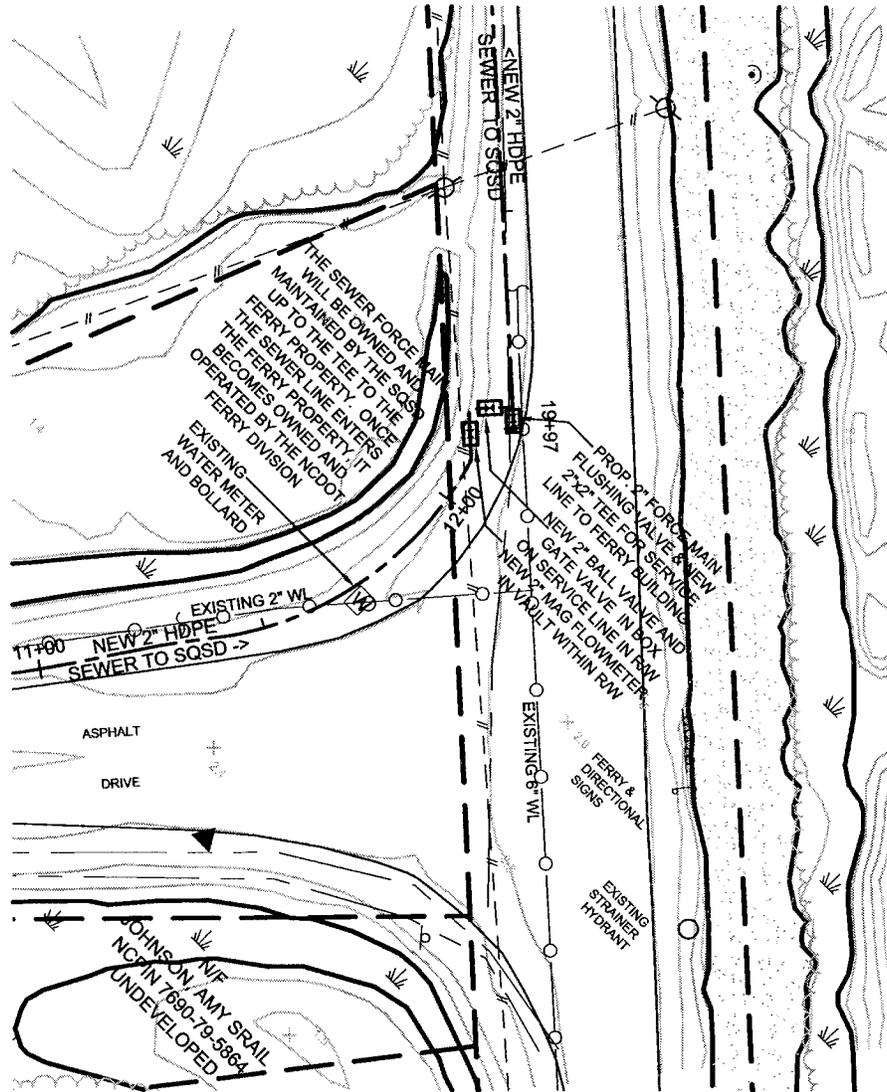
1.        03 3000        Refer to Specification Section 03 3000 – “Cast-in-Place Concrete”. Regarding concrete transportation time, the maximum batch to placement time is typically 90 minutes as specified in ASTM C94 for ready mixed concrete. The thirty minute limitation does not apply to the building concrete. However, section 32 1600 of the project specifications refers to the NCDOT Standard Specifications for site concrete. Table 1000-2 of the NCDOT Standard Specifications does require a thirty minute time limit for concrete placed in ambient temperatures above 89 degrees and with no retarding admixture. For the same temperature, this table allows 75 minutes if a retarding admixture is used. The batch to placement time increases in Table 1000-2 with lower temperatures.
  
2.        08 4313        Refer to Specification Section 08 4313 “Aluminum-Framed Storefronts” paragraph 2.01 “Manufacturers”. Subject to compliance with all requirements of the specifications and drawings, the following manufacturer’s product may be incorporated into the work of this project:  
Coral Architectural Products, 3010 Rice Mine Road,  
Tuscaloosa, AL 35406; Telephone: 205-345-1013;  
Fax: 800-443-6261.
  
