



# *B/CS* *Unified Technical* *Specifications*



*Sewer*  
*2012*



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## SECTION 33 01 30.13

**TESTING FOR SANITARY SEWAGE GRAVITY SYSTEM**

*(Sentences and/or paragraphs that are double underlined indicate revisions that were made from the 2009 specification.)*

**PART 1 - GENERAL****1.1 DESCRIPTION**

- A. This is a general specification, which applies to the furnishing of all labor, materials, tools, and equipment to perform all operations in connection with leakage testing for completed manholes and gravity sewer pipe and deflection testing for flexible sewer pipe.

**1.2 MEASUREMENT AND PAYMENT**

- A. Testing of sewer lines (except for T.V. Inspection), manholes and appurtenances shall not be considered a separate pay item. T.V. Inspection will be paid for as a separate bid item. The Contractor shall supply all water for the tests, all equipment and labor necessary to convey the water into the sewer, the necessary transportation to transport test plugs and risers from one test site to another and such labor and equipment as may be required in installing test plugs, and other incidental work in conducting the tests and the cost thereof shall be included in the price for constructing the sewer, including furnishing the test plugs.

**PART 2 – PRODUCTS****2.1 TESTING REQUIREMENTS****A. MANHOLE TESTING**

After completion of manhole construction, wall sealing, or rehabilitation, test manholes for leakage using Vacuum Testing or, if pre-approved by the City Engineer, Exfiltration Testing Procedures as specified herein.

**1. General**

Plug influent and effluent lines, including service lines, with suitably sized pneumatic or mechanical plugs. Ensure plugs are properly rated for pressures required in this test; follow Manufacturer's safety and installation recommendations. Place plugs a minimum of 6 inches outside of manhole walls.

**2. Vacuum Testing**

- a.) To perform a vacuum test, all lift holes and exterior joints shall be plugged with a non-shrink grout and all pipes entering a manhole shall be plugged.
- b.) No grout must be placed in horizontal joints before testing.
- c.) Stub-outs, manhole boots, and pipe plugs must be secured to prevent movement while a vacuum is drawn.
- d.) Contractor shall use a minimum 60 inch/lb torque wrench to tighten the external clamps that secure a test cover to the top of a manhole.

- e.) A test head must be placed at the inside of the top of a cone section, and the seal inflated in accordance with the manufacturer's recommendations.
  - f.) There must be a vacuum of 10 inches of mercury inside a manhole to perform a valid test.
  - g.) A test does not begin until after the vacuum pump is off.
  - h.) A manhole passes the test if after 2.0 minutes and with all valves closed, the vacuum is at least 9.0 inches of mercury.
3. Hydrostatic Testing
- a.) The maximum leakage for hydrostatic testing or any alternative test methods is 0.025 gallons per foot diameter per foot of manhole depth per hour.
  - b.) Seal all wastewater pipes coming into a manhole with an internal pipe plug, fill the manhole with water up to the manhole cover and maintain the test for at least one hour.
  - c.) A test for concrete manholes may use a 24-hour wetting period before testing to allow saturation of the concrete.

## B. GRAVITY PIPE LEAKAGE TESTING

### 1. General

Tests shall be made by the low-pressure air test, the infiltration test or the joint test. The infiltration test shall be used when the groundwater level is at least 2 ft above the crown of the pipe measured at the upstream manhole. The joint test shall be used for pipe sections greater than 36-inch inside diameter. The Contractor may use the joint test for pipe with a 27-inch through 36-inch average inside diameter at the approval of the Engineer or his representative. The low-pressure air test, the infiltration test and the exfiltration test shall be conducted from manhole to manhole. Trenches shall be completely backfilled and sewer line should be free of debris prior to testing. Plug all pipe outlets including laterals and secure plugs to prevent leakage blowout due to testing pressure.

### 2. Infiltration Test

#### a.) Performance:

The total infiltration, as determined by a hydrostatic head test, shall not exceed 50 gallons per inch of diameter per mile of pipe per 24 hours at a minimum test head of 2.0 feet above the crown of a pipe at an upstream manhole. For construction within the 100-year flood plain, the total infiltration shall not exceed ten gallons per inch of diameter per mile of pipe per 24 hours.

