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NOTICE OF ADOPTION OF SEWER SPECIFICATIONS

The Bryan County Engineering Director hereby provides notice of the adoption of the "Standard Details – Sanitary Gravity Sewer Line Testing and Acceptance" ("Specifications") dated September 20, 2024. The Specifications were posted for public review and comment on September 20, 2024, in accordance with UDO §114-430. Bryan County did not receive any comments during this time period, and the requisite time period has elapsed for formal adoption.

Any person aggrieved by the adoption of these Specifications may appeal such adoption pursuant to UDO §114-355. Such appeal must be filed within 30 days of this notice.

Kirk Croasmun, Engineering Director

10-22-24
Date

SEPTEMBER 20, 2024

STANDARD DETAILS

Bryan County Engineering Department

- **Sanitary Gravity Sewer Line Testing and Acceptance**
  - **General**
  - **Execution**
- **Appendix A: Forms**

SANITARY GRAVITY SEWER LINE TESTING AND ACCEPTANCE

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Low Pressure Air Test

B. Deflection Test

1.2 RELATED SECTIONS

A. Section 33 30 00 – Wastewater Collection System

B. Appendix "A" – Inspection Forms

1.3 REFERENCES (Latest Revisions)

A. National Association of Sewer Service Companies (NASSCO) – Pipe Condition Assessment Using CCTV

B. National Association of Sewer Service Companies (NASSCO) – Guidelines for Quality Control (QC) of NASSCO's PACP, LACP, and MACP Surveys

C. ASTM A 139 – Electric–Fusion (Arc) Welded Steel Pipe (NPS 4 and Over).

D. ASTM A 377 – Index of Specifications for Ductile Iron Pressure Pipe.

E. ASTM A 615/A 615 M – Deformed and Plain Carbon – Steel Bars for Concrete Reinforcement.

F. ASTM A 746 – Ductile Iron Gravity Sewer Pipe.

G. ASTM C 39/C 39M – Compressive Strength of Cylindrical Concrete Specimens.

H. ASTM C 443 – Joints for Concrete Pipe and Manholes, Using Rubber Gaskets.

I. ASTM C 478 – Circular Precast Reinforced Concrete Manhole Sections.

J. ASTM C 890 – Minimum Structural Design Loading for Monolithic or Sectional Precast Concrete Water and Wastewater Structures.

K. ASTM C 891 – Installation of Underground Precast Concrete Utility Structures.

L. ASTM C 913 – Precast Concrete Water and Wastewater Structures.

M. ASTM D 714 – Evaluating Degree of Blistering of Paints.

N. ASTM D–1557 – Laboratory Compaction Characteristics of Soil Using Modified Effort.

O. ASTM D 2241 – Poly (Vinyl Chloride) (PVC) Pressure–Rated Pipe (SDR Series).

P. ASTM D 2321 – Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity–Flow Applications.

Q. ASTM D 2774 – Underground Installation of Thermoplastic Pressure Piping.

R. ASTM D 2794 – Resistance of Organic Coatings to the Effects of Rapid Deformation (Impact).

S. ASTM D 3034 – Type PSM Poly (Vinyl Chloride) (PVC) Sewer Pipe and Fittings.

T. ASTM D 3139 – Joints for Plastic Pressure Pipes Using Flexible Elastomeric Seals.

U. ASTM D 3212 – Joints for Drain and Sewer Plastic Pipes Using Flexible Elastomeric Seals.

V. ASTM D 3740 – Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.

W. ASTM D–6938 – In–Place Density and Water Content of Soil and Soil–Aggregate by Nuclear Methods (Shallow Depth).

X. ASTM E 96 – Water Vapor Transmission of Materials.

Y. ASTM E 329 – Agencies Engaged in Construction Inspection, Testing, or Special Inspection.

Z. ASTM F 477 – Elastomeric Seals (Gaskets) for Joining Plastic Pipe.

AA. ASTM F 1417 – Installation Acceptance of Plastic Non–Pressure Sewer Lines Using Low–Pressure Air.

BB. ASTM G 154 – Operating Fluorescent Ultraviolet (UV) Lamp Apparatus for UV Exposure of Nonmetallic Materials.

CC. AWWA C 110 – Ductile–Iron and Gray–Iron Fittings

DD. AWWA C 111 – Rubber–Gasket Joints for Ductile Iron Pressure Pipe and Fittings.

EE. AWWA C115 – Flanged Ductile Iron Pipe with Ductile Iron or Gray Iron Threaded Flanges.

