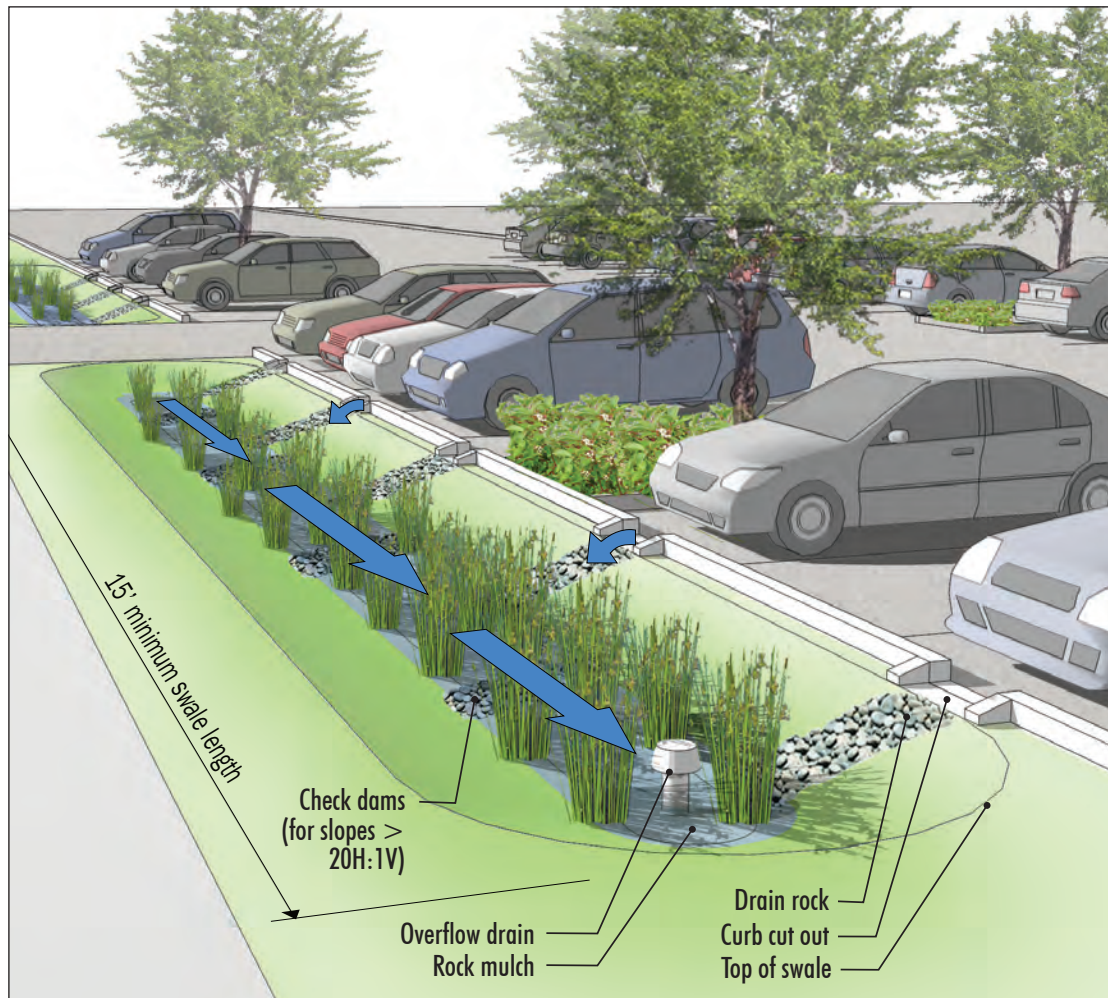
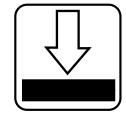


LIDA Swale



parking areas & impermeable landscape



impermeable soils



permeable soils

Description

A LIDA swale is a narrow, gently sloping landscaped depression that collects and conveys stormwater runoff. The densely planted LIDA swale filters stormwater as it flows the length of the swale and allows infiltration of water into the ground. The LIDA swale discharges to a storm sewer or other approved discharge point.