3.        21 3900        Refer to Specification Section 21 3900 - “Controllers for Fire-Pump Drivers” paragraph 2.1.c.3 “Solid-State Controller”. Delete “Reduced-voltage type”, and replace with “Across-the-line type”.
  
4.        26 3600        Refer to Specification Section 26 3600 “Transfer Switches”, paragraph 2.3 H “Automatic Transfer Switches”. Delete requirement for closed transition transfer.
  
5.        33 3340        Refer to Specification Section 33 3340 – “Sanitary Gravity Lines and Force Mains”. As indicated on the plans, the 2” force main piping from the pump station to the existing main shall be HDPE. Note that other sections of the force main on the property are shown as alternate materials. Delete Section 33 3340 in its entirety, and substitute Section 33 3340 Attachment ‘E’. Note that the HDPE pipe shall have a DR of 9.

END ADDENDUM NO. 4

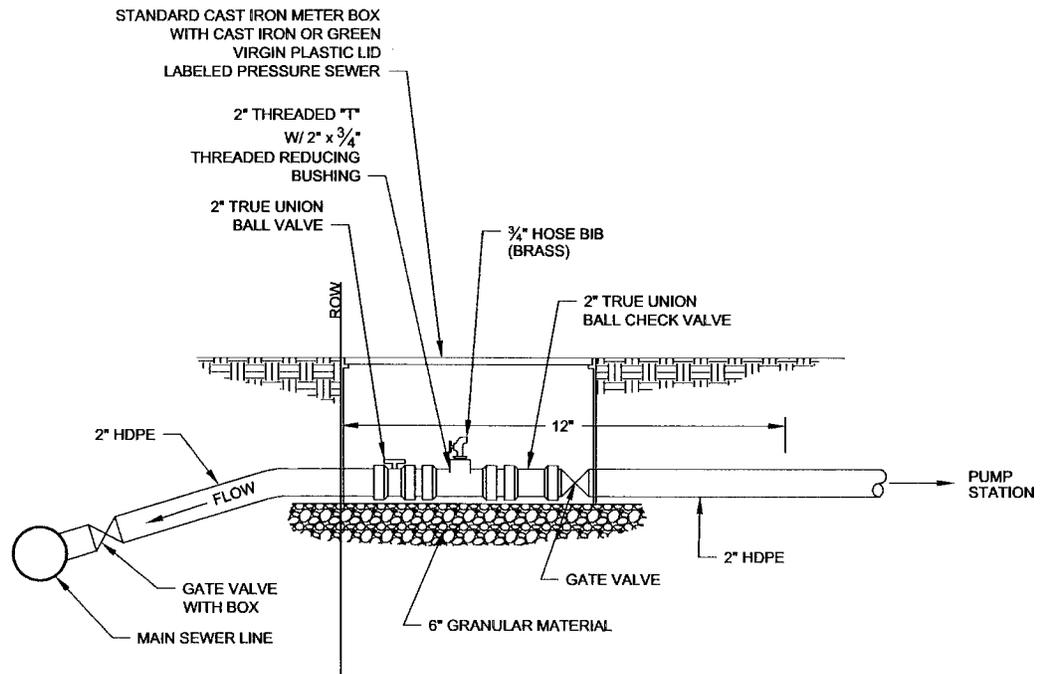
APPROVED BY: Mark D. Gibson AIA, NCDOT Facilities Design

cc: Email to all Bidders, Plan Rooms, SCO;  
Priscilla T. Williams, PE, Director Facilities Management Division, NCDOT;  
Amber Farrelly, PE, B & F Consulting;  
Kim Reitterer PE, Elm Engineering, Inc.