FF. AWWA C 150 – Thickness Design of Ductile Iron Pipe.

GG. AWWA C 151 – Ductile Iron Pipe, Centrifugally Cast, for Water.

HH. AWWA C 153 – Ductile–Iron Compact Fittings

II. AWWA C–500 – Metal–Seated Gate Valves for Water Supply Service.

JJ. AWWA C–509 – Resilient–Seated Gate Valves for Water Supply Service.

KK. AWWA C 600 – Installation of Ductile Iron Water Mains and their appurtenances.

LL. AWWA C900 – Polyvinyl Chloride (PVC) Pressure Pipe and Fabricated Fittings, 4 Inches through 60 inches, for Water Transmission and Distribution.

MM. ACI 318 – Building Code Requirements for Structural Concrete.

PART 2 EXECUTION

2.1 GENERAL

A. Compaction testing will be performed in accordance with ASTM D1557.

B. Moisture content testing will be performed in accordance with ASTM D1557.

C. If tests indicate work does not meet specified requirements, remove work, replace and retest at no cost to the Owner.

D. Outward (exfiltration) or inward (infiltration) leakage of gravity sewers shall not exceed two hundred (200) gallons per inch of pipe diameter per mile per day.

E. Locate and repair defective joints, pipes or manholes, and retest until the allowable test rates are within the allowances specified below.

F. Testing sequences shall be as follows:

1. Deflection test

2. Low–pressure air test

3. CCTV inspection

2.2 DEFLECTION TEST

A. Perform deflection test on all flexible pipe. For PVC gravity mains 10" or larger for depths between 15'–25' deep use Multi Fittings – Blue Brute Heavy Wall Tee for service connections to gravity main. For depths greater than 25', P401 lined (or approved equal) DIP tees shall be used for service connections. Where DIP tees are used, mandrel pull is not required. All other cases where PVC is used, mandrel pull is required.

B. Deflection shall not exceed 5%.

C. Perform initial deflection testing after the final backfill and compaction has been in place at least thirty (30) calendar days and prior to placing the sewer lines into operation. Perform final deflection testing during the 12th month of operation and prior to expiration of the Contractor's warranty and performance bond.

D. Perform deflection test using a rigid ball or mandrel having a diameter equal to 95% of the inside diameter of the pipe. Perform test without use of mechanical pulling devices.

5% Mandrel (In.)			
Nominal OD	C900, DR–18	C905, DR–18	D3034, SDR–26
6"	5.64		5.33
8"	7.37		7.11
10"	9.01		8.87
12"	10.70		10.55
14"		12.40	
16"		14.09	
18"		15.78	
20"		17.47	
24"		20.84	

2.3 LOW PRESSURE AIR TEST

A. Perform low pressure air test in accordance with ASTM F1417 and UNI B– 6–90.

B. Equipment

1. Low pressure air testing is to be conducted by the Contractor using an air source and other specified equipment provided by the same, which is properly calibrated and oil free. The air source shall utilize a single control panel consisting of a main shut–off valve, pressure–regulating valve, 9 psig pressure relief valve, input pressure gage, and continuous monitoring

pressure gage having a range of pressure from 0 to at least 10 psi with minimum divisions of .1 psi. The pressure gage used for continuous monitoring should be at least 4" in diameter and have an accuracy of + .04 psi.

2. Separate air hoses shall be provided for: the introduction of the low–pressure air from the control panel to the sealed line, the constant monitoring of air pressure build–up in the line, and the inflation of pneumatic plugs from the control panel.

3. Either mechanical or pneumatic plugs may be used to isolate sections of sewer main to be tested so long as they have the capability to resist the pressures inside the sewer line associated with this test. As well as isolating the sewer main itself by plugging manhole inverts, all service laterals, stub outs, and other fittings of this type should be properly sealed so as not to cause a failure of this test.

C. Procedure

Note: Conduct deflection test prior to low–pressure air test.

Lines must be cleaned by flushing or by other means before the low– pressure air test is to begin.

1. Isolate the sewer line to be tested with the plugs referenced above and ensure that all other outlets from which air could escape are properly sealed. In this step of the procedure, it is necessary to inspect the manhole invert being plugged to be sure that it has no damage which will be covered by the plug and not detected with the low–pressure air test.

