6.2 Flow-Through Planter

Figure 6-8: At-grade flow-through planter. Source: City of Emeryville

Best uses

- Treating roof runoff
- Next to buildings
- Dense urban areas
- Locations where infiltration is not desired

Advantages

- Can be adjacent to structures
- Multi-use
- Versatile
- May be any shape
- Low maintenance

Limitations

- Requires sufficient head
- Careful selection of plants
- Requires level installation
- Susceptible to clogging

Flow-through planters are designed to treat and detain runoff without allowing seepage into the underlying soil. They can be used next to buildings and other locations where soil moisture is a potential concern. Flow-through planters typically receive runoff via downspouts leading from the roofs of adjacent buildings. However, flow-through planters can also be set level with the ground and receive sheet flow. Pollutants are removed as the runoff passes through the soil layer and is collected in an underlying layer of gravel or drain rock. A perforated pipe underdrain must be directed to a storm drain or other discharge point. An overflow inlet conveys flows that exceed the capacity of the planter.

TREATMENT DIMENSIONS AND SIZING

- Flow-through planters may be designed with a 4% sizing factor (percentage of the surface area of planter compared to the surface area of the tributary impervious area). The area of impervious surface multiplied by 0.04 sizing factor will equal the footprint of the flow-through planter. Alternatively, calculations may be performed using either the hydraulic sizing criteria for flow-based treatment measures or the hydraulic sizing criteria for combination flow- and volume-based treatment measures, included in Section 5.1.
- Install an overflow weir adequate to meet municipal drainage requirements.
- Flow-through planters can be used adjacent to building and within set back area.
- Flow-through planters can be used above or below grade.
- Size overflow trap for building code design storm, set trap below top of planter box walls.
- Planter wall set against building should be higher to avoid overflow against building.
- Elevation of the surface area may vary as needed to distribute stormwater flows throughout the surface area.

- Minimum 2 and up to12 inches of water surface storage between the planting surface and crest of overflow weir.

VEGETATION

- Plantings should be selected for viability in a well-drained soil. See planting guidance in Appendix A.
- Use integrated pest management (IPM) principles in the landscape design to help avoid or minimize any use of synthetic pesticides and quick-release fertilizer. Check with the local jurisdiction for any local policies regarding the use of pesticides and fertilizers.
- Irrigation shall be provided, as needed, to maintain plant life.
- Trees and vegetation do not block inflow, create traffic or safety issues, or obstruct utilities.

INLETS TO TREATMENT MEASURE

Flow may enter the treatment measure (see example drawings in Section 5.13):

  - As overland flow from landscaping (no special requirements)
  - As overland flow from pavement (cutoff wall required)
  - Through a curb opening (minimum 18 inches)
  - Through a curb drain
  - With drop structure through a stepped manhole (refer to Figure 5-3 in Chapter 5)
  - Through a bubble-up manhole or storm drain emitter
  - Through roof leader or other conveyance from building roof

- Where flows enter the biotreatment measure, allow a change in elevation of 4 to 6 inches between the paved surface and biotreatment soil elevation, so that vegetation or mulch build-up does not obstruct flow.
- Splash blocks, cobbles or rocks shall be installed to dissipate flow energy where runoff enters the treatment measure.
- For long linear planters, space inlets to planter at 10-foot intervals or install flow spreader.

SOIL CONSIDERATIONS SPECIFIC TO FLOW THROUGH PLANTERS

- Waterproofing shall be installed as required to protect adjacent building foundations.
- If site conditions permit infiltration to underlying soils, waterproofing is not required.
- An underdrain system is generally required for flow through planters. Depending on the infiltration rate of in situ soils, the local jurisdiction may allow installation without an underdrain on a case-by-case basis.
- Underdrain trench shall include a 12-inch thick layer of Caltrans Standard Section 68-1.025 permeable material Class 2, or similar municipality-approved material. A minimum 4-inch diameter perforated pipe shall be placed within the backfill layer. To help prevent clogging, two rows of perforation may be used.
- Planting soil shall have minimum percolation rate of 5 inches per hour and a maximum long-term percolation rate of 10 inches per hour. Soil specifications are provided in Appendix K. Check with municipality for additional requirements.
- The biotreatment soil shall be at least 18 inches thick.
- Provide 3-inch layer of mulch in areas between plantings.