**NORMAL CONSTRUCTION**

<b>SIZE OF PIPE</b>	<b>ALLOWABLE LEAKAGE* Gal/Min/100 Ft.</b>
6"	0.0039
8"	0.0053
10"	0.0066
12"	0.0079
15"	0.0099
18"	0.0118
21"	0.0138
24"	0.0158
27"	0.0178
30"	0.0197
36"	0.0237

\* Equivalent to 50 gal. per inch diameter per mile per 24 hours

**CONSTRUCTION WITHIN 100 YR FLOOD PLAIN**

<b>SIZE OF PIPE</b>	<b>ALLOWABLE LEAKAGE* Gal/Min/100 Ft.</b>
6"	0.0008
8"	0.0011
10"	0.0013
12"	0.0016
15"	0.0020
18"	0.0024
21"	0.0028
24"	0.0032
27"	0.0036
30"	0.0039
36"	0.0047

\* Equivalent to 10 gal. per inch diameter per mile per 24 hours

The total leakage in cubic inches shall be the total cross-sectional area in square inches of the inside of the two risers and of any stacks in the sewer multiplied by the drop in water level in inches. For diameters not listed in chart, multiply the square of the diameter by the following chart value for 1" diameter.

DIAMETER OF RISER OR STACK	VOLUME PER INCH OF DEPTH	
	Cubic Inch	Gallon
1"	0.7854	.0034
2"	3.1416	.0136
2-1/2"	4.9087	.0212
3"	7.0686	.0306
4"	12.5664	.0544
5"	19.6350	.0850
6"	28.2743	.1224
8"	50.2655	.2176

b.) Execution:

Stop all dewatering operations and allow the groundwater to return to its normal level and allow to remain so for at least 24 hours. Leakage shall be determined by measuring the flow through the opening in the downstream plug for at least 15 minutes. Five separate measurements shall be made. The average of the measurements shall be used, discarding any one of the five measurements except the last that varies by more than 50% from the average of the other four. If the results of the tests are otherwise satisfactory, but the last of the five measurements show leakage in excess of that permitted, the tests shall be continued to determine if additional leaks may have developed during testing.

3. Air Test

a.) Performance:

The pipe shall be pressurized to 5 pounds per square inch gauge (psig) greater than the pressure exerted by groundwater above the pipe. Once the pressure is stabilized, the minimum time allowable for the pressure to drop 1.0 psig shall be 5 minutes per every 100 feet of pipe plus (+) 5 minutes per each service connection. Pipe sizes larger than 27 inches shall be tested as per TCEQ requirements.

The test may be stopped if no pressure loss has occurred during the first 25% of the calculated testing time. If any pressure loss or leakage has occurred during the first 25% of the testing period, then the test shall continue for the entire test duration as outlined in this subparagraph or until failure.

b.) Execution:

Add air until the internal air pressure of the sewer line is raised to approximately 5.5 psig. Allow the air pressure to stabilize. The pressure will normally drop until the temperature of the air in the line stabilizes.

When the pressure has stabilized and is at or above the starting test pressure of 5 psig, commence the test by allowing the gage pressure to drop to 5 psig at which point the time recording is initiated. Record the drop in pressure for the test period.

4. Joint Test

The joint test may be conducted by an air test or water test. The joint and the pipe segment shall be visually inspected immediately after testing.

a.) Performance:

The pipe is to be pressurized to 3.5 psig greater than the pressure exerted by groundwater above the pipe. Once the pressure has stabilized, the minimum time allowable for the pressure to drop from 3.5 psig to 2.5 psig shall be ten seconds.

If the groundwater pressure is equal to or greater than 3.5 psig, and the sewer line or joint is not leaking the sewer line or joint is acceptable and no additional testing is required. If one or more joints are leaking, but the total amount of leakage in the sewer line being tested is equal to, or less than, the allowable leakage specified in 250.03-B-1 “Performance”, the line is acceptable and no additional testing is required provided visible leaks are repaired. Moisture or beads of water appearing on the surface of the joint will not be considered as visible leakage.

b.) Execution:

Review proper operation, safety, and maintenance procedures as provided by the manufacturer of the joint test apparatus. Move the joint test apparatus into the sewer line to the joint to be tested and position it over the joint. Make sure the end element sealing tubes straddle both sides of the joint and the hoses are attached. For the water test, the bleed-off petcock must be located at top dead center. Inflate end element sealing tubes with air in accordance with equipment and manufacturer’s instructions.