2. Determine the duration of the test by using the formula found below or by consulting the accompanying tables at the end of this section.

$$T = 0.085\ DK/Q$$

Where: T = Shortest time in seconds allowed for the air pressure to drop 1.0 psig (or .5 psig in circumstances where a shorter test duration is desired)

K = .000419 DL, but not less than 1.0

Q = .0015 cubic feet/minute/square foot internal pipe surface area D = Nominal pipe diameter in inches L = Length of pipe being tested in feet

D = Nominal pipe diameter in inches

L = Length of pipe being tested in feet

3. Begin the test by connecting the air source to the inlet tap. Slowly add air until the internal pressure of the test section reaches a pressure 4.0 psig greater than the average back pressure of any groundwater above the pipe as long as the internal pressure does not exceed 9.0 psig. If ground water back pressure exists, it must be quantified by the Engineer prior to testing.

4. After the constant pressure of 4.0 psig (greater than the average ground

water back pressure) is attained, the air supply should be controlled to keep the pressure at 4.0 psig (greater than the average ground water back pressure) for at least two minutes allowing the entering air's temperature to reach equilibrium with the temperature of the pipe wall.

5. Once the pressure has stabilized to 4.0 psig (greater than the average ground water back pressure) disconnect the air supply from the control panel. Observe the continuous monitoring gage and decrease the internal pressure to no less than 3.5 psig (greater than the average ground water back pressure). At a reading of 3.5 psig or within the range of 3.5 to 4.0 psig, stop decreasing the pressure and commence timing with a stopwatch or any other timing device capable of being 99.8 percent accurate.

6. Once the predetermined time period from the formula or table above has elapsed, observe the continuous monitoring gage to obtain the amount of pressure lost during the test duration. If the pressure drop is found to be less than 1.0 psig (or 0.5 psig in circumstances where a shorter test duration is desired), the section is presumed to be free of any leaks or defective joints. If the pressure drop is 1.0 psig or greater (0.5 psig or greater in circumstances where a shorter test duration is desired), the test section has failed due to excessive pressure loss. When low– pressure air testing of a sewer line results in a failure the Contractor, at his/her own expense, shall detect the leak or defect and repair or replace whatever is necessary to remedy such defect in a manner acceptable to the Owner.

TABLE 1: MINIMUM SPECIFIED TIME REQUIRED FOR A 1.0 PSIG PRESSURE DROP FOR SIZE AND LENGTH OF PIPE INDICATED FOR Q = 0.0015

Pipe Diameter (in.)	Minimum Time (min:sec)	Length for Minimum Time (ft.)	Time for Longer Length (sec)	Specification Time (min:sec) for Length L Shown Below in feet							
				100	150	200	250	300	350	400	450
4	3:46	597	0.380 L	3:46	3:46	3:46	3:46	3:46	3:46	3:46	3:46
6	5:40	398	0.854 L	5:40	5:40	5:40	5:40	5:40	5:40	5:42	6:24
8	7:34	298	1.520 L	7:34	7:34	7:34	7:34	7:36	8:52	10:08	11:24
10	9:26	239	2.374 L	9:26	9:26	9:26	9:53	11:52	13:51	15:49	17:48
12	11:20	199	3.418 L	11:20	11:20	11:24	14:15	17:05	19:56	22:47	25:38
15	14:10	159	5.342 L	14:10	14:10	17:48	22:15	26:42	31:09	35:36	40:04
18	17:00	133	7.692 L	17:00	19:13	25:38	32:03	38:27	44:52	51:16	57:41
21	19:50	114	10.470 L	19:50	26:10	34:54	43:37	52:21	61:00	69:48	78:31
24	22:40	99	13.674 L	22:47	34:11	45:34	56:58	68:22	79:46	91:10	102:33
27	25:30	88	17.306 L	28:51	43:16	57:41	72:07	86:32	100:57	115:22	129:48
30	28:20	80	21.366 L	35:37	53:25	71:13	89:02	106:50	124:38	142:26	160:15
33	31:10	72	25.852 L	43:05	64:38	86:10	107:43	129:16	150:43	172:21	193:53
36	34:00	66	30.768 L	51:17	76:55	102:34	128:12	153:50	179:29	205:07	230:46

(Table taken from UNI–B–6–90)

TABLE 2: MINIMUM SPECIFIED TIME REQUIRED FOR A 0.5 PSIG PRESSURE DROP FOR SIZE AND LENGTH OF PIPE INDICATED FOR Q = 0.0015