# ATTACHMENT 'A'



# ATTACHMENT 'B'



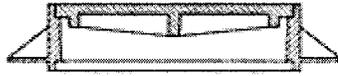
## STANDARD PRESSURE SEWER CONNECTION

NOT TO SCALE

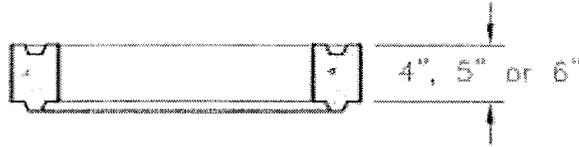


# ATTACHMENT 'D' GENERAL NOTES:

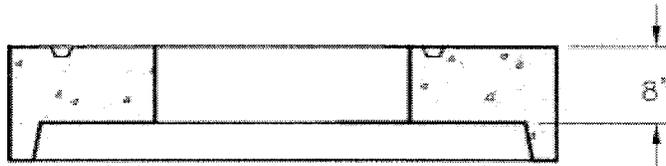
**Ring & Cover**  
(as specified)



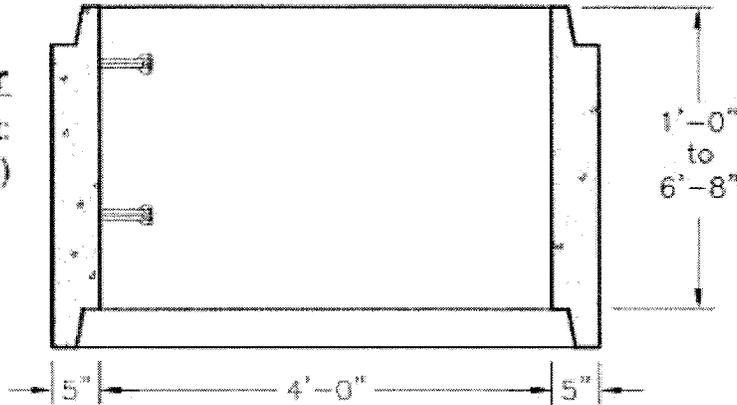
**Grade Ring**  
(24" or 27" ID  
Keyed or Blunt)



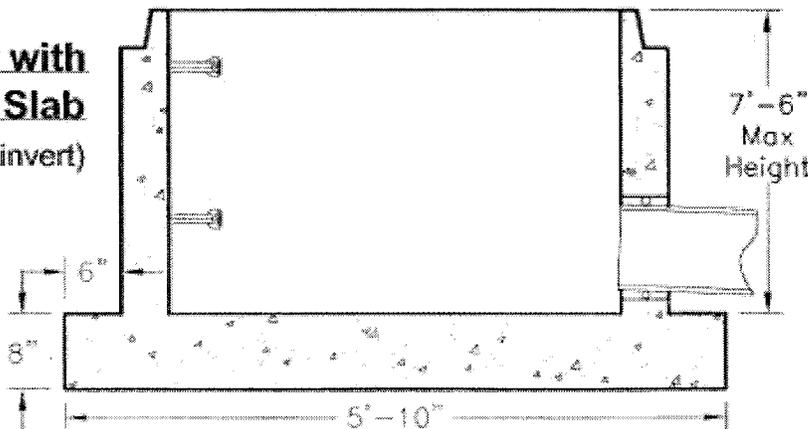
**Concentric Flat Top**  
(24" or 27" ID  
Keyed or Blunt)



**Intermediate Riser**  
(Standard height:  
1'-4" multiples)

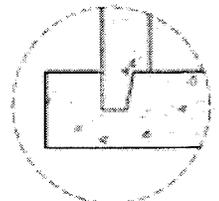


**Base Riser with Integral Base Slab**  
(Field cast invert)



## SECTION A-A

1. Concrete: 4,000 P.S.I. Minimum Strength @ 28 Days.
2. Steel Reinforcement: ASTM A-1 Grade 60. W4 Wire ASTM A82.
3. Manhole Sections Meet or Exceed Requirements of ASTM C-478.
4. Construction Joint Sealed with Butyl Rubber or Equivalent. "O"-Ring Gasket also Available.
5. Pipe to Manhole Gasket. Typical of Sanitary.
6. Coating Optional (Inside, Outside).
7. Reinforced Plastic Steps Spaced 1'-4"



**Alternate Design  
Manufactures Opti**

# ATTACHMENT 'E'

## SECTION 33 3340

### SANITARY GRAVITY LINES AND FORCE MAINS

#### 1. DESCRIPTION:

1.1 The Contractor shall furnish all labor, materials, equipment and supplies and shall perform all work necessary for the construction of the sewers, complete, tested and ready for use. The sewers shall be constructed to the lines and grades shown and shall be the size shown on the plans. The most current Swan Quarter Sanitary District and Hyde County Specifications are incorporated by reference.