i. Air Test - Pressurize the void volume with air to 3.5 psig greater than the pressure exerted by groundwater above the pipe. The drop in pressure shall be measured over ten seconds. Five separate measurements shall be made. The average of the measurements shall be used, discarding any one of the five measurements except the last that varies by more than 50% from the average of the other four. If the results of the tests are otherwise satisfactory, but the last of the five measurements show leakage in excess of that permitted, the tests shall be continued to determine if additional leaks may have developed during testing.

ii. Water Test - Introduce water into void volume until water flows evenly from open petcock. Close the petcock and pressurize with water to 3.5 psig above the pressure exerted by ground water. The drop in pressure shall be measured over ten seconds. Five separate measurements shall be made. The average of the measurements shall be used, discarding any one of the five measurements except the last that varies by more than 50% from the average of the other four. If the results of the tests are otherwise satisfactory, but the last of the five measurements show leakage in excess of that permitted, the tests shall be continued to determine if additional leaks may have developed during testing.

### C. DEFLECTION TESTING

Deflection tests shall be performed on all flexible pipes. For pipelines with inside diameters less than 27 inches, a rigid mandrel shall be used to measure deflection. For pipelines with an inside diameter 27 inches and greater, a method pre-approved by the Engineer shall be used to test for vertical deflections. Other methods shall provide a precision of two tenths of one percent (0.2%) deflection. The test shall be conducted after the final backfill has been in place at least 30 days. No pipe shall exceed a deflection of 5.0%. If a pipe should fail to pass the deflection test, the problem shall be corrected and a second test shall be conducted after the final backfill has been in place an additional 30 days. The tests shall be performed without mechanical pulling devices.

#### 1. Mandrel Sizing

The rigid mandrel shall have an outside diameter (O.D.) equal to 95% of the inside diameter (I.D.) of the pipe. The inside diameter of the pipe, for the purpose of determining the outside diameter of the mandrel, shall be the average outside diameter minus two minimum wall thicknesses for O.D. controlled pipe and the average inside diameter for I.D. controlled pipe. All dimensions shall be per appropriate standard. Statistical or other "tolerance packages" shall not be considered in mandrel sizing.

#### 2. Mandrel Design

The rigid mandrel shall be constructed of a metal or rigid plastic material that can withstand 200 psi without being deformed. The mandrel shall have nine or more "runners" or "legs" as long as the total number of legs is an odd number. The barrel section of the mandrel shall have a length of at least 75% of the inside diameter of the pipe. A proving ring shall be provided and used for each size mandrel in use.

#### 3. Method Options

Adjustable or flexible mandrels are prohibited. A television inspection is not a substitute for the deflection test. A deflectometer may be approved for use on a case-by-case basis. Mandrels with removable legs or runners may be accepted on a case-by-case basis. Mechanical devices will not be used to pull the mandrel.

### D. TV CAMERA INSPECTION

T.V. Camera Inspection shall be performed on all sewer pipe installed before acceptance. When the Contractor performs the inspection, the City Engineer or his representative shall be notified one working day prior so that he can view the procedure. The inspection shall be in digital video format, saved to a DVD or CD (enclosed within a protective case) and shall be given to the City Engineer or his representative for review and final records.

The lines shall be completely filled with potable water between manholes to fill the service connections and drained prior to T.V. Camera Inspection. Line shall be cleaned prior to T.V. inspection. All dirt/debris, including pipe grease, in the line which could cover a defect shall be removed. Line should be cleaned before being filled with water. Jetting of the lines in conjunction with the T.V. Inspection is prohibited. If the line to be televised is discovered to contain foreign material, which prohibits an acceptable T.V. inspection, the line shall be jetted and televised again.