SOIL CONSIDERATIONS FOR ALL BIOTREATMENT SYSTEMS

- Beginning December 1, 2011, soils in the area of inundation within the facility shall meet biotreatment soil specifications approved by the Regional Water Board (Appendix K), which supersedes other soil specifications. The minimum percolation rate for the

biotreatment soil is 5 inches per hour. The long-term desired maximum infiltration rate is 10 inches per hour, although initial infiltration rate may exceed this to allow for tendency of infiltration rate to reduce over time.

- Filter fabric shall not be used in or around underdrain trench.
- The underdrain shall include a perforated pipe with cleanouts and connection to a storm drain or discharge point. Clean-out shall consist of a vertical, rigid, non-perforated PVC pipe, with a minimum diameter of 4 inches and a watertight cap fit flush with the ground.
- There shall be adequate fall from the underdrain to the storm drain or discharge point.

CONSTRUCTION REQUIREMENTS FOR ALL BIOTREATMENT SYSTEMS

- When excavating, avoid spreading fines of the soils on bottom and side slopes. Remove any smeared soiled surfaces and provide a natural soil interface into which water may percolate.
- Minimize compaction of existing soils. Protect from construction traffic.
- Protect the area from construction site runoff. Runoff from unstabilized areas shall be diverted away from biotreatment facility.

MAINTENANCE CONSIDERATIONS FOR ALL TREATMENT MEASURES

- A Maintenance Agreement shall be provided.
- Maintenance Agreement shall state the parties' responsibility for maintenance and upkeep.
- Prepare a maintenance plan and submit with Maintenance Agreement. Maintenance plan templates are in Appendix G.

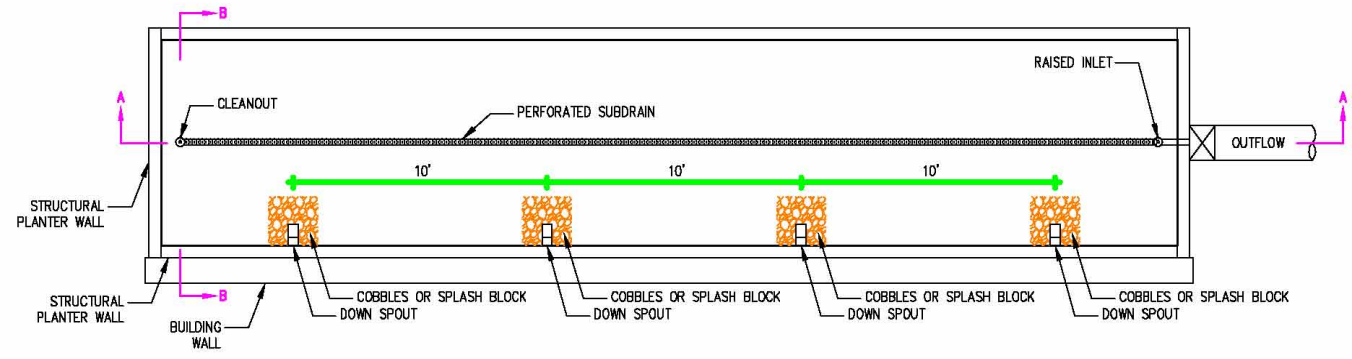

Figure 6-9: Plan view of long, linear planter, with inlets to the planter distributed along its length at 10' intervals.