1.2. Related Work: See the following sections for related specifications:

31 2000	Unclassified Excavation
32 9200	Seeding and Mulching

#### 2. MATERIALS:

2.1 Ductile iron pipe used for sanitary sewers shall be manufactured in accordance with AWWA Standard C-150-96. The minimum class pipe shall be a Class 50. Pipe joints shall be "Push-on" type manufactured in accordance with AWWA Standard C-111-95.

2.2 Manholes shall be precast reinforced concrete. Eccentric cones shall be used. All manholes shall be watertight. All manhole covers installed within fire lanes, sidewalks, or otherwise vehicular-accessible areas shall be rated for traffic loading.

2.2.1 Eccentric manholes shall be designed and manufactured in accordance with ASTM C489-97. The walls shall be a minimum of 5 inches thick and have a 6-inch minimum base. The standard joint shall be sealed with cementitious grout meeting all Federal Specifications. An O-ring or "ram neck" joint seal may be used. The "O" ring joint shall conform to the requirements of ASTM C442-98. A rubber water stop shall be supplied with the manholes to tie the pipe to the barrel section. These gaskets and clamps shall meet the requirements of ASTM C923-98. The contractor shall submit drawings showing the reinforcing, pipe openings and other details for approval by the engineer. Also, the contractor shall submit certified test reports indicating that the materials comply with the requirements of ASTM C478-97.

2.2.2 Manhole rings and covers shall be manufactured to the dimensions shown on the plans and shall be made from Class 30 gray iron, meeting the requirements of ASTM a48-94ae1. Any load bearing covers must be domestically cast and so indicated by the manufacturer name and "USA" in the castings. Any load bearing manhole ring and cover shall be Class 35 gray iron.

2.2.3 Manhole steps shall be made from reinforcing steel which is rubber plastic coated. These steps shall be furnished in accordance with the plans and applicable OSHA regulations.

2.2.4 Cement used in masonry or reinforced concrete units shall be Type 1, CSA normal, meeting ASTM C150-99.

2.3 PVC Sewer pipe for gravity flow shall be schedule 80 PVC or schedule 40 PVC as shown on the plans including the clean-out stack. A Bronze clean-out slotted plug will be provided for all cleanouts in traffic (pedestrian or vehicular) areas.