Select and use closed circuit television equipment that will produce a color digital video that clearly shows pipe, joints and all appurtenances, and shall be a self propelled tractor-type system. Produce and use closed circuit television equipment using a panorama tilt, radial viewing, pipe inspection camera that pans plus and minus 75 degrees, rotates 360 degrees,



and has optical zoom from 6 or less inches to infinity. The camera must have an accurate footage counter accurate to within 1 foot per 500 foot of pipe. Footage shall be continuously displayed on the video at all times. The camera operator shall pause at each tee, tilt camera and view up into the branch for inspection of joints and fittings maintaining a clear in focus picture at all times while zooming to the full extent of the camera. The camera operator shall stop at each fitting and change in pipe type and complete a 360 degree view of the fitting slow enough to identify all defects. Glare shall be avoided and shall not interfere with viewing the pipe segment. Maximum rate of travel for the camera shall be 30 feet per minute. DVDs or CDs shall be continuous from pipe segments between manholes. Provide DVDs or CDs with labels indicating project number, segment number, date televised, date submitted, starting manhole number, ending manhole number, pipe diameter, pipe length and street name.

The T.V. inspection shall be used to identify defective construction such as sags, debris, separated joints, etc. The City Engineer shall make all final determinations if the severity of the defect constitutes failure and subsequent removal of the segment in question.

E. RETESTS

Manholes or sewers which fail to meet the testing requirements shall be repaired and retested by the Contractor. All repairs and retesting shall be performed at the expense of the Contractor.

**PART 3 – EXECUTION**

**3.1 GENERAL**

- A. The Contractor shall notify the City Engineer or his representative when the manholes and line are ready to be tested. After the City Engineer or his representative concurs that the line is ready to be tested, the Contractor may proceed with testing. The Contractor will supply and set-up the test plugs and risers for the test and will perform the test in the presence of the City Engineer or his representative.
- B. Contractor shall take such precautions as required to prevent damage to lines and appurtenances being tested. Damage resulting from tests shall be repaired at Contractor's expense.

**END OF SECTION**

SECTION 33 31 13  
**SANITARY SEWAGE SYSTEM**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This is a general specification, which applies to the furnishing of all plant, labor, equipment, appliances and materials and in performing all operations in connection with the construction of sanitary sewers, together with the manholes, cleanout structures and other incidentals, in accordance with the plans and these specifications.

**1.2 RELATED WORK**

SECTION 31 78 00 - PIPE BORING, JACKING, & TUNNELING  
SECTION 31 23 33 - EXCAVATING, TRENCHING, & BACKFILL  
SECTION 33 05 01 - PVC PIPE & FITTING  
SECTION 33 05 02 - DUCTILE IRON PIPE  
SECTION 33 39 13 - MANHOLES  
SECTION 33 39 14 - SEWER SERVICES

**1.3 MEASUREMENT AND PAYMENT**

- A. Payments will be made at the price bid per foot for furnishing and installing pipe, which bid price will include all costs for the complete pipe installation, including line fittings, trenching, and backfill, embedment, compaction or tamping, sterilization, testing, final cleanup, and all other work not otherwise provided for in bid proposal. Pipe will be measured (by horizontal distance) from center of fitting to center of fitting, or end of pipe without deduction for the length of intermediate fittings.

**1.4 SUBMITTALS**

- A. All submittal requirements are listed with the material specifications

**PART 2 – PRODUCTS**

**2.1 TESTING REQUIREMENTS**

See: SECTION 33 01 30 - TESTING OF GRAVITY SEWER SYSTEMS

**PART 3 – EXECUTION**

**3.1 GENERAL**

Construction methods for each material are specified in the material specifications.

A. MINIMUM DEPTH

The desired depth for sanitary sewer pipe shall be six feet (6') as measured from the outside top of pipe vertically to finished ground or pavement surface elevation. The minimum depth shall be two feet (2'). Where the cover is 3.5' or less, ductile iron pipe should be used and cement stabilized sand backfill required where erosion may occur.

**END OF SECTION**

## SECTION 33 39 13

**MANHOLES**

*(Sentences and/or paragraphs that are double underlined indicate revisions that were made from the 2009 specification. Additional revision is indicated by a dashed underline.)*

**PART 1 - GENERAL****1.1 DESCRIPTION**

- A. This item shall govern the manufacture, construction, and installation of sanitary sewer manholes. All manholes shall conform to TCEQ requirements. Submittal and approval shall be required for all pre-cast design.

