

CHAPTER V

SANITARY SEWER SYSTEM

510 GENERAL

The City of Beaverton has adopted the Clean Water Services (CWS) *Design and Construction Standards*. All standards meet or exceed these requirements.

All sewers shall be designed and constructed so as to conform to the requirements of the Oregon State Department of Environmental Quality, CWS, and the City of Beaverton, including but not limited to the City's current Sanitary Sewer System Facilities Plan and this Manual. Public sewerage facilities shall be designed to allow the logical service of all parcels or tracts of land within the basin being considered. Sewer lines shall be extended, at owner's or developer's expense, to all adjacent parcels approximately equal to or higher in elevation to facilitate future development.

The City enforces CWS standards as written unless otherwise noted herein. Two CWS standards that the City enforces vigorously are as follows.

1. "Variance from the established line and grade shall not be greater than 1/32-inch per inch of pipe diameter and shall not exceed ½-inch, providing that such variation does not result in a level or reverse-sloping invert."
2. "All pipe for side sewers shall be green in color."

The City has adopted CWS standards with the following amendments:

- A. All steps within structures must comply with OSHA standards for fixed metal, individual rung ladders (OAR 437), and CWS, except that there shall be no more than 24 inches between the top of the casting and the rung of the top step, not 27 inches as CWS requires.
- B. Manhole components shall conform to the following requirements:
 1. One 2-inch concrete grade ring conforming to CWS requirements shall be installed on every new manhole.
 2. No more than one 2-inch grade ring shall be used per manhole, except that on pavement overlays, up to eight (8) inches of grade rings may be used for adjusting the elevation of each manhole's castings.
 3. Manhole castings (frames and covers) shall conform to CWS requirements, including but not limited to, the following. "Casting shall be tough, close-grained gray iron,

smooth and clean, free from blisters, blowholes, and defects, and conform to ASTM A48, Class 30. Covers shall be true and set within the ring [frame] at all points. To ensure flat, true [bearing] surfaces *that attain a true bearing all around*, all bearing surfaces shall be planed, [machined] or ground” by the manufacturer prior to delivery to the jobsite. Each casting shall be delivered to the jobsite with a packing slip or other document provided by the manufacturer or vendor stating that the casting has been manufactured in conformance with these specifications and that the warranty for the casting warrants that the bearing surfaces meet these specifications. Castings shall not make any noise whatsoever when exposed to traffic.

4. All manholes, including 60-inch and larger oversized manholes, shall have tongue and groove or key lock joints with flush exterior walls at the joints. Bell and spigot pipe with the outside diameter of the bells larger than the outside diameter of the pipe is not acceptable. This precludes the use of Clean Water Services’ (CWS) standard drawing No. 030 “Precast Rubber Gasket Manhole” in CWS’s “Design and Construction Standards for Sanitary Sewer and Surface Water Management.” The manhole joints shown in this standard drawing are not approved for use in the City of Beaverton.
5. Manhole barrels that are less than 36-inches high from top of manhole cover to top of pipe shall be constructed using short cones (or “shorty” cones) rather than “flat-tops” unless otherwise specified by the City Engineer. Short cones shall be as manufactured by Cascade Concrete Products, Inc., Scappoose, Oregon, or Hanson Pipe and Products, Portland, Oregon. (Other manufacturers’ short cones may be approved by the City Engineer as a Design Modification if, in the judgment of the City Engineer, the manufacturer has submitted sufficient structural calculations demonstrating that their short cone meets all City requirements.) Flat-tops may only be used in the construction of shallow manholes that are less than 20-inches high from top of manhole cover to top of pipe (i.e., in cases where the shortest available approved short cone would be too high). The use of a flat-top in such cases requires the express prior approval of the City Engineer as a Design Modification pursuant to Section 145. The structural design of flat-tops shall conform to CWS standards, except that the CWS “optional rubber gasket flat top” is not approved by the City.
6. Pipe manufacturers supplying oversized manholes (manholes with diameters greater than 48-inches) in the City of Beaverton shall use the wet pour pre-cast process to manufacture manholes with flush-walled manhole joints. During the wet pour process, the manufacturer shall provide block-out openings in the walls of the manholes for pipe penetrations. Each such opening shall be provided with additional steel reinforcement around it as required to meet ASTM standards for pre-cast manholes.
7. All manhole joints shall be grouted with “Tams Speedcrete Redline” non-shrink grout or “Allcrete” non-shrink grout. Contractor shall not re-temper grout after initial mixing. Any re-tempered grout shall be rejected.

