

**Division 1 Section 01999**  
**MODIFICATIONS TO STANDARD SPECIFICATIONS**

**1.0 GENERAL**

The most current editions of the City of Austin *Standard Specifications*, the Texas Commission on Environmental Quality (TCEQ) design criteria for sewerage systems (Chapter 317) and for water systems (Chapter 290), and the Texas Department of Transportation *Standard Specifications for Construction of Highways, Streets, and Bridges* shall be a part of the Technical Specifications for this project as though included herein, except as noted and amended herein.

All references to the City of Austin in the *Standard Specifications* shall be disregarded, as the City of Austin is not a party to this contract. Where appropriate, "City of San Marcos", can be used in place of "City of Austin".

References in the *Standard Specifications* to specific sections of the General Conditions of the Contract shall be disregarded.

References in the *Standard Specifications* to City of Austin Standard Details shall be disregarded. Details on the Drawings take precedence, however, City of San Marcos Standard Details shall be referred to as available and applicable.

Although each section of the *Standard Specifications* includes a discussion of various methods of measurement and payment, measurement and payment will be accomplished in accordance with the bid form and the General and Supplementary Conditions of this Contract.

Any discrepancies between the construction plans and these specifications shall immediately be brought to the attention of the Engineer.

These specifications and contract documents shall be on site with the Contractor's representative at all times.

**1.1 Standards**

Reference to the standards of any technical society, organizations, or association, or to codes of local and state authorities, shall mean the latest standard, code, specification, or tentative specification adopted and published at the date of taking bids, unless specifically stated otherwise.

**1.2 Modified Specifications**

The following items in the City of Austin Standard Specifications are modified as follows for use in this contract:

**Note: Add/delete project-specific modifications as needed.**

ITEM NUMBER	SPECIFICATION SECTION	SPECIFICATION ITEM NUMBER(S)	MODIFICATION
506S	Manholes	506S.3.D, 506S.3.L	Adjustment Rings
510	Pipe	510.2(2)(a), 510.3(14)	Pipe Embedment
510	Pipe	510.3(22)	Mechanical Joint Restraint
510	Pipe	510.3(24)(c)	Tapping Sleeves
510	Pipe	510.3(26)	Quality Testing for Wastewater Pipe
510	Pipe	510.3(27)	Pressure Pipe Testing
510	Pipe	510.3(28)	Service Charges for Testing
510	Pipe	510.3(29)	Disinfection of Water Lines
510	Pipe	additional item	Abandoning Existing Utilities

1.2.1 Section 506S Manholes

A. 506S.3.D Brick

Brick adjustment rings are not permitted. All adjustment rings shall be HDPE grade rings secured in place with ½-inch butyl mastic seals.

B. 506S.3.L Precast Grade Rings

Precast grade rings are not permitted. All adjustment rings shall be HDPE grade rings secured in place with ½-inch butyl mastic seals.

1.2.2 Section 510 Pipe

A. 510.2(2)(a) Pipe Bedding Stone

Replace with the following.

Bedding shall be angular material (crushed stone or gravel) that is clean, washed material, hard and insoluble in water, free of mud, clay, silt, vegetation or other debris.

1. For pipe smaller than 12-inches in internal diameter, the embedment material shall meet ASTM C33 size No. 67.

Sieve Size	Percent Passing
1"	100%
¾"	90-100%
3/8"	20-55%
#4	0-10%
#8	0-5%

2. For pipe 12-inches in internal diameter and larger, the embedment material shall meet ASTM C33 size No. 57.

Sieve Size	Percent Passing
1 ½"	100%
1"	95-100%
½"	25-60%
#4	0-10%
#8	0-5%

B. 510.3(14) Pipe Bedding Envelope

Modify to include the following.

All lines shall have a minimum of 6-inches of embedment material below the bottom of the pipe. The initial layer of embedment placed to receive the pipe shall be brought up to a grade higher than that required for the bottom of the pipe. The pipe shall be placed and brought to grade by tamping or by removal of the slight excess amount of embedment under the pipe.

Adjustments to grade shall be made by scraping away or filling with embedment material. Wedging or blocking up of pipe will not be permitted. Each pipe section of the pipe shall have a uniform bearing on the embedment for the length of pipe, except immediately at the joint. All lines shall have a minimum of 6-inches of granular embedment material on each side of the pipe and not less than 12-inches above the top of pipe.

C. 510.3(22) Pipe Anchorage, Support and Protection

Modify item as follows.