**1.2 MEASUREMENT AND PAYMENT**

- A. The depth of manholes completed shall be determined by measuring the vertical distance from the flow line of the sewer main to the top of the manhole ring and cover.
- B. Standard manholes shall be measured by the each for various size diameters and depths.
- C. The contract unit prices shall be the total compensation for furnishing all labor, materials, tools, equipment, and incidentals and performing all work, of whatever nature required, that is necessary for the completion of the manholes in accordance with the provisions of the plans and these specifications. Material or methods used to stabilize the foundation shall be subsidiary to the bid item for Manholes.
- D. Cleanouts for services shall be considered subsidiary to the price for each service connection.
- E. Drop connections will be measured for payment per each, complete in place regardless of depth.

**1.3 SUBMITTALS**

- A. Submit manufacturer's data on materials furnished indicating compliance with the specifications regarding dimensions, thickness, weights, and materials.
- B. Submit manufacturer's "Certificate of Compliance" stating that the materials furnished comply with this specification.

**PART 2 – PRODUCTS****2.2 MATERIALS****A. CONCRETE**

Refer to SECTION 03 30 00 - CONCRETE

**B. MANHOLE RINGS AND COVERS**

The standard rings and covers (V-1432-3) and the water-tight ring and cover (V-2432-3) shall be manufactured by East Jordan Iron Works (or pre-approved equal.) The manhole shall bear the appropriate model number, the logo of City and the words "Sanitary Sewer". The cover shall have pick lugs cast into the surface. All manhole ring and covers shall have a 32" diameter.

**C. GRADE RINGS**

Grade rings shall be precast reinforced concrete. Minimum thickness shall be 2 inches by 8 inches wide by 30 inches inside diameter.

**D. PRECAST REINFORCED MANHOLE SECTIONS**

Precast manhole sections conform to the current ASTM C478 standard. Joints shall be O-ring gasketed. Thickness for manhole risers shall be as listed under wall “B” in the “Class Tables” of ASTM C76, Reinforced Concrete Pipe.

**E. PRE-CAST MANHOLE BASES**

Pre-cast manhole bases will conform to all TCEQ requirements and City Specifications for invert depths, reinforcement, base thickness and manhole depth for pipe size.

**F. DROPS**

Drops shall be constructed of either ductile iron as specified in SECTION 33 05 02 – DUCTILE IRON PIPE or PVC pipe as specified in Section 33 05 01 - POLYVINYLCHLORIDE PIPE AND FITTINGS. City of Bryan requires drops to be placed on the inside of a manhole, using a cross to allow access to the vertical pipe, for all pipes up to and including 12” in size. Outside drops will not be allowed unless pre-approved by City of Bryan. City of College Station requires drops to be placed on the outside of a manhole, using a size on size wye, for all pipes 6” in size and larger. For pipes smaller than 6”, within the City of College Station, drops shall be placed inside of manhole using a cross.

**2.2 TESTING REQUIREMENTS**

See SECTION 33 01 30 - TESTING OF GRAVITY SEWER SYSTEMS.

**PART 3 – EXECUTION****3.1 INSTALLATION****A. MANHOLE BASES**

1. Construct manhole bases in the configuration shown on the Plans. Minimum thickness below the flowline of sewer shall be 8 inches or as shown on the details.
2. Insure that bases are constructed or installed on firm ground and that ground water is controlled. Install appropriate material for a minimum of 4” to stabilize bottom if directed to do so by the Engineer.
3. The invert of manholes shall be formed in such a fashion that they are smooth and will not obstruct flow of sewage. Provide flow channels in the manhole base equivalent to the top of the pipe by forming the concrete base and trowelling it to a smooth, even finish with a steel trowel. Slope the manhole bench from the wall line to edge of flow channel and trowel it smooth on a grade of 1 inch per foot with a liberal radius applied at flow channel intercepts.

**B. PRECAST MANHOLES**

1. Precast Manhole bases shall be placed on a 6” minimum depth layer of cushion sand, gravel or pre-approved material.

2. Cast bottom section of precast manhole riser ring in manhole base as shown on the Plans. Place “Synko-Flex” waterstop (or pre-approved equal) per manufacturer’s recommendations prior to setting precast starter ring.