Pipe Diameter (in.)	Minimum Time (min:sec)	Length for Minimum Time (ft.)	Time for Longer Length (sec)	Specification Time (min:sec) for Length L Shown Below in feet							
				100	150	200	250	300	350	400	450
4	1:53	597	0.190 L	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53
6	2:50	398	0.427 L	2:50	2:50	2:50	2:50	2:50	2:50	2:51	3:12
8	3:47	298	0.760 L	3:47	3:47	3:47	3:47	3:48	4:26	5:04	5:42
10	4:43	239	1.187 L	4:43	4:43	4:43	4:57	5:56	6:55	7:54	8:54
12	5:40	199	1.709 L	5:40	5:40	5:42	7:08	8:33	9:58	11:24	12:50
15	7:05	159	2.671 L	7:05	7:05	8:54	11:08	13:21	15:35	17:48	20:02
18	8:30	133	3.846 L	8:30	9:37	12:49	16:01	19:14	22:26	25:38	28:51
21	9:55	114	5.235 L	9:55	13:05	17:27	21:49	26:11	30:32	34:54	39:16
24	11:20	99	6.837 L	11:23	17:57	22:48	28:30	34:11	39:53	45:35	51:17
27	12:45	88	8.653 L	14:25	21:38	28:51	36:04	43:16	50:30	57:42	46:54
30	14:10	80	10.683 L	17:48	26:43	35:37	44:31	53:25	62:19	71:13	80:07
33	15:35	72	12.926 L	21:33	32:19	43:46	53:52	64:38	75:24	86:10	96:57
36	17:00	66	15.384 L	25:39	38:28	51:17	64:06	76:55	89:44	120:34	115:23

(Table taken from UNI–B–6–90)

2.4 MANHOLE NEGATIVE AIR PRESSURE (VACUUM) TEST

A. Vacuum Test shall be in accordance with ASTM C1244.

1. All lift holes and any pipes entering the manhole are to be plugged. A vacuum will be drawn and the vacuum drop over a specified time period is used to determine the acceptability of the manhole.

2. The values recorded are applicable only to the manhole being tested and at the time of testing.

B. Preparation of the Manhole.

1. All lift holes shall be plugged.

2. All pipes entering the manhole shall be temporarily plugged, taking care to securely brace the pipes and plugs to prevent them from being drawn into the manhole.

C. Procedure.

1. The test head shall be placed at the top of the manhole in accordance with the manufacturer's recommendations.

2. A vacuum of 10 inches of mercury shall be drawn on the manhole, the valve on the vacuum line of the test head closed, and the vacuum pump shut off. The time shall be measured for the vacuum to drop to 9 inches of mercury.

3. The manhole shall pass if the time for the vacuum reading to drop from 10 inches of mercury to 9 inches of mercury meets or exceeds the values indicated in Table 2.

TABLE 3.

MINIMUM TEST TIMES FOR VARIOUS DIAMETER MANHOLES

	Diameter (in.)		
Depth (ft.)	48	60	72
	Time (sec.)		
8	20	26	33
10	25	33	41
12	30	39	49
14	35	46	57
16	40	52	67
18	45	59	73
20	50	65	81
22	55	72	89
24	59	78	97

4. If the manhole fails the initial test, necessary repairs shall be made by an approved method. The manhole shall then be retested until a satisfactory test is obtained.

5. For manholes less than 8 feet in depth the minimum value listed shall be used. For other manhole diameters or greater depths, refer to ASTM C1244.

D. Test for leakage of gravity sewers using either the infiltration or exfiltration test. Allowable leakage shall be 100 gallons per inch of pipe diameter per mile per 24 hours up to a maximum of 2400 gallons per mile per 24 hours.

1. Use infiltration test when ground water is at least 4 feet above pipe crown along entire length of line to be tested. Plug the pipe at the upper manhole. Install suitable measuring device at the next lowest manhole. Measure the amount of water flowing through the outlet after flow has been stabilized.

2. Ground water determination: Use same procedure as "low pressure air test" above.

3. Use exfiltration test when ground water is less than 4 feet above the pipe crown. Plug the pipe at the lower manhole. Fill the line and manhole to 4 feet above pipe crown or top of manhole whichever is less. Let the water stand until pipe as reached maximum absorption and until all trapped air has escaped, 4 hours minimum. After maximum absorption is reached, refill manhole to original level. After 30 minutes, record difference in level and convert to gallons. Subtract manhole loss to obtain pipeline loss. Manhole loss is found by plugging inlet and outlet and filling manhole with water to 4 feet above pipe crown or top of manhole whichever is less. Let water stand one hour to reach maximum absorption. Refill to original level. After 30 minutes, check difference in level and convert to gallons. Manhole leakage shall not exceed 1/2 gallon per hour.

