

DESIGN AND CONSTRUCTION GUIDELINES AND STANDARDS

DIVISION 33 • UTILITIES

33 00 00 • SITE UTILITIES

SECTION INCLUDES

Domestic Water
Fire Water Service
Water Well
Sanitary Sewer
Storm Drains
Foundation Drainage

RELATED SECTIONS

03 30 00 Concrete
21 00 00 Fire Suppression - Sprinklers
22 00 00 Plumbing
26 00 00 Electrical
31 00 00 Earthwork
32 12 00 Asphalt Paving
32 80 00 Site Irrigation
33 36 00 Septic Systems

REFERENCES

Standard Specifications for Highways and Bridges, Commonwealth of Massachusetts, Current Edition

DOMESTIC WATER

MATERIALS

Check with the local water department for specific requirements and any special conditions. Generally, water pipe is to be ductile iron manufactured in accordance with the requirements of ANSI/AWWA C 153/A21.153. The pipe shall be special thickness Class 52 with a minimal wall thickness of 0.31 inches for 6-inch, 0.33 inches for 8-inch, 0.35 inches for 10-inch and 0.37 for 12-inch diameter pipe.

Pipes are to have cement mortar lining and seal coating in accordance with ANS A21.11/AWWA C111, latest version and will be push-on joint, provided with sufficient quantities of accessories and of standard 18 or 20 foot lengths.

All fittings are to be ASTM A-536 ductile iron, cement lined mechanical joint and will meet or exceed the requirements of AWWA C-110, with fittings 4 inches to 24 inches, pressure rated at 350 psi.

All accessories (glands, gaskets, T-bolts, and nuts) are to be in accordance with AWWA C-111. All mechanical bolts (T-bolts) are to be Cor-Ten or equal.

Curb stops, corporations, valves and appurtenances are to conform to the requirements of the local water department and be compatible with their stock.

DESIGN AND CONSTRUCTION GUIDELINES AND STANDARDS

DIVISION 33 • UTILITIES

33 00 00 • SITE UTILITIES

DESIGN

Test the town water supply for mineral content and pressure; design the system accordingly. Check with the local water department to see if the town has test data available.

Test new domestic pipelines for strength and for leakage at the pressure specified by the local water authority or NFPA Standard 24 for one hour minimum in accordance with standard testing protocols. At the successful completion of testing, send the results to the local authority and, if necessary, DEP.

The domestic water line is to be chlorinated in accordance with the local authority's requirements.

FIRE WATER SERVICE

DESIGN

Check with local fire AHJ for fire suppression requirements that may exceed code requirements so that they can be considered during design. This inquiry should include a check of any hydrant requirements.

WELL WATER

GUIDELINES

The current Commonwealth of Massachusetts, Department of Environmental Protection, Drinking Water Program, Guidelines for Public Water Systems

SANITARY SEWER

MATERIALS

Sewer (septic) pipe and fittings (gravity) are to be polyvinyl chloride (PVC) conforming to ASTM D 3034 for 4 inch through 15 inch diameter. Fittings are to be rubber ring conforming to ASTM D 3212.

Sewer and septic force main are to be PVC conforming to ASTM D1784 D2241 and commercial standard PS22-70, latest revisions. Pipe is to be class 150 (DR 18) and joints are to be elastomeric ring, bell and spigot type meeting ASTM D3139-77 or latest revision.

Gravity lines for septic leaching trenches are to be PVC schedule 40 NSF.

Pressure distribution lines are to be PVC 160 psi pipe SDR 26, with rubber rings and conform to ASTM F477.

PVC non-pressure pipes are to be furnished in standard lengths.

PVC gravity sewer tees, wyes, and tee wyes to be used for service connections are to be PVC SDR 35 fittings with ring tight joints.

Push-on joints shall consist of

- A single continuous, molded rubber ring gasket;
- A bell socket cast integrally with the pipe or fitting;

DESIGN AND CONSTRUCTION GUIDELINES AND STANDARDS

DIVISION 33 • UTILITIES

33 00 00 • SITE UTILITIES

- And a pipe or fitting plain end.

Push-on joints are to have the same pressure rating as the pipe or fitting of which they are a part.

Gaskets for push-on joints shall be vulcanized natural or synthetic rubber and be free of porous areas, foreign materials and visible defects.

DESIGN

Gravity pipes shall be designed using standard sanitary engineering procedures in order that continuous "positive" flow is always present between all manholes. Flow will be established from the highest point to the lowest point on the sewer line. Maintain minimum design slope of 1/4 inch per foot for pipe 3 inches in diameter or less and 1/8 of an inch per foot for pipe larger than three inches in diameter to meet 248 CMR 10.05.2. Confirm that the minimum scouring velocity of 2.0 feet/ second (fps) will be maintained at all times.