The base shall have a minimum diameter 12 inches greater than the outside diameter of the manhole, and a minimum thickness including the area under the pipe as follows:

0’ to 12’ deep manhole ..... 8” base thickness  
 Greater than 12’ depth ..... 12” base thickness

3. All invert channels shall be smooth and accurately shaped to a semi-circular bottom conforming to the outside of the adjacent sewer section. Inverts shall be formed directly in the concrete of the manhole base or may be constructed by laying full section sewer pipe straight through the manhole and cutting out the top half after the base is constructed. Changes in the direction of the sewer and entering branches shall have a true curve of as large a radius as the size of the manhole will permit. Where the largest pipe at a manhole is less than 12”, the channel depth shall be one half of the largest pipe diameter. When the largest pipe at the manhole is between 12 and 24 inches (inclusive,) the channel depth shall be three fourths of the largest pipe diameter. When the largest pipe at a manhole is greater than 24”, the channel depth shall match the largest pipe. In all cases, the edges of the pipe along the invert and at the walls of the manhole shall be plastered and brush-finished. Plaster shall be non-shrink or hydraulic grout.
4. Where inlet leads, main or lateral pipe sewers enter manholes, pipes shall be cut off flush with inside of manhole any irregularities shall be grouted up with non-shrink grout. Install stub outs, where shown, to line and grade. Use one full joint of pipe, of size indicated, for stub out. Seal stub out with plug. Install plug in such a manner as to prevent seepage of leakage through stub outs. Installation of plug shall be such that it may easily be removed in future without damaging bell or groove end of stub out.
5. If manholes are constructed in streets where immediate subsequent paving or re-paving is involved, readjust the manhole ring and covers, immediately prior to the paving operations. Manholes shall be installed with joints of size and numbers required to obtain correct depth. Contractor is responsible for verifying correct manhole depth before construction. Initially, manhole tops shall be not less than 6-inches nor greater than 18-inches from final grade. If manholes are relocated in the field because of unforeseen conflicts, the Contractor is responsible for correct depth of manhole. Manhole tops shall be set as follows:
  - a.) Developed Areas: Set manhole tops 1-inch higher than existing elevation of natural ground or other final grade when specified by the Engineer.
  - b.) Undeveloped Areas: Set manhole tops flush with paved surfaces and 6-inches higher than shoulder and/or proposed final grade elevations in easements or other unpaved areas. Where manholes are located in bottom of ditches, either set manhole top by EJIW V-2342, or pre-approved equal, flush with ditch bottom and seal with solid cover, or set twelve inches above ditch top and reshape ditch around manhole.
6. Prior to placing each section of manhole riser or cone, thoroughly clean the bells and spigots to be joined.
7. Backfilling will be performed evenly and carefully around the manhole after the full strength of the concrete is attained.

8. Carefully place the O-ring gasket and check for proper alignment.
9. Plug lift holes, interior joints, and exterior joints with “Water Plug” grout.
10. Each manhole shall be individually vacuum tested according to the SECTION 33 39 13 - MANHOLES. Stub-outs, boots, and pipe plugs shall be secured to prevent movement while the vacuum is being drawn.

C. CAST-IN PLACE MANHOLES

Cast-In place manholes are not allowed without prior approval from the City Engineer. This approval shall only be in emergency situations.

D. FIBERGLASS MANHOLES

Fiberglass manholes are permitted with written approval from the City Engineer.

E. INSTALLATION OF MANHOLE AROUND EXISTING SEWER PIPE (City of College Station Only)

Should a manhole need to be installed around an existing sewer, the existing sewer pipe must first be exposed and an invert constructed under the pipe. The excavation must be kept free of water while the manhole is being constructed. Inverts may be formed by pouring the concrete invert (3,000 psi) and cutting out the top half of the pipe. A precast manhole section, with U-shaped cutouts for the pipe, can then be installed over the existing pipe. The voids of the cutout must then be filled with hydraulic cement. The top sections of the manhole shall be constructed per the standard manhole specification. Cast-in-place manholes will also be permitted for installation around existing sewers. The sanitary sewer pipe shall not protrude into the trough of the manhole (all pipe shall be flush with the manhole).

E. SERVICE CONNECTIONS

Service connections at manholes will meet all other requirements of this specification and shall be tied into the manhole with a manhole boot. At the time of construction, the Engineer will designate the locations of the service outlets and the depth to the top of the lateral pipe, if depth is not indicated on the plans. The minimum depth of cover over the end of the lateral pipe shall be no deeper than what is required to serve the intended lot.

