

**TYPICAL SANITARY SEWER SPECIFICATIONS
TO BE USED FOR PRIVATE SEWER DEVELOPMENT
WITHIN
FLORENCE REGIONAL SEWAGE DISTRICT**

1. Standard specifications of Florence Regional Sewage District (the District) and Department of Transportation (INDOT) shall apply for all work and materials. Sanitary sewer pipe shall be installed in accordance with Section 715 of the current INDOT standard specifications handbook.
2. Sanitary sewer gravity pipe, unless pressure rated pipe required per IAC or directional drilled pipe, shall be Polyvinyl Chloride (PVC) in accordance with ASTM D3034-89 with a minimum wall thickness designation of SDR 35 and installed per ASTM D2321-89 specification. PVC pipe used shall be grooved bell, spigot end, and gasketed. The pipe shall be made of PVC plastic having a cell classification of 12454B.
3. PVC sanitary sewer gravity fittings shall also conform to the requirements of the ASTM D3034-89 specification. All fittings shall be molded in one piece with standard pipe bells, gasketed elastomeric joints, and spigot ends. Single piece molded PVC with standard pipe bells, gaskets, and spigot ends for back-to-back tee wyes are acceptable. Wall thickness of all fittings shall have a minimum designation of SDR 26. Gaskets for elastomeric joints shall be molded with a minimum cross-sectional area of 0.20 square inches and conform to ASTM F477 specification.
4. All sanitary manholes shall be precast concrete manholes in accordance with ASTM C478 and Section 720 of the current INDOT standard specifications handbook. O-rings shall conform to C443. Double row of Kent Seal or equivalent shall also be applied to all joints and between riser rings and castings. Manhole step spacing shall be no more than 16-inches. Manholes shall be air tested for leakage in accordance with ASTM C1244-02, Standard Test Method for Concrete Sewer Manholes by the Negative Air Pressure (Vacuum) Test.
 - A. Installation and operation of vacuum equipment and indicating devices must be in accordance with manufacturers' recommendations and performance specifications which have been provided by the manufacturer and accepted by the District Engineer. *The vacuum equipment must be capable of testing the entire manhole, including the casting and riser rings.*
 - B. With the vacuum tester set in place:
 1. Connect the vacuum pump to the outlet port with the valve open.
 2. Draw a vacuum of ten (10) inches of Hg. (5 psi) and close the valve.
 - C. Accepted standards for leakage will be established from the elapsed time for a negative pressure change from ten (10) inches to nine (9) inches of mercury. The maximum allowable leakage rate for a four (4) foot diameter manhole must be in accordance with the following:

Minimum Elapsed Time for a:

Manhole Depth	Pressure Change of 1 Inch Hg
10 feet or less	60 seconds
>10 feet but <15 feet	75 seconds
>15 feet but <25 feet	90 seconds

For manholes five (5) feet in diameter, add an additional fifteen (15) seconds and for manholes six (6) feet in diameter, add an additional thirty (30) seconds to the time requirements for four (4) foot diameter manholes. For all manholes deeper than twenty-five (25) feet, the Engineer will determine the applicable minimum elapsed time.

- D. If the manhole fails the test, necessary repairs must be made. The vacuum test and repairs must be repeated until the manhole passes the test.
 - E. If manhole joint sealants are pulled out during the vacuum test, the manhole must be disassembled and the joint sealants replaced.
 - F. Manholes will be subject to visual inspection with all visual leaks being repaired.
5. Butyl rubber coating with plastic wrap shall be applied around each manhole joint from 3-inches above to 3-inches below each joint. The appropriate primer shall be applied prior to applying the rubber coating. Inside joints to be filled with precoat plug material. Entire exterior surface of sanitary sewer manholes shall be sprayed with a bituminous coating and all exterior gap exposure of riser rings shall be back plastered or grouted with nonshrink grout.
 6. The manhole chimneys, including all riser rings shall be sealed using flex rib internal chimney seal manufactured by Cretex, NPC, or a District approved equal. The flex rib internal chimney seal shall extend from a minimum of 3-inches below the top of the cone section to 3-inches over the manhole casting frame or per manufacturers installation procedures if directed otherwise. Internal Chimney Seal shall be installed after manhole vacuum testing and prior to final acceptance. Water test may be done, per manufacturer or Districts recommendation, to provide assurance that internal chimney seal is water tight.
 7. The casting elevations are set by plan, however, the castings are to be adjusted in the field by the District's representative should a discrepancy occur between plan grade and existing grade. New manhole ring(s) and cover shall be installed to establish grade. Maximum height of adjusting rings shall be 12-inch on existing structure adjustment and 10-inch maximum on new construction.
 8. Backfill around all installed or proposed manhole structures, sidewalks, bike paths and/or all

paved areas shall be made with granular material (b-borrow) or No. 8 stone, up to 18-inches below cross-section thickness (which shall include "No. 53" stone depth). If more stringent backfill requirements are set out per city, town, county, or District specifications those standards shall be followed. Trench opening within 5-feet of the back of the curb of paved roadways, shall be backfilled with granular material or No. 8 stone in accordance with Section 211 of the current INDOT standard specifications handbook.