2.5 CCTV INSPECTION

A. CCTV Inspection Equipment

1. Closed Circuit Television Camera:

The television camera used for the inspection shall be color and one that is specifically designed and constructed for sanitary sewer inspection. Lighting for the camera shall be suitable to allow a clear picture of the entire periphery of the pipe. The camera shall be operative in 100 percent humidity/submerged conditions. The CCTV camera equipment will provide a view of the pipe ahead of the equipment and of features to the side of the equipment through turning and rotation of the lens. The camera shall be capable of tilting at right angles along the axis of the pipe while panning the camera lens through a full circle about the circumference of the pipe.

2. Lateral Video Camera

Lateral cameras may be push–type or launched from the sewer main line. Lateral cameras shall be colored, shall be self–leveling, and equipped with a footage counter to provide on screen display of footage measurement.

3. Video Capture System

The video recordings of the sewer inspections shall be made using digital video equipment. The digital recording equipment shall capture sewer inspection on DVD disks or hard drive, with each sewer reach inspection recorded as an individual movie file (.MPEG, .MPG, or .WMV) or approved equal.

a. The video file names will be referenced in the inspection database and in an inspection report generated in PDF format. The pipeline collection and real–time video capture and data acquisition systems shall be provided.

b. The system shall use the most current NASSCO Pipeline Assessment Certification Program (PACP) compliant application software and shall be fully object oriented or approved equal. It shall be capable of printing pipeline inspection reports with captured images of defects or other related significant visual information on a standard color printer.

c. The imaging capture system shall store digitized color picture images and be saved in digital format on a DVD, hard drive or approved equal. Also, this system shall have the capability to supply the Owner with inspection data reports for each line segment.

d. The contractor shall have the ability to store the compressed video files in industry standard and approved the Owner format and be transferable with the PACP compliant inspection database.

e. The contractor's equipment shall have the ability to "Link". "Linking" is defined as storing the video time frame code with each observation or defect with the ability to navigate from/to any previously recorded observation or defect instantaneously.

f. The system shall be able to produce data reports to include, at a minimum, all observation points and pertinent data. All data reports shall match the defect severity codes in accordance with PACP naming conventions

g. The data–sorting program shall be capable of sorting all data stored using generic sort key and user defined sort fields.

h. Camera footage, date & manhole numbers shall be maintained in real time and shall be displayed on the video monitor as well as the video character generators illuminated footage display at the control console.

i. Depth gage: The camera shall have a depth gage or approved method to measure deflection in the pipe and joint separation approved by the Owner.

2.6 GRAVITY MAIN INSPECTION CCTV DATA

A. CCTV data shall be recorded and saved in MPEG format or Windows Media video format.

B. CCTV inspections shall use unique identification numbers established and provided by the Owner in pipe segment reference, upstream manhole number and the downstream manhole number fields.

C. The video files will be named in accordance with the Owner file naming convention:
Upstream MH ID_Downstream MH ID _ Inspection Date (year_month_day).wmv.
Example: 39540008_39540007_2009_08_05.wmv

D. Reports shall be submitted in an electronic version (.pdf) generated by the computer software and shall be consistent with PACP requirements, observation report with still images; and CCTV inspection results.

1. PACP export pipe inspection database (.mdb) saved on CD–R's, DVD, or portable hard drives

2. Inspection digital photographs in JPEG format saved on CD–Rs, DVD or portable hard drives

E. The video file names will be referenced in the inspection database and in an inspection report generated in PDF format. The pipeline collection and real time video capture and data acquisition systems shall be provided

F. The system shall use the most current PACP compliant application software and shall be fully object oriented or approved equal. It shall be capable of printing pipeline inspection reports with captured images of defects or other related significant visual information on a standard color printer.

G. The imaging capture system shall store digitized color picture images and be saved in digital format on a DVD, hard drive or approved equal. Also, this system shall have the capability to supply the Owner with inspection data reports for each line segment.

H. The CONTRACTOR shall have the ability to store the compressed video files in industry standard and approved by Owner format and be transferable with the PACP compliant inspection database.

I. The CONTRACTOR'S equipment shall have the ability to "Link". "Linking" is defined as storing the video time frame code with each observation or defect with the ability to navigate from/to any previously recorded observation or defect instantaneously.

J. The system shall be able to produce data reports to include, at a minimum, all observation points and pertinent data. All data reports shall match the defect severity codes in accordance with PACP naming conventions

K. The data–sorting program shall be capable of sorting all data stored using generic

sort key and user defined sort fields.