F. CLEANOUT STRUCTURES

The Contractor shall construct cleanouts where shown on the plans and as specified. All backfill around and above the pipe shall be machine tamped in layers not exceeding 3-inches in depth so that no settlement shall occur after the cleanout is constructed. Cleanouts shall be provided at each service connection and located at the edge of an easement or at the right-of-way. The cleanouts shall be enclosed within a round plastic box which has a lid that makes the cleanout accessible, set flush with the ground. Cleanout shall include a brass plug (City of Bryan only).

G. DROP MANHOLES

Drop manholes shall be constructed for elevation differences of 24 inches or greater as measured from the flow line of the pipe to the flow line entrance of the manhole and constructed in a manner that will allow the water from the drop to drop in the flow line of the intersecting sewer.

**END OF SECTION**

SECTION 33 39 14  
**SEWER SERVICES**

*(Sentences and/or paragraphs that are double underlined indicate revisions that were made from the 2009 specification.)*

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This section describes the manufacture, construction, and installation of sewer services for ordinary sewer service.

**1.2 MEASUREMENT AND PAYMENT**

- A. Services shall be categorized as “long” if over 15-feet in length or “short” if 15-feet or shorter and measured as “EACH” or as provided in the Bid Proposal Form.
- B. Payment will be made at the unit price bid per each for furnishing and installing services. This unit bid price will include all costs for the complete service installation, including all appurtenances, bedding, marking, cleanouts, and testing.

**1.3 SUBMITTALS**

- A. Submit manufacturer’s data on materials furnished, indicating compliance with the specifications regarding dimensions, thickness, weights, and materials.
- B. Submit manufacturer’s “Certificate of Compliance”, stating that the materials furnished comply with this specification.

**PART 2 – PRODUCTS**

**2.1 MATERIALS**

All materials shall be as shown on the details.

**PART 3 – EXECUTION**

**3.1 GENERAL**

A. **INSTALLATION**

Information supplied by the manufacturers on any and all appurtenances should be reviewed in detail before installation of the service. At the job site, prior to installation, the material should be visually inspected and any foreign material in the interior portion of the service should be removed. A detailed inspection of the service should be performed prior to installation.

- B. The services should be bedded in a fashion similar to bedding main lines as shown on the details. Cleanouts shall be provided at each service connection and located at the edge of an easement or at the right-of-way. The cleanouts shall be enclosed within a round plastic box which has a lid that makes the cleanout accessible, set flush with the ground. Cleanout shall include a brass plug (City of Bryan only).

**END OF SECTION**



SECTION 33 39 14.01

**CONNECTION OF NEW LINES TO EXISTING MANHOLES**

**PART 1 - GENERAL**

**1.1 DESCRIPTION**

- A. This item shall govern for the connecting of new sewer lines to existing manholes, where so indicated on the Plans or as directed by the Engineer.

**1.2 MEASUREMENT AND PAYMENT**

- A. Connecting new sewer lines to existing manholes will be paid for at the unit price bid in the Proposal for each connection made. The price will be full remuneration for making the connection complete, including cutting the hole in the manhole, shaping the bottom of the manhole of necessary, grouting the pipe and including the furnishing of all equipment, labor, materials, power, tools, and incidentals necessary to complete the work, except the pipe.

**PART 2 – PRODUCTS**

N/A

**PART 3 – EXECUTION**

**3.1 GENERAL**

- A. Where new sewer lines are to be connected to existing manholes, holes of the proper size and at the proper location shall be cored into the existing manholes. Where it is necessary to provide a smooth flow through the manhole, the bottom of the manhole shall be shaped to conform to the bottom of the pipe as directed by the Engineer.
- B. Other methods in lieu of coring may be used and should be discussed with the City Engineer prior to performing. The City Inspector should be notified at the beginning of either of these processes.
- C. If the manhole can not satisfactorily be cored due to its condition, a hole shall be cut into the existing manhole. The sewer pipe shall be inserted into the hole cut in the manhole so that the end of the pipe will be flush with the inside of the manhole and the pipe shall be made smooth and water-tight with a Type "A" mortar.

**END OF SECTION**