Concrete thrust blocking shall not be used in this project. Joints shall be restrained with Ford Uni-Flange®, EBAA Iron Megalug® products, or approved equivalent.

D. 510.3(24)(c) Pressure Taps to Existing Water System

Modify item as follows.

Any taps to AC water pipe will be made utilizing stainless steel tapping sleeves.

E. 510.3(26) Quality Testing for Installed Pipe

Replace the item with the following.

1. Wastewater Pipe Acceptance Testing

Wastewater pipe installed in the City and its ETJ areas shall be tested for exfiltration and infiltration as described below in "Exfiltration Test" and "Infiltration Test" or by acceptable low pressure air test, as described below in "Low Pressure Air Test of Gravity Flow Wastewater Lines". At the conclusion of either test series, the work shall be further tested for pipe deflection as described below in "PVC Gravity Pipe Deflection Test". The contractor shall be solely responsible for making proper structural repairs to those elements which do not pass these test requirements.

2. Exfiltration Test

The Contractor shall complete all testing and coordinate with the City inspector for all inspections. The pipeline shall be completely filled with water for its complete length or by sections as determined by the City inspector. If tested for its complete length, the maximum head at any point shall not exceed 25 feet unless otherwise indicated. If tested in sections, the manholes in the test section shall be completely filled with water. After the pipeline has been filled and allowed to stand for 24 hours, the amount of exfiltration shall be calculated. Any amount in excess of 200 gallons per inch of inside pipe diameter per mile per day shall be cause for rejection.

For portions of lines located within the Edwards Aquifer Recharge Zone or within any recharge area or recharge feature within the Edwards Aquifer Transition Zone, the minimum head during testing shall not be less than 2 feet and the leakage rate shall not exceed 50 gallons per inch of inside pipe diameter per mile per day. This rate shall apply for the entire portion of the line extending up to the first manhole located outside the recharge zone, recharge area, or recharge features indicated on the Drawings and shall also be applicable for any recharge areas or recharge features which may be identified during construction. For construction within the 25-year flood plain, the exfiltration rate shall not exceed 10 gallons per inch diameter per mile of pipe per 24 hours at the same minimum test head.

3. Infiltration Test

The Contractor shall complete all testing and coordinate with the City inspector for all inspections. When the pipeline is completed, the upper portion of the ditch backfill shall be removed to a depth of not less than 18 inches below the finished surface and width equal to the original trench width. The trench shall then be flooded in the ditch a minimum of 12 inches deep. In cases of steep terrain, earthen dikes shall be used to assure that water will stand over the trench. After it is apparent that the trench is completely saturated, the main shall then be inspected with closed-circuit television for infiltration. Any section of the main or any service stub that indicates excessive infiltration shall be cause for rejection.

For portions of lines located within the Edwards Aquifer Recharge Zone or within any recharge area or recharge feature within the Edwards Aquifer Transition Zone, the total infiltration as determined by water test, must be at a rate not greater than 50 gallons per inch of pipe diameter per mile of pipe per 24 hours at a minimum test head of two feet. This rate shall apply for the entire portion of the line extending up to the first manhole located outside the recharge zone, recharge area, or recharge features indicated on the Drawings and shall also be applicable for any recharge areas or recharge features which may be identified during construction. For construction within the 25-year flood plain, the infiltration rate shall not exceed 10 gallons per inch diameter per mile of pipe per 24 hours at the same minimum test head.

4. PVC &FRP Gravity Pipe Deflection Test

The Contractor shall complete all testing and coordinate with the City inspector for all inspections. Twenty-Four (24) hours after the pipe has been completely installed and backfilled and between 30 days and 90 days from installation, a mandrel constructed by the contractor shall be pulled through the entire line to determine whether the maximum allowable 5% deflection has been exceeded. The diameter of the mandrel shall be 5% less than the inside diameter of the sewer line as calculated by the formula:

$$\text{Mandrel O.D.} = 0.95 \times \text{Base ID of the pipe to be tested.}$$

In such cases where the mandrel may hang due to excess deflection, the pipe shall be uncovered at this point and the conditions shall be corrected. Correction may be by reworking the embedment and backfill, or by replacing that section of pipe. This portion of the pipe shall again be backfilled, and the mandrel pulled through again. This process shall be repeated until the pipe is clear of all obstructions.