L. Camera footage, date and manhole numbers shall be maintained in real time and shall be displayed on the video monitor as well as the video character generators illuminated footage display at the control console.

2.7 GRAVITY MAIN REQUIREMENTS BEFORE CCTV INSPECTION

A. All manhole flow channels and benching per specifications shall be constructed and coated (if applicable) prior to CCTV inspection.

B. CCTV inspections shall be received, reviewed, and approved by the Owner prior to installation of pavement.

C. The CONTRACTOR shall clean gravity mains to remove debris and stains from the pipe prior to televising. Flushing water or debris will not be allowed to enter pump station wet wells. Water will be pumped from the sewer system during flushing to an acceptable discharge location. A visual inspection shall be made, and all obstructions removed.

D. Gravity Mains/Pipes that are dirty (dirty walls and/or debris in the inverts) shall be re–flushed and cleaned before rescheduling a CCTV inspection. If necessary, swabbing may be required of specific sections of pipe.

E. The CONTRACTOR shall pass a mandrel through the PVC pipe to confirm if ring deflection is in excess of five percent (5%). The base inside diameter shall be used to determine mandrel size as per ASTM D 3034 and/or ARTICLE 28.

F. Dewatering systems shall not be operated within 48 hours prior to CCTV inspection.

G. Backfill from the gravity main to the subgrade shall be compacted and stabilized for inspection and cleaning vehicle access prior to CCTV.

2.8 NOTIFICATION

A. Contractor shall notify the Owner a minimum of 48 hours prior to performing any CCTV gravity main inspection work.

2.9 TELEVISING OF GRAVITY MAINS

A. Wherever possible, gravity mains shall be televised in the downstream direction.

B. Sufficient water shall be run through each section of main until water runs through each downstream manhole no more than 24 hours prior to televising. Lines that are dry or that enough water has not run through to reach the downstream manhole shall not be televised.

C. Gravity mains shall be televised from manhole to manhole utilizing a 360– degree pan and tilt color camera driven through at a moderate rate of speed not more than 30 feet per min. The camera shall be of the self–propelled tractor type with a measuring device mounted to the front capable of being read as the tractor

moves and capable of accurately measuring depth of standing water up to, and including, three inches.

D. Begin video recording at the top of the manhole to see the condition of the manhole and any pipe that is connected to the manhole. Record going down into the manhole all the way to the preset footage with continuous recording until the downstream manhole.

E. Lighting should be set to allow for clear visibility without excessive reflection and should allow realistic colors to be visible.

F. The iris of the camera should be adjusted to allow for a sharp focused image and the lens should be kept clean and free of obstructions.

G. The operator should follow the manufacturer's instructions to achieve the proper color correction.

H. All notes or coded references shall have footages recorded with them

I. The camera should be centered within the pipe.

J. The distance between manhole centers shall be accurate within 0.5 percent.

K. The camera shall be stopped at all laterals adjusted for a clear picture and an orbital scan of the lateral taken pausing at the invert at the service lateral to detect dirt or infiltration.

L. All laterals shall be televised when reaching the lateral if a launch type camera is utilized.

M. The camera shall also be stopped at any suspected or confirmed defects, the focus properly adjusted, and a clear digital video taken.

N. Areas suspected of leaking shall be paused long enough to determine if a leak exists currently or if deposits have occurred.

O. A digital photo shall be taken of all areas noted on the report including laterals and any confirmed or suspected defects.

P. Manholes upstream and downstream shall be measured from rim to invert and the depth recorded on the inspection header in feet and inches.

Q. Manhole material and defects shall be noted.

R. Manholes that have laterals tied into them shall have sufficient water run through them and then a CCTV inspection to the property line will be conducted.

2.10 CCTV QA/QC Inspection Procedures and Causes for Rejection of CCTV Work

A. The CONTRACTOR shall submit their Quality Assurance Plan and Quality Control procedures to the Owner. The CONTRACTOR shall ensure data quality and submit the results of the internal quality control checks performed on submitted data.