2.3.1 PVC Sewer pipe, saddles and adapters shall conform to the requirements of ASTM D3034-98.

- 2.3.2 The PVC force main shown from the equilibrium tank at the dock to the pump station shall be Schedule 80 and installed according to manufacturer's recommendations and as shown on the plans and specifications. All other force mains are HDPE or DIP as shown on the plans and specifications.
- 2.3.4. All fittings and solvent welds shall conform to ASTM D2241.
- 2.7 HDPE pipe used for force main shall have a DR of 9 or less and be manufactured from a PE 3608 resin listed with the Plastic Pipe Institute (PPI) as TR-4. The resin material shall meet the specifications of ASTM D 3350 with a minimum cell classification of 345464C. Pipe shall have a manufacturing standard of ASTM F 714 and be manufactured by an ISO 9001 certified manufacturer. The pipe shall contain no recycled compounds except that generated in the manufacturer's own plant from resin of the same specification from the same raw material. The pipe shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions, voids, or other injurious defects.
- 2.7.1 Molded butt fusion fittings shall be in accordance with ASTM D3261 and shall be manufactured by injection molding, a combination of extrusion and machining, or fabricated from HDPE pipe conforming to this specification. All fittings shall be pressure rated to provide a working pressure rating no less than that of the pipe. Fabricated fittings shall be manufactured using a McElroy Datalogger to record fusion pressure and temperature. A graphic representation of the temperature and pressure data for all fusion joints made producing fittings shall be maintained as part of the quality control. The fitting shall be homogeneous throughout and free of visible cracks, holes, foreign inclusions, voids, or other injurious defects.
- 2.7.2 Electrofusion Fittings shall be PE 3608 HDPE, minimum cell classification of 345464C as determined by ASTM D3350 and be the same base resin as the pipe. Electrofusion Fittings shall have a manufacturing standard of ASTM F1055.
- 2.7.3 Flanged and Mechanical Joint Adapters shall be PE 3608 HDPE, Cell Classification of 345464C as determined by ASTM D3350 and be the same base resin as the pipe. Flanged and mechanical joint adapters shall have a manufacturing standard of ASTM D3261. All adapters shall be pressure rated to provide a working pressure rating no less than that of the pipe.
- 2.7.4 Mechanical restraint for HDPE may be provided by mechanical means separate from the mechanical joint gasket sealing gland. The restrainer shall provide wide, supportive contact around the full circumference of the pipe and be equal to the listed widths. Means of restraint shall be machined serrations on the inside surface of the restrainer equal to or greater than the listed serrations per inch and width. Loading of the restrainer shall be by a ductile iron follower that provides even circumferential loading over the entire restrainer. Design shall be such that restraint shall be increased with increases in line pressure. Serrated restrainer shall be ductile iron ASTM A536 with a ductile iron follower; bolts and nuts shall be corrosive resistant, high strength alloy steel. The restrainer shall have a pressure rating of, or equal to that of the pipe on which it is used or 150 PSI which ever is lesser. Restrainers shall be JCM Industries, Sur-Grip or pre-approved equal.

Nominal Size	Restraint Width	Serrations per inch
4", 6"	1-1/2"	8
8" 10 & 12"	1-3/4"	8

Pipe stiffeners shall be used in conjunction with restrainers. The pipe stiffeners shall be designed to support the interior wall of the HDPE. The stiffeners shall support the pipe's end and control the "necking down" reaction to the pressure applied during normal installation. The pipe stiffeners shall be formed of 304 or 316 stainless steel to the HDPE manufacturers published average

inside diameter of the specific size and DR of the HDPE. Stiffeners shall be by JCM Industries or pre-approved equal.

**3. INSTALLATION:**

- 3.1 The loading and unloading of all pipe, manholes and other accessories shall be in accordance with the manufacturer's recommended practices and shall at all times be performed with care to avoid any damage to the material.
- 3.2 All materials shall be stored in accordance with the manufacturer's recommendations. All PVC sewer pipe shall be protected from ultra-violet rays if stored on the job longer than twenty days.
- 3.3 All pipes shall be kept free of dirt and other debris. Any damage relating to the coating of the various materials for sewer or force mains shall be repaired in a manner approved by the engineer, or replaced. Machined manhole frames shall remain intact until construction is complete.
- 3.4 The contractor shall ensure that all Occupational Safety and Health Administration (OSHA) regulations and standards are followed during all phases of the construction project.
- 3.5 **Excavation**
  - 3.5.1 Prior to any excavation, the contractor shall locate all existing utilities in the field.
  - 3.5.2 Trench width shall be a minimum of six inches plus outside diameter of the pipe and a maximum of twenty-four inches plus outside diameter of the pipe, unless additional trench width is required by OSHA.
  - 3.5.3 Trench bottom conformation, where no special bedding is required, is a flat bottom where the trench bottom is excavated slight above grade and cut down to the pipe grade by hand in the fine-grading operation. Where the trench bottom is inadvertently cut below grade, it shall be filled to grade with an approved material and thoroughly tamped.
  - 3.5.4 The contractor shall keep all trenches free from water during the excavation for construction of sewer mains.
  - 3.5.5 In trenches where water is present or dewatering is required, the trench shall be stabilized with #67 stone. When the contractor encounters material during trench excavation that is unsuitable, this material shall be replaced with material that is considered suitable for pipe laying operations.
- 3.6 The pipe material shall be installed in accordance with the manufacturer's recommendations and these specifications.
  - 3.6.1 The sewer pipe installation shall start at the downstream end and proceed upstream to the termination point as shown on the plans. The bell ends shall point upstream. After the trench foundation has been properly graded with bell holes, where appropriate, the pipe shall be carefully lowered into the trench. The pipe nor accessories shall not be dropped or dumped into the trench.
  - 3.6.2 The pipe interior shall be kept clean before and after laying. Pipe ends shall be plugged at the end of each workday or when work is temporarily stopped. The plugs shall be watertight so no water nor debris can enter the pipe.