5. Low Pressure Air Test of Gravity Flow Wastewater Lines

a) General

The Contractor shall complete all testing and coordinate with the City inspector for all inspections. Wastewater lines may, at the discretion of the Engineer, be air tested between manholes. Backfilling to grade shall be completed before the test and all laterals and stubs shall be capped or plugged by the Contractor so as not to allow air losses which could cause an erroneous test result. Manholes are to be plugged so they are isolated from the pipe and cannot be included in the test. All plugs used to close the sewer for the air test must be capable of resisting the internal pressures and must be securely braced. Place all air testing equipment above ground and allow no one to enter a manhole or trench where a plugged sewer is under pressure. Release all pressure before the plugs are removed. Use only qualified personnel to conduct the test.

b) Ground Water

Since the presence of ground water will affect test results, the average height of ground water (if any) above the pipe shall be determined prior to starting the test. Test holes shall be dug to the pipe zone at 100 foot intervals to determine ground water elevations. The average height, in feet, of groundwater above the pipe invert shall be multiplied by 0.433 psi/ft. to determine the groundwater back pressure acting on the section of pipe to be tested. The contractor may submit to the Engineer for approval alternate methods for ground water elevation determination.

c) Test Equipment

The above ground air control equipment shall include a shut off valve, pressure

regulating valve, pressure relief valve, input pressure gauge and a continuous monitoring gauge having a pressure range from 0 to at least 10 psi. The continuous monitoring gauge shall be no less than 4 inches in diameter with minimum divisions of 0.10 psi and an accuracy of + 0.04 psi. The Engineer may, at any time, require a calibration check of the instrumentation used.

Two separate hoses shall be used to: (1) connect the control panel to the sealed line for introducing low-pressure air, and (2) a separate hose connection for constant monitoring of air pressure build-up in the line. All air used must pass through a single, above ground control panel.

d) Test Procedure

The sewer shall be cleaned of all debris prior to beginning the test. Low pressure air shall be slowly introduced into the sealed line until the internal air pressure reaches 4.0 psig greater than the average back pressure of any groundwater, but not greater than 9.0 psig. Care should be taken to avoid flooding of the air inlet by any infiltrated water in the pipe.

After a constant pressure of 4.0 psig (greater than the average groundwater back pressure) is reached, the air supply shall be throttled to maintain that internal pressure for at least two (2) minutes. This time allows the temperature of the entering air to equalize with the temperature of the pipe wall. When the temperatures have been equalized and the pressure stabilized, the air hose from the control panel shall be shut off or disconnected. The continuous monitoring pressure gauge shall then be observed while the pressure is decreased to no less than 3.5 psig greater than the average back pressure of any groundwater. At this pressure timing shall commence with a stop watch or other timing device at least 99.8% accurate.

If the time shown in Table 1 for the designated pipe size and length, elapses before the air pressure drops 0.5 psig, the section undergoing the test shall have passed. The test may be discontinued once the prescribed time has elapsed even though the 0.5 psig drop has not occurred.

If the pressure drops 0.5 psig before the appropriated time has elapsed, the air loss rate shall be considered excessive and the section of pipe has failed the test. The Contractor shall determine at his own expense the source or sources of leakage and repair or replace all defective materials and/or workmanship. The extent and type of repair which may be allowed shall be subject to the approval of the Engineer. The completed pipe installation shall then be retested to the requirements of the original test.

When lines are air tested, manholes are to be tested separately in accordance with the manhole test.

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

1 Pipe Diameter (in.)	2 Minimum Time (min: sec)	3 Length For Minimum Time (ft)	4 Time For Longer Length (sec)	Specification Time for Length (L) Shown (min:sec)							
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft
4	1:53	597	.190L	1:53	1:53	1:53	1:53	1:53	1:53	1:53	1:53
6	2:50	398	.427L	2:50	2:50	2:50	2:50	2:50	2:50	2:51	3:12
8	3:47	298	.760L	3:47	3:47	3:47	3:47	3:48	4:26	5:04	5:42
10	4:43	239	1.187L	4:43	4:43	4:43	4:57	5:56	6:55	7:54	8:54
12	5:40	199	1.709L	5:40	5:40	5:42	7:08	8:33	9:58	11:24	12:50
15	7:05	159	2.671L	7:05	7:05	8:54	11:08	13:21	15:35	17:48	20:02
18	8:30	133	3.846L	8:30	9:37	12:49	16:01	19:14	22:26	25:38	28:51
21	9:55	114	5.235L	9:55	13:05	17:27	21:49	26:11	30:32	34:54	39:16
24	11:20	99	6.837L	11:24	17:57	22:48	28:30	34:11	39:53	45:35	51:17
27	12:45	88	8.653L	14:25	21:38	28:51	36:04	43:16	50:30	57:42	46:54
30	14:10	80	10.683L	17:48	26:43	35:37	44:31	53:25	62:19	71:13	80:07
33	15:35	72	12.926L	21:33	32:19	43:56	53:52	64:38	75:24	86:10	96:57
36	17:00	66	15.384L	25:39	38:28	51:17	64:06	76:55	89:44	102:34	115:23

6. Television Inspection

a) General

The Contractor shall complete all testing and coordinate with the City inspector for all inspections. The Contractor shall furnish all labor, materials and equipment to provide televising and videotaping of sewer lines utilizing a color closed circuit television inspection unit to verify that there are no sags and to locate service connections.