8. Paving rings are not allowed without the City Engineer's written approval except on overlay projects.
 9. Adjustment of manhole castings shall conform to the City's Standard Drawing for same.
- C. Contrary to ASTM Standard Specification No. C 478, Section 9, the City of Beaverton does not allow the repair of manhole products used in new manholes, except that the City may allow a repair on a project-specific basis where the City finds that there are sufficient extenuating circumstances, a repair method acceptable to the City is proposed, and sufficient additional maintenance securities are submitted to the City before the repair(s) is/are made. Any manhole products exhibiting imperfections in manufacture, damage during handling or other damage shall be rejected, except in the following cases:

Repair of new manhole components shall conform to the following requirements:

1. The City Engineer may approve a proposed repair of a new manhole component that is defective or damaged if the applicant submits a Request for Design Modification detailing the extent of the defect or damage, the method of repair and all other documentation required by Section 145 of the Manual and the City Engineer, the repair is made in accordance with the City Engineer's prior approval of the repair method, and the repair passes all tests required by the City.
2. Generally, the City Engineer will approve Requests for Design Modifications for field repairs only if the repairs are very minor and do not affect the structural integrity of the manhole. Manhole products that are field-repaired and do not pass the tests referenced above shall be rejected. Rejected repairs may be corrected no more than two (2) times, after which the City Engineer may require that the unsatisfactorily repaired product or products be replaced by a new, defect-free product or products meeting all City requirements, and at no cost to the City. If a field repair is made without the City Engineer's prior approval, the City Engineer may reject the field-repair and require correction of the repair or may require that the repaired manhole product be replaced with a new one.
3. The City Engineer may allow the repair of a manhole with a pre-cast opening ("block-out") for a pipe penetration that is incorrectly located or becomes unnecessary if the repair is performed by the manufacturer pursuant to ASTM C 478, section 8.2.1.6 and passes all tests required by ASTM C 478 and the City.
4. Manhole channels constructed with insufficient depth shall be repaired only by removing the defective channel completely and re-pouring the channel to the correct depth in accordance with CWS standards. Adding a layer of non-shrink grout to the top of the manhole floor to increase the channel's depth is not acceptable.

- D. The City does not allow outside drop manholes in new sewer lines. All enclosed inside drops must be constructed with pipe; no partitions will be allowed.
- E. All inside drop manholes must be 60-inch diameter or larger diameter structures, or equivalently sized rectangular structures approved by the City Engineer.
- F. All backfill material shall be specified by referencing the *Oregon Standard Specifications for Construction* and *Oregon Standard Drawings*.
- G. No private sanitary sewer shall be located within any lot other than the lot, which is the site of the building or structure served by such sewer. The exception to this will be common areas in planned unit developments, and/or City right-of-ways, or as otherwise approved by the City Engineer.
- H. The City will scan all new public sanitary pipe along with existing sections of pipe which are disturbed or affected by new construction. Prior to requesting a television scan, the contractor shall flush, clean, and remove all debris from the system.
- I. No manhole shall be placed where future maintenance access cannot be assured. Where practical, a hard all-weather surface capable of supporting an 80,000 pound truck shall be constructed to provide access to manholes in common areas or parks.
 - 1. The hard all-weather surface in the maintenance access shall meet the following minimum design criteria:
 - a. Three (3) inches of class “C” asphaltic concrete; over two (2) inches of ¾ inch – 0 inch compacted crushed rock; over six (6) inches of 1 ½ inch – 0 inch compacted crushed rock; over subgrade compacted to 95-percent AASHTO T-99; or,
 - b. The design engineer may submit a certified road design capable of supporting an 80,000-pound vehicle in all weather conditions.
 - 2. The access will include strengthened sidewalk sections designed for driveway crossings per the Standard Drawings for sidewalks where maintenance vehicles will cross.
 - 3. Maximum grade shall be ten (10) percent with a maximum three (3) percent cross slope. All turn-arounds and landings shall have a maximum slope of five (5) percent in any direction.
 - 4. The minimum pavement width shall be 12 feet on straight runs and 15 feet on curves. Curves shall be designed with a minimum of a 40-foot interior radius.

5. Access for the City maintenance vehicle (the City's vactor truck) shall be within five (5) feet from the front of the vehicle to the structure or within 15 feet from the side of the vehicle as measured from the midpoint of the vehicle.
 6. In the event private property exists between the public right-of-way and the stormwater facilities (located in tract and in some limited cases, an easement), a public access easement between these two points shall be provided. This access easement shall be a minimum of 20 feet wide.
 7. The maintenance access shall be designed with approved grading and drainage to protect the access and adjacent land from erosion and flooding from concentrated and diverted surface drainage.
- J. All intersection changes in direction and changes in pipe cross-sectional dimensions of public lines shall have an access structure approved by the City Engineer.
- K. No change of pipe materials is permitted unless expressly approved by the City Engineer on a project-specific basis. Approved changes in pipe materials on main lines shall occur only at access structures.
- L. All pipe for side sanitary sewers shall be laid with magnetic tape per CWS standards.
- M. Prior to acceptance, all new public storm sewer lines shall be thoroughly cleaned, mandrelled and TV scanned in accordance with the City's requirements for such work. Such work shall be performed prior to paving over said lines and again a second time during the maintenance period or as directed by the City Engineer.