2.11 GRAVITY MAIN INSPECTION CCTV REPORT

A. The CONTRACTOR will be required to submit the following deliverables on a weekly basis.

1. Inspection Reports are to include:

a. Inspection session header information (see required fields in Section 2.02 above)
b. Defect log report including photo captures from CCTV video
c. Schematic drawing of pipe showing defects
d. Format: Adobe Acrobat PDF files – 1 report PDF per pipe with the following
e. File name format: <upstream MH ID>_<downstream MH ID>_<Date
f. (year_mo_day format)>.PDF
g. Example: 30060002_30060001_2010_02_16.pdf

B. The CONTRACTOR shall submit quality control forms that include a hard copy print out of the inspection reports checked with errors and omissions clearly marked

C. Inspection video files on DVD or portable hard drive, labeled as follows: DVD/Hard drive Labels – Typed labels shall be attached to the face of each DVD. The typed index labels shall include the following information:

1. Content (CCTV)
2. Contractor name
3. Purpose of Survey
4. Tributary Pump station number
5. Reaches included (from Manhole Number ## to Manhole Number ##)
6. Date of survey
7. Contract Number / Delivery Order Number (if applicable)

a. Electronic Inspection Data stored and exported in a NASSCO Pipeline
b. Assessment and Certification Program (PACP) compliant Microsoft Access
c. database (.MDB) version 4.4 delivered on DVD or portable hard drive.
d. Inspection photograph digital files (jpeg) indexed to NASSCO PACP
e. compliant database.

2.12 CAUSES FOR REJECTION OF GRAVITY MAINS

A. The CONTRACTOR shall be required to replace the pipeline if the CCTV inspection reveals cracked, broken or defective pipe, and/or in the case of PVC pipe if a ring deflection is in excess of five percent (5%).

B. Joint separation shall be no greater than one inch between the spigot and bell of

the pipe or as required by the pipe manufacture.

C. No evidence of leakage will be acceptable for private gravity mains connecting to the Owner's collection system.

D. Misalignment resulting in vertical sags in excess of ¾ " will require replacement of the gravity main.

E. The following NASSCO PACP codes or notes shall be cause for rejection of gravity sewer systems.

1. PACP coding of "Line" (L) shall be accompanied by a measurement of the line, grade, or angular deviation. Variance of established line and grade at any point along the length of the pipe shall not be greater than 1 inch, provided such variation does not result in a level or reverse sloping invert. An approved method shall be used to determine this deviation. A PACP coding of MWLS with a percentage of pipe greater than 12.5% on 8–inch sewer, 15% on 10–inch sewer etc. will be corrected by excavation and repair.

2. PACP coding of "Infiltration" (I) for pipe joints shall be replaced or the pipe joint shall be reseated at the joint. Grouting shall not be considered a method of repair and will not be accepted. Replace the leaking gravity main segment if there is visible infiltration at any point other than the pipe joint.

3. Any PACP coding in the category of "Structural Family".

4. PVC pipe having ID tears will be rejected.

5. PACP condition grading of "OB" (obstruction) in pipe shall be rejected, the obstruction shall be removed, and the line cleaned and re–televised.

2.13 ACCEPTANCE

A. Successful passage of both the leakage test and CCTV inspection is required before acceptance by the Owner.

B. Prior to repair or replacement of failed sewer pipe, the method of repair or replacement shall be submitted to the Owner for approval. Pressure grouting of pipe or manholes shall not be considered as an acceptable method of repair.

PART 3 FINAL ACCEPTANCE PRIOR TO SUBMISSION FOR PERMIT TO OPERATE (PTO)

A. No pipeline installation will be accepted until all known and visible leaks have been repaired

B. OWNER will conduct a final walkthrough inspection after all testing is complete normally in conjunction with walkthrough inspection of water infrastructure and only when site is ready. Should items not be ready for final inspection, OWNER does reserve the right to reschedule until all fully addressed. This is a final acceptance inspection, not a punch list generator. Minimum requirements for walkthrough inspection are below.

1. All roadside curbing in and cleaned with applicable markings applied so that field curb markings are visible
2. All weather reasonable access roads must be rocked and roadside curbing complete (if applicable) prior to testing and ready for pavement before final walkthrough
3. Final grading complete within utility locations
4. All areas where manholes fall within pavement shall be paved or grade stake set at final pavement height
5. All property corner frontage staked
6. All drainage easement frontage corners staked
7. All OWNER Utility Easement frontage staked where applicable
8. Record drawings brought to inspection by Engineer of Record
9. All sewer main lines cleaned and ready for inspection
10. All sewer services on property corner/property line as called out on plans within the OWNER easement and staked
11. All sewer service cleanout locations to have proper concrete collar and lid set to grade
12. All Manhole frame and covers set to final grade
13. All fiber glass markers in place (For manholes set in overgrown locations/underdeveloped locations)
14. All manholes requiring epoxy coating shall be complete
15. All manholes free from infiltration and all invert, channel, and inside drop work complete
16. All manholes must have watertight frame and cover
17. All curbs (if applicable) marked for service and MH locations
18. Manhole plug to be removed at final inspection barring issues that would prevent removal

C. Certify that all testing has been successfully completed and items noted on walkthrough inspections are fully corrected. Line will only be fully accepted after items above are complete and all closeout documentation submitted.