The T.V. unit shall have the capability of displaying on videotape information concerning the pipe inspection observations. The television inspection equipment shall have an accurate footage counter which displays on the monitor the exact distance of the camera from the center line of the starting manhole. Each tape shall be permanently labeled with the following:

1. Project Name
2. Date televised
3. Station to Station location and size of pipe
4. Street or easement location
5. Name of Contractor

#### 6. Tape number(s)

In addition, each tape shall have a written log of all defects, sags, offsets, service connection condition and locations recorded on a footage basis. This inspection log shall also indicate the section televised, flow and camera direction, position of tape failures, pipe and weather conditions. The tapes and inspection logs shall become property of the City.

#### b) T. V. Inspection

T.V. inspection shall be done on manhole section at a time. The camera heights shall be adjusted so that the lens is centered (1/2 I.D. or higher) in the pipe being televised. In no case shall the television camera be pulled or propelled through the line at a speed greater than 25 feet per minute. If the depth of flow at the upstream manhole of the section is above the maximum allowable for television inspections, the flows shall be reduced to an allowable level by temporarily plugging or blocking the flow, or performing the inspection during minimum flow hours or by by-passing pumping around the section. If the camera is unable to pass an obstruction, the Contractor shall televise the manhole section from the other direction to provide a suitable tape of the entire manhole section.

The method(s) used for securing passage of the camera are to be at the discretion of the Contractor and approved by the Engineer. No additional payment will be made for an excavation or other method which may be required to retrieve video equipment that has been hung up, destroyed or lost during the televising operation.

If the Contractor produces a videotape of such poor quality that the Engineer is unable to evaluate the condition of the sanitary sewer main or locate the sanitary sewer service lateral connection, the Contractor shall be required to reteleviser the sewer main and provide a tape of good quality at no additional cost to the City. If the Contractor cannot provide a tape of such good quality that can be reviewed by the Engineer, the City may elect to televise the line at the Contractor's expense.

#### F. 510.3(27) Pressure Pipe Hydrostatic Testing - Replace the item with the following.

##### 1. Hydrostatic Testing for Waterlines

The Contractor shall complete all testing and coordinate with the City inspector for all inspections. After the pipe has been installed and backfilled and all service lines, fire hydrants, and other appurtenances installed and connected, a leakage test, followed by a pressure test shall be conducted. The specified test pressures will be based on the elevation of the lowest point of the line or section under test. Before applying the specified test pressure, all air shall be expelled from the pipe. If permanent air release valves are not located at all high points, the contractor shall install corporation cocks at such points.

##### a) Pressure Test

Each valved section of the entire project shall be tested, at a pressure of 200 psi for a sufficient period (approximately 10 minutes) to discover all leaking or defective materials. Repairs shall be made by the contractor to correct any leaking or defective materials.

##### b) Pressure Pipe Leakage Test

A leakage test will follow the pressure test and be conducted on each valved section of the entire project. The leakage test shall be at 150 psi for at least 2 hours.

Leakage shall be defined as the quantity of water that must be supplied into any test section of pipe to maintain the specified leakage test pressure after the air in the pipeline has been expelled and the pipe has been filled with water. The allowable leakage shall comply with AWWA C-600 or AWWA C-605 which define the allowable leakage as:

$$L = \frac{S D p^{1/2}}{133,200}$$

where;

L = Leakage in gallons per hour

S = Length of pipe in feet

D = Diameter (inside) of pipe in inches

P = Pressure in pounds per square inch

If such testing discloses leakage in excess of the calculated amount, the contractor, at his expense, shall locate and correct all defects in the pipeline until the leakage is within the indicated allowance.