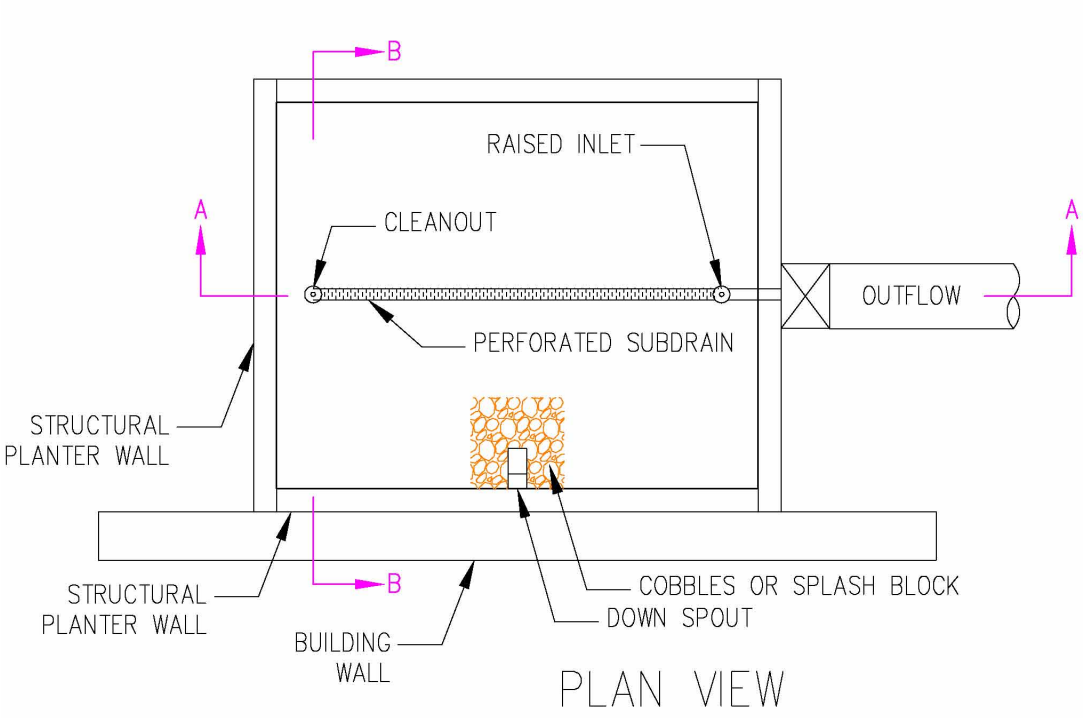

Figure 6-10: Plan view of planter designed to disperse flows adequately with only one inlet to planter

