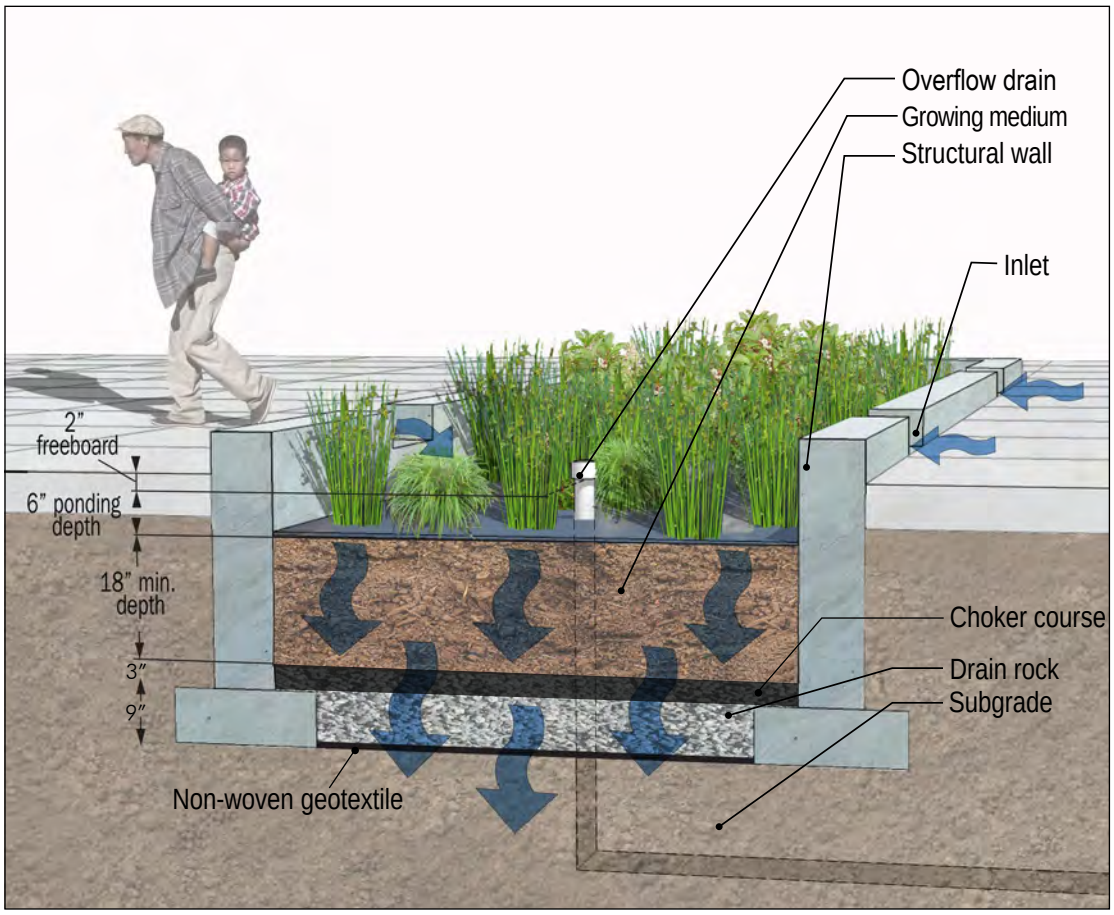
Structural Infiltration Planter



parking areas & impermeable landscape

permeable soils

Description

Structural Infiltration planters) are landscaped reservoirs that collect, filter and infiltrate stormwater runoff, allowing pollutants to settle and filter out as the water percolates through planter soil and infiltrates into the ground. Structural Infiltration planters typically require less piping than flow-through planters and a smaller facility size than traditional swales where native soils allow for infiltration. Unlike Non-Structural Infiltration Planters, Structural Planters do have hard sides and sometimes a hard bottom. Depending on the site, Structural Infiltration planters can vary in shape and construction, with or without walls to contain the facility, or formed as a shallow, basin-like depression.

Application & Limitations

Structural Infiltration planters should be integrated into the overall site design and may help fulfill the landscaping area requirement. Structural Infiltration planters can be used to manage stormwater flowing from all types of impervious surfaces, from private property and within the public right-of-way. Check with the local jurisdiction if proposing to use Structural Infiltration planters in the public right-of-way. The size, depth and use of Structural Infiltration planters are determined by the infiltration rates of the site's existing soils.

Y - Public System Approvable
Y - Quantity for Conveyance
Y - Hydromodification Approach
N - Water Quality Treatment Approach

Structural Infiltration Planter

Beaumont Village Lofts, NE Portland

Design Factors

Soil Suitability and Facility Sizing

The size and depth of the Structural Infiltration planter will depend upon the infiltration rate of existing soils. A sizing factor of 0.06 assumes the site infiltration rate is less than 2 in/hr.

For example, the size of an Structural Infiltration planter managing 1,500 square feet of total impervious area would be 90 square feet (1,500 x 0.06).

Size may be decreased if:

- Demonstrated infiltration rate is greater than 2 in/hr using ASTM D3395-09 method; or
- Amended soil depth is increased.

