

Chapter 3: LIDA Design Process

3.1 Design Basis

Primary goals of LIDA site design are to reduce the volume of stormwater runoff and to treat pollutant loads where they are generated using appropriate site planning and by directing stormwater to small-scale systems throughout the site. LIDAs integrated into landscaping and the site design may reduce the size of or eliminate stormwater ponds in separate land tracts, and may reduce underground piping, curbs, and gutters.

The District requires stormwater treatment for nearly all development and other activities that create new impervious surfaces or increase the amount of stormwater runoff or pollution leaving the site. Refer to the Standards for specific requirements and how to calculate the impervious area requiring LIDA or water quality facilities.

Stormwater treatment to remove pollutants is required in the Tualatin River Basin by the Oregon Department of Environmental Quality to comply with the Clean Water Act. The District's Total Maximum Daily Load (TMDL) and National Pollution Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) Permit require new development and redevelopment to reduce pollution from stormwater runoff. This is achieved by constructing water quality facilities to remove pollution, or by using LIDAs to reduce runoff and pollutants.

The water quality storm runoff rate volume calculations for sizing water quality facilities are presented in Chapter 4 of the Design and Construction Standards. To determine the size of LIDA facilities, owners and designers may use the LIDA Sizing Form in Section 3.2. This form is based on the water quality design storm and typical soil conditions. [Retrofit project sizing: For retrofit projects where there has been no stormwater treatment, the sizing requirements must be determined by District and City staff. Do not rely solely on the sizing methods in this manual.]

LIDA facilities are intended as stormwater quality facilities. However, onsite stormwater quantity detention may be incorporated into LIDA facility design in some cases if required. Porous pavement and infiltration planters/rain gardens may be adapted to provide detention storage. Porous pavement may be constructed with vaults or gravel/rock storage galleries to detain excess runoff. Infiltration planters or rain gardens may reduce stormwater runoff volume to meet all or part of a site's detention requirements if there is adequate native soil infiltration (greater than 2 inches per hour). Also, extended dry basins and constructed water quality wetlands (refer to the Water Quality Facilities section of the Design and Construction Standards) may be designed with additional capacity to provide both detention and water quality treatment. **When detention and treatment functions are to be combined, the analysis and design calculations must be done by a professional engineer.**

See the fact sheets in Chapter 4 for specific design criteria, photos and sketches of various LIDA facilities.

Chapter 3: LIDA Design Process

3.2 Design Steps for LIDA Facilities

For most development sites, LIDA facilities may be designed using District sizing factors. Complete stormwater plan submittal requirements are detailed in the Design and Construction Standards, and local planning and permitting departments may have additional requirements. For sites less than one acre, the impervious area requiring treatment may be reduced if LIDAs are used. This manual includes a LIDA Sizing Form to assist in sizing. The following steps describe the sizing process.

STEP 1: Determine impervious area requiring treatment

- Refer to Chapter 4 of the Design and Construction Standards for instructions to calculate the impervious area requiring water quality treatment for new development and redevelopment sites.

STEP 2: Deduct impervious area LIDA credits

- Deduct the site areas designed with porous pavement or green roofs from the impervious area calculated in Step 1.
- Check with the local jurisdiction about any additional credits (i.e. rainwater harvesting, tree protection, etc.)

STEP 3: Size LIDA facilities for remaining impervious area

- Use the LIDA Sizing Form to determine the size of LIDA facilities required to treat stormwater runoff from the remaining impervious area.
- Sizing factors for infiltration based LIDAs assume an existing site soil infiltration rate of less than 2 inches per hour. Fact sheets for these facilities (in Chapter 4) provide information about soil infiltration testing that may be performed if the designer believes site soils have greater infiltration capacity and wants to produce information to support a smaller sizing factor.
- If more than one LIDA facility is used on the development site, each facility must be sized for the amount of impervious area draining into it.

STEP 4: If needed, design water quality facilities for large impervious areas or remaining untreated impervious area

- The sizing factors noted in this Handbook shall not be used for LIDA facilities treating runoff from more than 15,000 square feet of impervious area.
- For large development sites and impervious areas, a large water quality facility (vegetated swale, extended dry basin or constructed water quality wetland) or proprietary facility may be appropriate.

Clean Water Services LIDA Sizing Form

Project Title:	_____
Project Location:	_____
Contact Name/Title/Company:	_____
Phone/e-mail:	_____

STEP 1: Determine Impervious Area Requiring Treatment

Total Site Area (acres):	<input type="text"/>
Total Existing Impervious Area (sq.ft.):	<input type="text"/>
Proposed New Impervious Area (sq.ft.):	<input type="text"/>
Impervious Area Requiring Treatment (sq.ft.) (Refer to Design & Construction Standards Chapter 4 for instructions to calculate this area, which will be less than or equal to the new plus existing site impervious area.)	<input type="text"/>

STEP 2: Deduct Impervious Area LIDA Credits

Porous Pavement (sq. ft.):	<input type="text"/>
Green Roof (sq. ft.):	<input type="text"/>
Other Credits as approved (sq. ft.):	<input type="text"/>
Total Credits (sq. ft.):	<input type="text"/>
Remaining Impervious area (sq. ft.) (Total from Step 1 – Total Credits):	<input type="text"/>

STEP 3: Size LIDA Facilities for Remaining Impervious Area

	IA: Impervious area treated (sq.ft.)	SF, Sizing Factor	LIDA facility size (sq.ft.) (IA x SF)
Infiltration Planters/Rain Garden		0.06	
Flow-through Planter		0.06	
LIDA Swale		0.06	
Vegetated Filter Strip		0.06	

Total Impervious Area treated (sq.ft.)	<input type="text"/>	(*Must equal total from Step 2 or additional LIDA facilities or Water Quality Facilities must be added.)
----------------------------------------	----------------------	----------------------------------------------------------------------------------------------------------