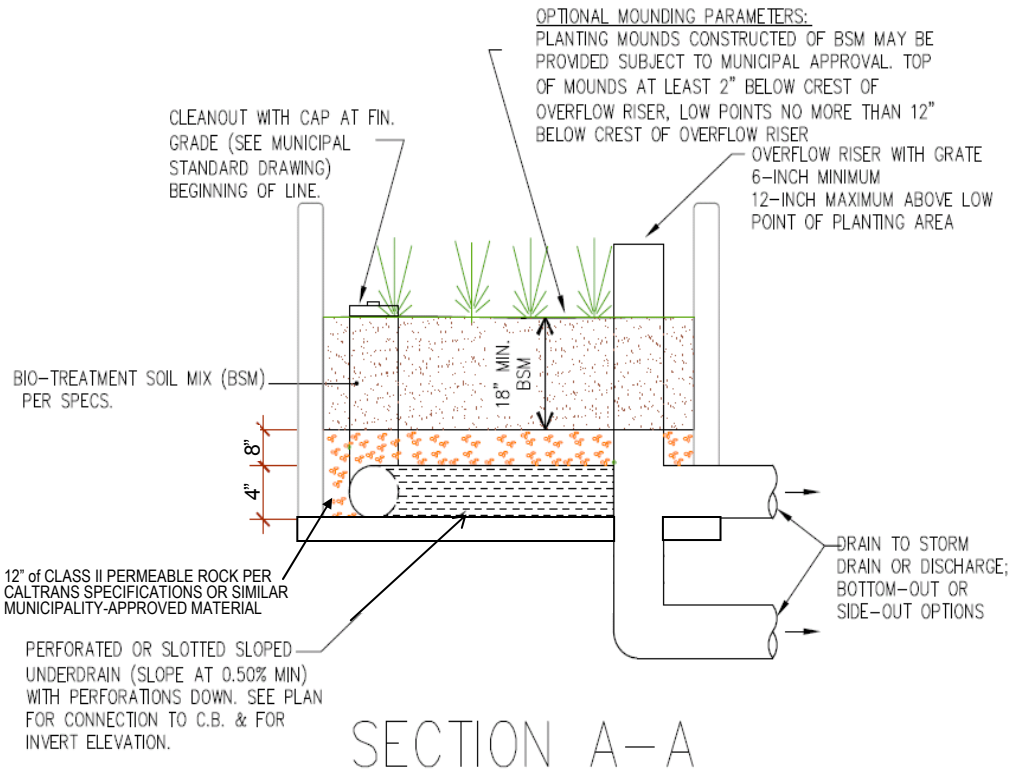

Figure 6-11: Cross section A-A of flow-through planter, shows side view of underdrain (Not to Scale)

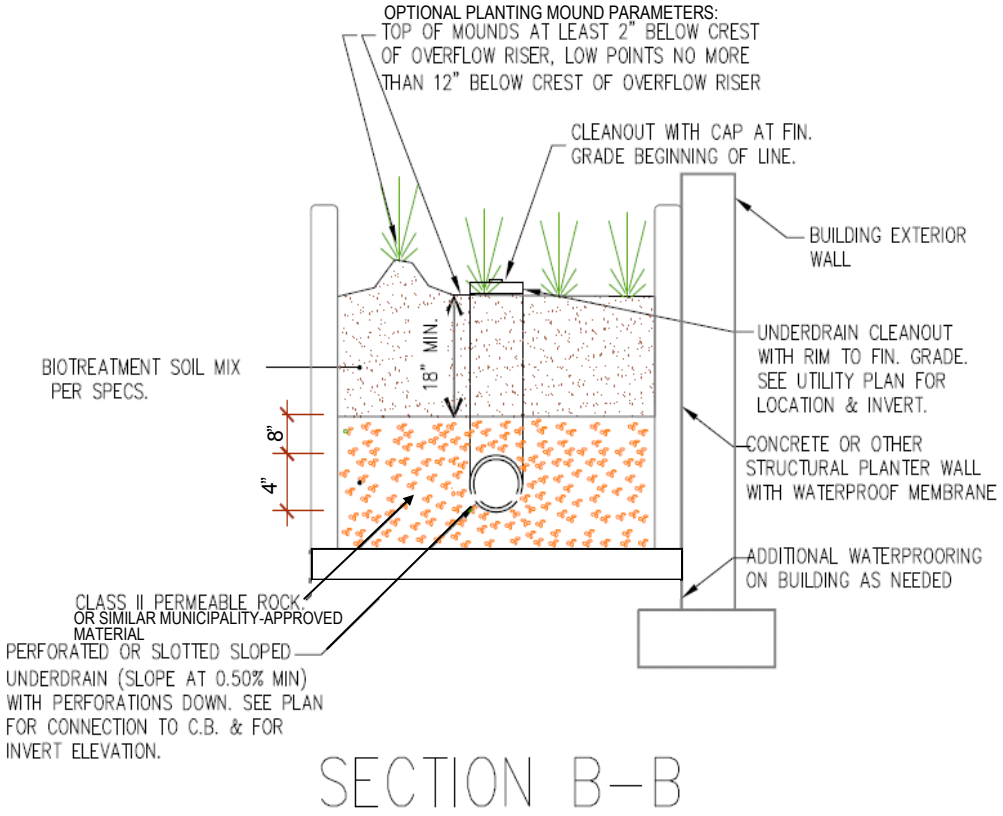

Figure 6-12: Cross section B-B of flow-through planter, shows cross section of underdrain

Figure 6-13: Above-grade planters. Source: City of Portland

Figure 6-14: Close-up of Flow Through Planter. (Source: City of Portland)

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