- 3.6.3 When a sewer pipe passes over or under a storm drain pipe, the vertical separation shall be no less than 24 inches.
- 3.6.4 The horizontal separation between any water main and sewer (gravity or force main) shall be at least ten feet.
- 3.6.5 When a water main crosses over a sewer main, a minimum of eighteen inches of vertical separation shall be provided. If a water main must cross under a sewer, both pipes must be ductile iron for a minimum of fifteen feet either side of the crossing and a minimum of eighteen inches of vertical separation shall be provided.
- 3.7 The foundation for PVC gravity sewer pipes shall be a firm flat bottom trench of 4 inches of Class 1 material as defined in ASTM D-2321-89(1995) compacted, with bell holes.
- 3.8 Ductile iron sewer pipe shall be installed in accordance with the requirements of AWWA Standard C-600-87.
- 3.9 Any directional bores required due to construction site conditions will be considered incidental to the installation of the force main and not paid for as a separate item.
- 3.10 Manhole inverts shall be constructed with a width equal to that of the effluent pipe, height to the springline and invert "shelves" from that point upward at 60 degrees to the manhole walls. The manhole invert shall be finished so it is smooth concrete.
- 3.11 All manholes must be vacuum tested as follows:
  - 3.11.1 All lifting holes shall be plugged with an approved non-shrink grout.
  - 3.11.2 All pipes entering the manhole shall be plugged. The contractor shall securely brace the plugs to keep them from being drawn into the manhole.
  - 3.11.3 The test head shall be placed inside the top of the cone section of the manhole and the seal inflated in accordance with the manufacturer's recommendations.
  - 3.11.4 The vacuum testing equipment shall be approved for vacuum testing manholes. A vacuum of 10 inches of mercury shall be drawn and the vacuum pump shut off. With the valves closed, the time for the vacuum to drop to 9 inches of mercury shall not be less than sixty seconds for a 4' diameter manhole, nor more than 75 seconds for a 5' diameter manhole. These parameters are for manholes less than 10 feet in depth.
  - 3.11.5 If the manhole fails the initial test, repairs shall be made with an approved non-shrink grout. Retesting shall proceed and continue until a satisfactory test is accomplished.
- 3.12 VC Sewer pipe shall be installed in accordance with ASTM D2321. Class I, II or III "Embedment Material" shall be used for the installation.
- 3.13 HDPE joinings shall be as per manufacture's recommendations and shall adhere to the following
  - 3.13.1 For butt fusion, sections of polyethylene pipe should be joined into continuous lengths on the jobsite above ground. The joining method shall be the butt fusion method and shall be performed in strict accordance with the pipe manufacturer's recommendations. The butt fusion equipment used in the joining procedures should be capable of meeting all conditions recommended by the pipe manufacturer, including, but not limited to, temperature requirements of 400-450 degrees Fahrenheit, alignment, and an interfacial fusion pressure of 75 PSI. The butt fusion joining will produce a joint weld strength equal to or greater than the tensile strength of the pipe itself. All field welds shall be made with fusion equipment equipped with a McElroy Data Logger.

Temperature, fusion pressure and a graphic representation of the fusion cycle shall be part of the quality control records.