Geometry/Slopes

The shape may be circular, square, rectangular, etc. to suit the site design requirements. Regardless of the shape, a minimum planter width of 30 inches is needed to achieve sufficient time for treatment and avoid short-circuiting. Planters in a relatively flat landscaped open area should not slope more than 0.5% in any direction.

Piping for Structural Infiltration planters

Follow Plumbing Code requirements for piping that directs stormwater from impervious surfaces to planters. Stormwater may flow directly from the public street right-of-way or adjacent parking lot areas via curb openings. For Structural Infiltration planters install an overflow drain to allow not more than six inches of water to pondStructural Infiltration planter need an overflow drain to ensure no more than six inches of water will pond. On private property, follow Plumbing Code requirements for this overflow drain and piping, and direct excess stormwater to an approved disposal point as identified on permit drawings. Check with local jurisdiction or use Clean Water Services Design and Construction Standards for additional information on piping material for use in the public right-of-way.

Setbacks

Check with the local building department to confirm site-specific requirements.

- Generally, a minimum setback of 10 feet from building structures is recommended.
- Planters should not be located immediately upslope of building structures.

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New Seasons, 20th and SE Division St., Portland

Design Factors (continued)

Before site work begins, clearly mark Structural Infiltration planter areas to avoid soil disturbance during construction. No vehicular traffic should be allowed within 10 feet of Structural Infiltration planter areas, except as necessary to construct the facility. Consider construction of Structural Infiltration planter areas before construction of other impervious surfaces to avoid unnecessary traffic loads. To avoid erosion, use approved erosion control BMPs.

Soil Amendment/Mulch

Amended soils with appropriate compost and sand provide numerous benefits: infiltration, detention, retention, better plant establishment and growth, reduced summer irrigation needs, reduced fertilizer need, increased physical/chemical/microbial pollution reduction and reduced erosion potential. Primary treatment will occur in the top 18 inches of the Structural Infiltration planter. Amended soil in the treatment area is composed of organic compost, gravelly sand and topsoil. Compost is weed-free, decomposed, non-woody plant material; animal waste is not allowed. Check with the local jurisdiction or Clean Water Services for Seal of Testing Approval Program (STA) Compost provider.

Vegetation

Planted vegetation helps to attenuate stormwater flows and break down pollutants by interactions with bacteria, fungi, and other organisms in the planter soil. Vegetation also traps sediments, reduces erosion, and limits the spread of weeds. Appropriate, carefully selected plantings enhance the aesthetic and habitat value. For a complete list of allowable plants, refer to page 76.

The entire water quality treatment area should be planted appropriately for the soil conditions. Walled infiltration run-on planters will be inundated periodically. Therefore the entire planter should be planted with herbaceous rushes, sedges, perennials, ferns and shrubs that are well suited to wet-to-moist soil conditions.

If the Structural Infiltration planter has side slopes (basin without vertical walls), soil conditions will vary from wet to relatively dry; several planting zones should be considered. The flat bottom area will be moist-to-wet, and the side slopes will vary from moist at the bottom to relatively dry near the top where inundation rarely occurs. The moisture gradient will depend upon the designed maximum water depth, total depth of the planter and steepness of the side

Structural Infiltration Planter

Mississippi Commons, NE Portland

12th and Montgomery St., Portland

Design Factors (continued)

slopes. This moisture gradient is a transition zone and should be planted with species that tolerate occasional standing water, with plants that prefer drier conditions toward the top of the slope. Areas above the side slopes, immediately adjacent to the basin and above the designed high water line will not be inundated and should be planted with self-sustaining, low maintenance grasses, perennials and shrubs suitable for the local climate.

Native plants are encouraged, but non-invasive ornamentals that add aesthetic and functional value are acceptable with approval. All vegetation should be planted densely and evenly to ensure proper hydrological function of the Structural Infiltration planter. For a complete list of allowable plants refer to page 76.

Quantities per 100 square feet:

- 115 herbaceous plants, 1' on center spacing, 6" or ½-gal container size; or
- 100 herbaceous plants, 1' on center, and 4 shrubs, 1-gal container size 2' on center.

Trees are not allowed in Structural Infiltration planters. Small trees are allowed in raingardens and should be selected by their adaptability to wet-to-moist conditions and full size at maturity. Trees should be placed along the side slopes of the facility rather than at the bottom. Trees should be a minimum 2 gallon by 2 feet tall. Dig planting area twice the width of tree rootball and the depth of the rootball plus 12" (or total depth of 30", whichever is greater) should be backfilled with amended soil for optimal growth, with no sub-surface rock layer.

Required Maintenance Period

- Water-efficient irrigation should be applied for the first two years after construction of the facility, particularly during the dry summer months, while plantings become established. Irrigation after these two years is at the discretion of the owner.
- If public, the permittee is responsible for the maintenance of the Structural Infiltration planter for a minimum of two years following construction and acceptance of the facility.

Long-Term Maintenance

If private, the property owner will be responsible for ongoing maintenance per a recorded maintenance agreement (see page 88 for example maintenance agreement).

For detailed Operation and Maintenance Plans that describe proper maintenance activities please refer to page 91.

All publicly maintained facilities not located in the public right-of-way must have a public easement to ensure access for maintenance.

References

Clean Water Services Design and Construction Standards.