9. The Contractor shall be responsible for verifying that all state highways, city, and county permits have been obtained by the developer prior to start of construction.
10. Initial as builts shall be presented to the inspecting engineer prior to final submittal to the District for review, otherwise Contractor shall be required to furnish the developer's Engineer with a set of prints showing actual sewer locations and inverts including lateral location, depth, and length. Such asbuilt prints must be received by the Engineer before the final contract payment can be authorized. As builts shall be submitted per the Districts current standard which can be found at www.ctrwd.org.
11. The sanitary sewer laterals and stubs termination shall be indicated on the surface with a detectable metal post set immediately above the said termination point if full connection is not immediately made.
12. All sanitary sewer lines upon completion will be required to pass a low pressure air test. Said test shall be conducted according to ASTM F1417-92, and shall be witnessed by a District employee or the Districts representative. The testing shall be in accordance with Table 1 as follows with 0.5 psi being added for each foot of water above the sewer line being tested. Sewer lines shall be subject to visual leak inspection at downstream manholes with all visual leaks being repaired and subject to televising requests by the District.
13. Prior to final deflection test (mandrel test) all mainlines shall be cleaned and free of any debris. Deflection tests shall be performed on all flexible* pipe after the final backfill has been in place at least 30 days. No pipe shall exceed a vertical deflection of 5% deflection test results. (*The following are considered non-flexible pipes: concrete pipe, ductile iron pipe, and cast iron pipe). The deflection test shall be performed with a nine-point mandrel. Proving rings shall be available at time of test otherwise no testing will be allowed. All mandrel testing shall be witnessed by a District employee or the Districts representative.
14. The ends of all laterals are to be plugged water tight with a gasketed cap capable of withstanding a low pressure air test without leakage. Laterals shall be subject to visual leak inspection at downstream manholes with all visual leaks being repaired
15. Bedding for flexible pipe and rigid pipe shall be No. 8 crushed stone from 6-inches below to 12-inches above the pipe. Manholes shall be placed on no less than 6-inches of No. 8 crushed stone bedding.
16. Water line, utility, and legal drain crossings and separations shall be in accordance with

the more stringent of the two: 327 IAC 3-6-9 or the Districts standard drawings.

17. The trench shall be opened sufficiently ahead of pipe laying to reveal obstruction, and shall be properly protected and/or barricaded when left unattended.
18. No water shall be permitted to flow into the sanitary sewer system during construction. Contractor shall utilize a pump to keep the water level below the pipe. Pump discharge shall be directed to a storm outlet in accordance with state and federal laws and regulations (327 IAC 3-6-20). Any pipe entering existing sewers shall be plugged with screw type mechanical, braced plug until such time as all tests on the sewers and all punch list items are complete.
19. All sewer laterals installed shall be bedded the same as the main line sewer.
20. Forty-eight (48) hours notice shall be given to the District prior to the start of sewer construction. Also, 48 hours notice shall be given prior to doing any testing on the sewer.
21. Manhole castings shall be stamped SANITARY SEWER (Neenah Casting R-1772 or East Jordan 1022Z1GS) and be self-sealing type. *The casting flange shall be 34 inches and the clear opening shall be min. 20- 13/16 inches.* Watertight castings shall be bolt-down East Jordan 1022Z1PT and also stamped SANITARY SEWER.
22. The minimum slope of the sewer shall be:

<u>Size of Pipe</u>	<u>Minimum Constructed Slope</u>
8-inch	0.40%
10-inch	0.28%
12-inch	0.22%
15-inch	0.15%
18-inch	0.12%
23. The Contractor shall provide measurements of the slope of the sewer for each manhole section as construction progresses. Such measurements shall be certified by a Registered Land Surveyor or Engineer and be available on-site for observation by the District's Inspector. No more than three manhole sections can be constructed in advance of such measurements.
24. In the event the Contractor does not meet the minimum slopes, the sewer section and any other affected sewer sections shall be reconstructed to meet such minimum slopes.
25. Laterals are to be installed with a minimum 14 gauge tracer wire from the wye to the terminus. Upon lateral completion the contractor for the building or home will extend the wire from this terminus to the building cleanout adjacent to the building.

TABLE 1

MINIMUM SPECIFIED TIME REQUIRED FOR A 1.0 psi

DROP FOR SIZE AND LENGTH OF PIPE INDICATED

(testing pressure after stabilization no less than 4.0 psi and no more than 8.0 psi)

Pipe Diameter In.	Minimum Time, min:s	Length for Minimum Time, ft	Time for Longer Length, S	Specification Time for Length (L) Shown, min:s							
				100 ft	150 ft	200 ft	250 ft	300 ft	350 ft	400 ft	450 ft
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	19:58	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	115:57	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	86	30.768 L	51:17	76:55	102:34	128:12	153:50	179:29	205:07	230:46