- 3.13.2 Sidewall fusions for connections to outlet piping shall be performed in accordance with HDPE pipe and fitting manufacturer's specifications. The heating irons used for sidewall fusion shall have an inside diameter equal to the outside diameter of the HDPE pipe being fused. The size of the heating iron shall be ¼ inch larger than the size of the outlet branch being fused.
- 3.13.3 Mechanical bolted joining may be used where the butt fusion method cannot be used. Flange joining will be accomplished by using a HDPE flange adapter with a ductile iron back-up ring. Mechanical joint joining will be accomplished using either a molded mechanical joint adapter or the combination of a Sur-Grip Restrainer and Pipe Stiffener as manufactured by JCM Industries, Inc. Either mechanical joint joining method will have a ductile iron mechanical joint gland.
- 3.13.4 Socket fusion, hot gas fusion, threading, solvents, and epoxies may not be used to join HDPE pipe.
- 3.14 The manufacturer of any pipe used in this specification shall package the pipe in a manner to deliver the pipe to the project neatly, intact, and without physical damage. The transportation carriers shall use appropriate methods and intermittent checks to insure the pipe is properly supported, stacked and restrained during transportation.
- 3.15 Pipe shall be stored on clean, level ground to prevent undue scratching or gouging. The pipe shall be handled in such a manner that it is not pulled over sharp objects or cut by lifting equipment. Any damaged sections of pipes shall be removed and replaced by the Contractor as part of the lump sum for the project.
- 3.16 All backfill shall be compacted in six-inch lifts. Backfill must be compacted to at least 95% of Standard Proctor Density.
- 3.17 Sewer lines will be tested using the water test or low pressure air test. Sewer laterals will be tested as well as the main. Plugs must be installed on the laterals at the building clean-out.
- 3.18 The low pressure air test in accordance with ASTM C 828 will be used on PVC mains and laterals. Prior to testing, the main shall be clean of debris and flushed with water. The line is to be pressurized to 4 psi and stabilized. After stabilization, the pressure will be decreased to 3.5 psi. The time to drop from 3.5 psi to 2.5 psi will be measured. The following table will be used to determine the test time.

Nominal pipe size (inches)	Time (Minutes per 100 feet of pipe)
Four inches	0.3
Six inches	0.7
Eight inches	1.2

If there are multiple sizes, add the various times together. If the pressure does not drop below 2.5 psi, the pipe is acceptable. If not, correct and retest.

- 3.19 Pressure testing for HDPE pipes shall be conducted in accordance with ASTM F 2164, Field Leak Testing of Polyethylene Pressure Piping Systems Using Hydrostatic Pressure. The HDPE pipe shall be filled with water, raised to test pressure and allowed to stabilize. The test pressure shall be 1.5 times the operating pressure at the lowest point in the system. In accordance with section 9.8, the pipe shall pass if the final pressure is within 5% of the test pressure for 1 hour. For safety reasons, only hydrostatic testing will be used.

- 3.20 A deflection test shall be performed on PVC and HDPE sewer pipes no later than 30 days after initial backfill installation. The maximum allowable deflection shall be five percent for these sewer pipes. The test shall use a minimum of nine-pronged mandrel pulled through the pipe. The contact length of the mandrel shall be at least twenty-four inches.
- 3.21 The irrigation and wastewater force mains shall be constructed of Class 160 SDR 26 pipe and installed according to manufacturer's recommendations and as shown on the plans and specifications.
- 3.22 All fittings and solvent welds shall conform to ASTM D2241.
- 3.23 The section of force main to be hydrostatically tested shall be slowly filled with water at a rate which will allow complete evacuation of air from the line. The line shall be tested to a pressure of 150 psi as measured at the lowest elevation of the line for a duration of 2 hours. The pressure gauge used in the hydrostatic test shall be calibrated in increments of 10 psi or less. At the end of the test period, the leakage shall be measured with an accurate water meter.

Pipe size and the corresponding allowable leakage (gal.) per 1000 feet of pipe are as follows:

PIPE SIZE	ALLOWABLE LEAKAGE/1000 FT. (Gallons)
2"	0.43
3"	0.64
4"	0.85
6"	1.28

All visible leaks are to be repaired regardless of the amount of leakage.

- 3.24 All sanitary sewer components and structures are to be tested per municipal standards to ensure that no unacceptable leakage enters the system. This includes, but is not limited to, pipe joints, tank seams, tank penetrations, grouting, manhole frame and covers, conduit in pump control panel and tanks.
- 4. **METHOD OF MEASUREMENT AND BASIS OF PAYMENT:**
- 4.1 All work covered by this section for site work shall not be measured but paid for as part of the lump sum contract price.

**END OF SECTION**