2. Hydrostatic Testing for Wastewater Force Mains

The Contractor shall complete all testing and coordinate with the City inspector for all inspections. All wastewater force mains shall be hydrostatically tested by the Contractor after connections have been made to lift station pumps and prior to placing the line or lines in service. Test pressure shall be 50 psi maintained for a duration of one (1) hour after all defective joints, pipe, valves, or breaks have been satisfactorily corrected. Tests shall be made to valved sections of the lines and shall be limited to section lengths as approved by the engineer. Tests shall be witnessed by representatives of the City.

Each tested section of pipe shall be slowly filled with water as to expel all air from the line prior to application of test pressure. If permanent air release valves (automatic or manual) are not located at all high points, the contractor shall furnish and install corporation cocks at such points so the air can be expelled, the corporation cocks shall be closed, and a pipe cap installed "hand tight".

No test section will be accepted until the pipe joints show no sign of leakage when tested at 50 psi as specified herein. Any visible leaks, regardless of the type of pipe, shall be eliminated.

The contractor shall, at his own expense, locate and repair all leaks. Contractor shall furnish test plugs, taps for testing, etc.

G. 510.3(28) Service Charges for Testing

Delete the item in its entirety.

H. 510.3(29) Disinfection of Potable Water Lines - Replace the item with the following.

1. The Contractor shall complete all disinfection and coordinate with the City inspector for all inspections. The contractor shall protect all piping materials from contamination during storage, handling and installation. Prior to disinfection, the pipeline interior shall be clean, dry and unobstructed. All dirt, debris, gasket lubricant, etc., shall be washed from the line by swabbing with hypochlorite solution and/or flushing with

clean water.

The contractor, at his expense, shall provide all equipment, supplies and the necessary labor to perform the sterilization under general supervision of the City.

Reference for the standard procedure for sterilization of water lines is made to AWWA C651-86, "Disinfecting Water Mains".

a) Procedure and Dosage

All valves shall be arranged to prevent the strong disinfecting dosage from flowing back into the existing water supply piping. The new pipeline shall then be completely filled with disinfecting solution by feeding the concentrated chlorine and approved water from the existing system uniformly into the new piping in such proportions that every part of the line has minimum concentration of 50 parts per million (50 ppm or 50 mg/liter) available chlorine.

Unless otherwise indicated, all quantities called for herein refer to measurements by the testing procedures in the current edition of "Standard Methods". The chlorine concentration of each step in the sterilization procedure shall be verified by chlorine residual determinations. This disinfecting solution shall be retained in the piping for at least 24 hours and all valves, hydrants, etc., shall be operated to disinfect all their parts. After this retention period, the water shall contain no less than 25 parts per million chlorine throughout the treated section of the pipeline.

This heavily chlorinated water shall then be carefully flushed from the line until the chlorine concentration is no higher than the residual generally prevailing in the existing distribution system, or approximately 1 part per million. Proper planning and appropriate preparations to handle, dilute and dispose of this strong chlorine solution without causing injury or damage to the public, the water system or the environment must be approved by the City before flushing of the line may begin and the flushing shall be witnessed by an authorized representative of the City.

b) Bacteriological Testing

After final flushing of the strong disinfecting solution, water samples from the line shall be tested for bacteriological quality by the City and must be found free of coliform organisms before the pipeline may be placed in service. One test sample shall be drawn from the end of the main and additional samples collected at intervals of not more than 1000 feet along the pipeline.

The contractor, at his expense, shall install sufficient sampling taps at proper locations along the pipeline. Each sampling tap shall consist of a standard corporation cock installed in the line and extended with a copper tubing gooseneck assembly. After samples have been collected, the gooseneck assembly may be removed and retained for future use.

Samples for bacteriological analysis shall be collected only from suitable sampling taps in sterile bottles treated with sodium thiosulfate. Samples shall not be drawn from hoses, fire hydrants, etc. The City, at its expense, will furnish the sterile sample bottles and collect the test samples with City personnel.

If the initial disinfection fails to produce acceptable sample test, the disinfection procedure shall be repeated until satisfactory test results have been obtained before the piping may be placed in service. Subsequent tests will be charged to the contractor.

I. Add the following item - Abandoning Existing Utilities

1. Water Mains

All existing water mains to be abandoned upon completion of the project shall be cut and plugged at the general location shown on the plans. An approved plug shall be used and the exact locations shall be marked and field verified with the Owner.

2. Water Meters and Meter Boxes

Water meters to be abandoned shall be removed at the locations indicated on the plans with the service lines cut and the meters and meter boxes delivered by the Contractor to a yard located at 630 E. Hopkins, San Marcos, Texas.

**2.0 MATERIALS**

Not used.

**3.0 EXECUTION**

Not used.

**END**