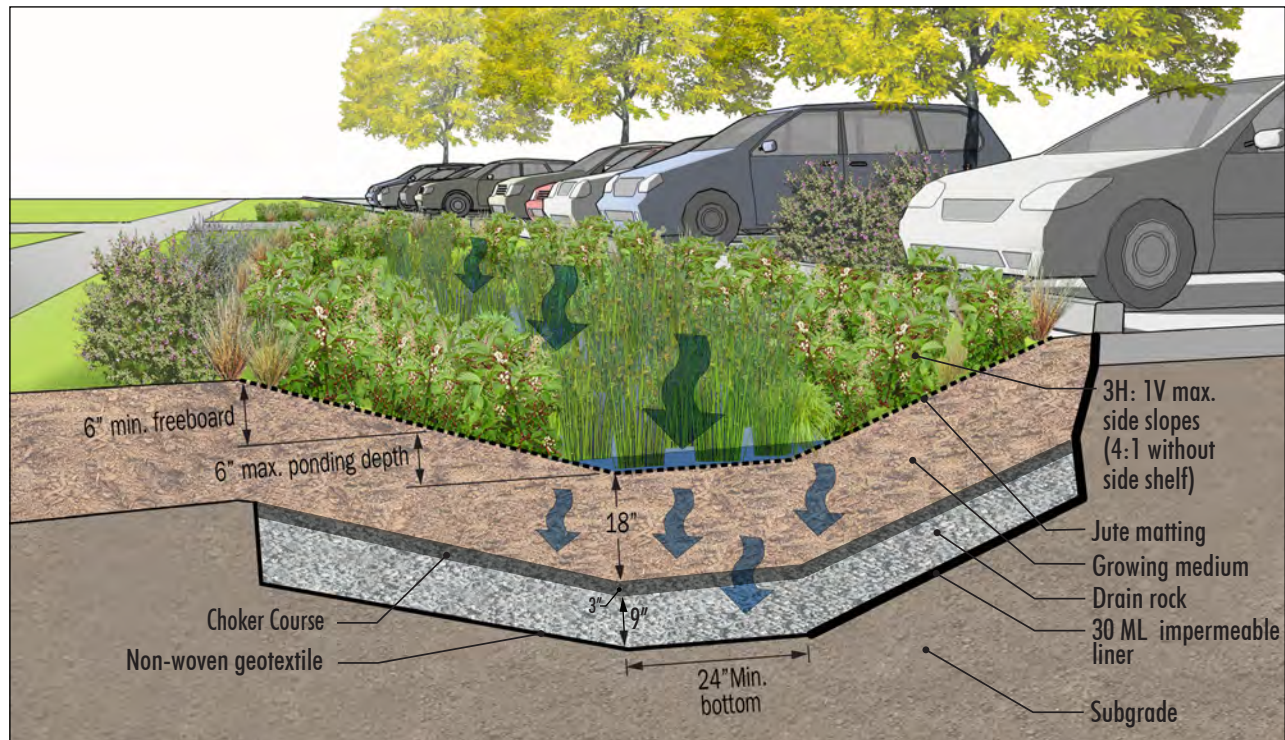
Compared to vegetated swales, LIDA swales may be shorter and narrower, but require deeper levels of amended soil and a subsurface drain rock layer to compensate for the smaller size and to function effectively.

Application & Limitations

A LIDA swale may help fulfill a site's landscaping area requirement. LIDA swales are approved to treat stormwater flowing from all types of impervious surfaces including private property and the public right-of-way, rooftops, parking lots, and streets. Check with the local jurisdiction if proposing to use a LIDA swale in the public right-of-way.



Boeckman Road, Wilsonville



Design Factors

Sizing

The size of the LIDA swale 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 a LIDA swale 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

A LIDA swale's slope end to end is at least 0.5% and no more than 6%. For sites with steeper slopes, check dams may be incorporated into the design. Side slopes from the bottom to the top of the swale must be 3:1 or less. The minimum bottom width is 2 feet, and the minimum depth is 1 foot.

Piping for LIDA Swales

If needed, stormwater may be directed from impervious surfaces to LIDA swales by piping per plumbing code requirements, or may flow directly into the LIDA swale via curb openings. A LIDA swale has no underdrain. An overflow drain allows no more 6 inches of water depth to collect in the LIDA swale. On private property, the overflow drain and piping must meet plumbing code requirements

and direct excess stormwater to an approved disposal point. Check with the 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.



Peoples Food Cooperative, SE Portland



Ecotrust building, Portland



New Seasons, SE Division St, Portland

Design Factors (continued)

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 LIDA swale. 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.

To avoid erosion, use approved erosion control BMPs for LIDA swale.

Vegetation

The entire facility area including side slopes and treatment areas are planted with vegetation appropriate for the soil conditions. Planting conditions vary from wet to relatively dry within the LIDA swale. The flat bottom will be inundated frequently and should be planted with species such as rushes, sedges, perennials, ferns, and shrubs well-suited to wet-to-moist soil conditions. The side slope moisture gradient varies from wet at the bottom to relatively dry near the top where inundation rarely occurs. The moisture gradient will vary depending upon the designed water depth, the swale depth, and side slope steepness. The transition zone from the bottom of the LIDA swale to the designed high water line or top of freeboard should be planted with sedges, rushes, perennials, ferns, and shrubs that can tolerate occasional standing water and wet-to-moist planting conditions. The areas above the designed high water line and immediately adjacent to the LIDA swale will not be regularly inundated and should be planted with self-sustaining, low maintenance grasses, perennials, and shrubs suitable for the local climate and site.

Native plants are encouraged, but appropriate, non-invasive ornamentals are acceptable for aesthetic and functional value. All vegetation should be densely and evenly planted to ensure proper hydrological function of the LIDA swale.

Quantities:

Bottom of LIDA swale (wet-to-moist zone, per 100 sf)

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

Side slopes and top of LIDA swale (wet-to-moist transition zone and dry zone)

- 1 tree per 300 sq. ft, minimum 2-gal container size by 2 ft-tall and
- 10 shrubs (1-gal) and 70 groundcovers (½-gal) per 100 sf

Trees are allowed in LIDA swales, and may be required. Trees should be selected by adaptability to wet-to-moist conditions and size at maturity. An area twice the width of the 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. Place trees along the side slopes rather than the bottom of the LIDA swale.



Tualatin Hills Park at Portland Community College

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 LIDA swale 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



NE Siskiyou Street, Portland



155th & Hart, Beaverton