



Profile Scale:
Horizontal: 1"=50'
Vertical: 1"=5'

Deflection and Leakage Test

- (a) A deflection test shall be performed on each flexible pipe following the elapse of thirty (30) days after the placement of the final backfill. This will be done utilizing the mandrel test method.
- (b) The pipe will not exceed a deflection of five percent (5%) or greater as the mandrel will fill at least 95% of the pipe diameter and must pass through the pipe to get approval.
- (c) The diameter of the rigid ball or mandrel used for a deflection test must be no less than ninety-five percent (95%) of the base inside diameter of the pipe to be tested, dependent on what is specified in the corresponding ASTM standard. The test must not be performed with the aid of a mechanical pulling device.
- (d) Pre-testing Procedures:
- The Contractor shall determine groundwater levels that may exist above the pipe to be tested. Acceptable methods of determination of groundwater levels shall consist of piezometers or open excavation (when authorized by the Engineer). The total number of installations, regardless of methods selected, shall be sufficient enough so as to adequately conclude the groundwater height above the invert of the segment or segments of gravity sewer being tested.
 - Upon determination of stabilized static groundwater depth level, the height above the pipe invert shall be divided by 2.3 ft. to establish psi of back pressure and added to all readings.
 - No low pressure air test shall be conducted until such time that it has been demonstrated that the groundwater level has fully stabilized.
 - When piezometer method has been selected it shall be temporarily capped after initial installation and fully protected from damage until completion and acceptance of low pressure air test.
 - When pre-approved open excavation method is implemented it shall be installed in accordance with all federal, state, and local safety and health regulations, laws, and or ordinances. The open excavation method shall not be conducted in any area that may affect or disturb the structural integrity of the gravity line being tested or any adjacent structure(s) or utilities.
 - Upon completion and acceptance of low pressure air test(s), the Contractor shall be responsible for removal, backfilling, and restoration of areas affected by piezometers or in the case of open cut method, shall be responsible for backfill, compaction and restoration of affected areas. In each case backfilling, compaction and restoration shall be in accordance with applicable specifications.

Leakage Testing Procedure:

- Clean the section of sewer line to be tested by flushing or other means prior to conducting the low-pressure air test. This cleaning serves to eliminate debris and produce the most consistent results.
- Isolate the section of sewer line to be tested by inflatable stoppers or other suitable test plugs.
- Connect the air hose to the inlet tap and portable air control source. The air equipment shall consist of necessary valves and pressure gauges to control an oil-free air source and the rate at which air flows into the test section to enable monitoring of the air pressure within the test section.
- Low pressure air shall be introduced into the line until the internal pressure reaches four (4) psig, and the supply throttled to maintain four (4) psig for at least two (2) minutes. The supply shall then be shut off or disconnected. The pressure shall be allowed to drop to about three and one-half (3 1/2) psig at which time the timing shall commence and the time accurately measured for a one (1) psig pressure drop per table given below. If the test section fails to meet these requirements, the Contractor shall, at his own expense, determine the source of leakage, repair or replace all deficiencies, and retest the installation until passing, all in a manner approved by the Engineer. This does not mean that the Low Pressure Air Test has to be repeated but rather a passing test has to be achieved by either the Low Pressure Air Test or the Ex-filtration Test.
- Upon completion of the test, open the bleeder valve and allow all air to escape. Plugs should not be removed until all air pressure in the test section has been reduced to atmospheric pressure.

Installation

All gravity sewers and accessories shall be installed in accordance with 327 IAC 3-6-18(a) (ASTM D2321). All PVC SDR 35 pipes sized shall be ordered from a company with a manufacturer's certification to conform to ASTM D3034. All PVC SDR 21 pipes sized shall be ordered from a company with a manufacturer's certification to conform to ASTM D2241. SDR 21 has a 200-psi rating. Watertight flexible gasket A-Lok or equal to be used on inlet or outlet pipes.

LOW PRESSURE AIR TEST ALLOWABLE LEAKAGE FOR A 1 PSIG PRESSURE DROP		
Pipe Diameter	Time of Test (sec.'s)	Minimum Time of Test (sec.'s)
4	0.380 x L	226
6	0.854 x L	340
8	1.520 x L	454
10	2.374 x L	566
12	3.418 x L	680
15	5.342 x L	850
18	7.692 x L	1020
21	10.470 x L	1190
>21	as per plans	

Manhole Vacuum Testing

When utilizing ASTM C1244, a vacuum of 10 inches Hg is drawn on the manhole after all lift holes are plugged, and pipes entering the manhole are temporarily plugged and securely braced. The time is measured for the vacuum to drop to 9 inches Hg. The manhole is accepted if the measured time meets or exceeds the values presented in Table 1 of ASTM C1244. If the manhole fails the initial test, it may be repaired by an approved method until a satisfactory test is obtained.

MINIMUM MANHOLE VACUUM TEST TIMES FOR VARIOUS MANHOLE DIAMETERS PER DEPTH OF MANHOLE			
Manhole Depth (Feet)	48 in. Diam. MH (Seconds)	60 in. Diam. MH (Seconds)	72 in. Diam. MH (Seconds)
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
26	64	85	105
28	69	91	113
30	74	98	121
>30	as per plans		

[Signature]



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Surveying • Engineering • Asphalt • Utilities • Site Development

3 RIVERS

Strategic Growth
A D V I S O R S

Date:	No.	Remarks	By:
05/17/22	1	Revisions per City/Banning Comments	JMS
05/23/22	2	Revised Sanitary & Water	JMS
05/31/22	3	Revised Sign&Spot Grades per INDOT	JMS
07/07/22	4	Revised per Starbucks Comments	JMS
07/26/22	5	Revised Trail & Sidewalk Grading	JMS
08/12/22	6	Revised Sanitary Plan & Details	JMS
12/12/22	7	Site Layout Revision	JMS

3 Rivers Federal Credit Union

Sanitary Notes & Profile

Address: W. State Road 38
Purdue, Indiana 4664
Attn: Michael Romary
110 West Lakeshore Drive, Suite 1000
Fort Wayne, IN 46802

Date: 5-12-22

Drawn By: SAL

Checked By: AJC

Job No.: 21183

Scale: as shown

Sheet No.: C4.4