D. If newly installed line has successfully passed testing after construction but fails to receive approval from County to place into operation within one year, County will require the line be tested again prior to final acceptance.

END OF SECTION

APPENDIX "A"
INSPECTION FORMS

MANHOLE VACUUM TEST FORM

PROJECT NAME:_____ CONTRACTOR: _____

Location		Pressure		Test Time (min.)	Pass / Fail
Line ID	Manhole No. or Station	Start (inHg)	Drop (inHg)		

In paved areas, asphalt binder or aggregate base course must be in place prior to vacuum test.

I,_____(engineer or engineer's representative), certify the following:
(Printed Name)

1. I have witnessed all vacuum testing.
2. All testing was performed in accordance with Bryan County requirements.
3. The information on this form is true and accurate.

Witnessed by Contractor: _____
(Printed Name)

_____
(Signature)

Date: _____

LOW-PRESSURE AIR TEST FORM

PROJECT NAME:_____ CONTRACTOR: _____

Location			Pipe		Test	Test Pressure			Pass / Fail
Line ID	Starting Manhole	Ending Manhole	Dia. (in.)	Length (ft.)	Time (min.)	Groundwater Adj. (psig)	Start (psig)	Drop (psig)	

Minimum test pressure = 3.5 psig + groundwater adjustment (add 0.43 psig/foot groundwater head), max test pressure = 9.0 psig.

I,_____(engineer or engineer's representative), certify the following:
(Printed Name)

1. I have witnessed all low-pressure air testing.
2. All testing was performed in accordance with Bryan County requirements.
3. The information on this form is true and accurate.

Witnessed by Contractor: _____
(Printed Name)

_____
(Signature)

Date: _____

MANDREL TEST FORM

PROJECT NAME:_____ CONTRACTOR: _____

Location			Pipe		Pass/ Fail	Failure Station Number
Line ID	Starting Manhole	Ending Manhole	Dia. (in.)	Length (ft.)		

I,_____(engineer or engineer's representative), certify the following:
(Printed Name)

1. I have witnessed all Mandrel testing.
2. All testing was performed in accordance with Bryan County requirements.
3. The information on this form is true and accurate.

Witnessed by Contractor: _____
(Printed Name)

_____
(Signature)

Date: _____

CCTV INSPECTION REPORT

Sent To – Bryan County Engineering Department Attention: _____

_____ has completed a CCTV inspection for _____
(Contractor name) (project name)

To verify that the sanitary sewer system has been constructed to County specifications and standards. The results of the CCTV inspection are:

Deficiencies have been identified and shall be repaired prior to County acceptance of the sewer system.

Copies of the CCTV video and punch list are available to the Engineer and may be picked up at Bryan County Engineering Department. Copies of the punch list are included with this form.

The County shall notify the contractor of these deficiencies and then Contractor must demonstrate and verify that repairs have been made. Any sewer lines that are repaired shall be retested in accordance with Bryan County testing procedures. The Contractor shall notify County after repairs and testing are complete by filling out the information below, signing and returning this document to County.

By:_____(County) Date: _____

I_____(Contractor), certify to the best of my knowledge and belief that all repairs required to correct the deficiencies identified by the CCTV inspection have been completed and that the project is ready for a follow–up inspection. (attach test forms)

_____(signature) Date: _____

A follow–up CCTV inspection indicates that deficiencies remain, and that additional work is required. The Contractor shall follow the procedure as outlined above.

Follow–Up #1 By:_____(County) Date: _____

Follow–Up #2 By:_____(County) Date: _____

Follow–Up #3 By:_____(County) Date: _____

I_____(Contractor), certify to the best of my knowledge and belief, that all repairs required to correct the deficiencies identified by the follow–up CCTV inspection have been completed and that the project is ready for a follow–up inspection. (attach test forms)

Follow–Up #1 _____ (signature) Date: _____

Follow–Up #2 _____ (signature) Date: _____

Follow–Up #3 _____ (signature) Date: _____

The sanitary sewer system meets all Bryan County requirements and specifications. The County final approval letter shall be mailed to your office within fifteen (15) working days.

By:_____(County) Date: _____