Take soil borings along the pipe line at intervals no greater than 300 feet to confirm bearing capacity of the soils. Provide this information on the plans or in the specifications including depth to groundwater and any ledge, boulders or other physical obstructions noted. In any event it is the Designer's job to design the project according to the investigative information.

Profile plans should include manhole number, stationing, invert(s) in, invert(s) out, slope and type of pipe material. Layout plans should include any and all topography, structures, other utilities, as well as all previously mentioned information and any other information needed to design and construct the project.

SEPTIC SYSTEMS

REFERENCES

Design septic systems in accordance with both 310 CMR 15.000 Title V and the regulations of the local Board of Health, whichever governs. For further discussion on Septic Systems, go to Design Standards and Guidelines section 33 36 00 Septic Systems.

STORM DRAINS

GUIDELINES

Conform to the description, materials and construction methods of the requirements of appropriate sections of the latest edition with current amendments of the Standard Specifications for Highways and Bridges, Department of Public Works, Commonwealth of Massachusetts.

MATERIALS

Use the following guidelines and refer to the local DPW official's requirements for drain pipe sizes and materials:

- 12 inch diameter (minimum) reinforced concrete for paved areas (designed to meet the load of traffic)
- 8 inch diameter schedule 40 PVC for landscaped areas

DESIGN AND CONSTRUCTION GUIDELINES AND STANDARDS

DIVISION 33 • UTILITIES

33 00 00 • SITE UTILITIES

Acceptable materials for manholes and catch basins include precast concrete and solid concrete block.

All frames, grates and covers should be traffic-bearing H-20 rated cast iron, 24 inch inside diameter as manufactured by E.L. LeBaron Co. or an approved equal. Covers should be labeled "DRAIN".

Where possible and feasible, install "cascade" style grates, especially on sloped, paved areas. In all other locations, use common engineering practice.

Avoid grates:

- With long narrow slots that could be a hazard for bicycle and wheelchair wheels
- That are smaller than 12" because they are easily removed by vandals - creating a hazard.

Trench drains may have either concrete or fiberglass boxes; fiberglass is less expensive.

DESIGN

The storm drainage system should be designed in accordance with the latest hydrological engineering techniques and incorporate all "Best Management Practices" as outlined by The Massachusetts Department of Environmental Protection, current edition. Storm water design should be calculated using the 25 year design storm with characteristics for the region in which the system will be located. A copy of the calculations, including water shed analysis map(s) will be submitted to DHCD as part of the design review process.

Consult with the local officials as to when and where it may be necessary to submit plans for their review and approval especially where the Conservation Commission and/or Planning Board may have to get involved.

Consult the local Conservation Commission and Department of Public Works for requirements for gas traps for catch basins at roads, driveways, and parking lots.

Avoid locating manholes, catch basins, curb valves, or other obstructions in pedestrian pathways, especially in the middle of curb cuts.

EXECUTION

All pipes shall be laid to the lines and grades shown on the drawings or as directed by the engineer. Verification of lines and grades will be done prior to any further work commencing and any variations noted and addressed.

DESIGN AND CONSTRUCTION GUIDELINES AND STANDARDS

DIVISION 33 • UTILITIES

33 00 00 • SITE UTILITIES

All pipes to be laid in open trench excavation shall be bedded and uniformly supported over their full length on foundations of the types specified and shown on the drawings.

Flat bottomed trenches shall be excavated and dewatered prior to preparing the specified foundation.

After the trench has been brought to the proper grade, the pipe shall be laid carefully in the trench using ropes, slings and proper equipment to accomplish the task.

Pipes will be laid true to the grades shown on the drawings and the interior and ends thoroughly cleaned of any debris and/or soil. When the engineer has been satisfied, backfilled and compacted in accordance with the contract documents.

FOUNDATION DRAINAGE

MATERIALS

Acceptable pipe materials include perforated schedule 40 PVC and slotted polyethylene tubing.

Provide a soil separator. Use a non-woven geotextile fabric.

DESIGN

Pipes should be a minimum of 4 inches in diameter. Consider 6 inch diameter pipe for areas prone to vermin infestation.

EXECUTION

Line trenches with drainage fill and a non-woven geotextile fabric.

Wrap the non-woven geotextile fabric all the way around the gravel, not just around the pipe.

OTHER UTILITIES

Describe the Contractor's scope of work with regard to installation and coordination of all utilities, including those of outside parties, i.e., cable, telephone, gas, electric, etc. Coordinate this information for the appropriate trades in the mechanical and electrical sections of the specifications. Clarify whether the Contractor, city, town or other outside party will supply labor and materials.

Utility back charges, permits and connection fees should be paid by the LHA.