

LID Selection and Siting

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Presentation Outline

- Selection & Siting
 - Site opportunities
 - Constraints
 - Other considerations

LID Opportunities at Different Scales



Master Planned Community Scale

- Cluster development so that large areas of open space remain undeveloped
- Provide riparian buffers
- Locate development on least infiltrative soils
- Utilize infiltration properties of sandy soils for groundwater recharge

Tract Map Scale

- Minimize impervious areas by incorporating landscaped areas as open space or parks
- In areas not subject to mass grading, the smallest site disturbance area possible should be delineated and flagged and temporary storage of construction equipment should be restricted in these areas to minimize soil compaction on site
- Provide riparian buffers by clustering development upland and away from drainages
- Natural slopes and native vegetation on slopes adjacent to drainages should be preserved and/or restored and enhanced

Planning Area Scale

- Streets, sidewalks, and parking lot aisles should be constructed to the **minimum widths** specified in the land use code and in compliance with regulations for the Americans with Disabilities Act and safety requirements for fire and emergency vehicle access.
- Incorporate neighborhood-scale **LID facilities into parks**
- **Trails** in reserve areas and parks can be constructed with **pervious materials**
- **Native and/or non-native/non-invasive, climate-appropriate vegetation** that requires less watering and chemical application should be utilized within the common area landscaping
- Impervious surfaces should be minimized in common area landscape design
- Landscape watering in common areas, commercial areas, multiple family residential areas, and in parks should use **efficient irrigation technologies** and centralized irrigation controls.

Site Opportunities

- **Bioretention/Landscaped Based Solutions**
 - Runoff from sidewalks, walkways, trails, patios, and rooftops can be directed into adjacent landscaping
 - Bioretention areas/swales can be located in parking lot islands or other on-site landscaped areas.
- **Green Streets**
 - Bioretention / vegetated swales / filter strips can be incorporated into parkways, medians, and shoulders
 - Porous pavement can be used in parking and low traffic areas
- **Green roofs**
- **Cisterns**



Constraints

- Locations where **seasonal high groundwater** or mounded groundwater beneath the infiltration BMP is within 5-10 feet of the bottom of the infiltration BMP
- Locations on the project site where soils have an **infiltration rate** less than 0.5 inches per hour.
- Locations on the project site within 100 feet of a **groundwater well** used for drinking water, non-potable wells, tanks, drain fields, and springs; locations less than 50 feet away from **slopes steeper** than 15 percent; and locations less than eight feet from **building foundations** or an alternative setback established by the geotechnical expert for the project

Constraints

- Brownfield development sites or other locations where **pollutant mobilization** is a documented concern, unless a site specific analysis determines the infiltration would be beneficial.
- Locations with potential **geotechnical hazards** established by the geotechnical expert for the project.
- Projects with **high pollutant-risk areas** such as service/gas stations, truck stops, and heavy industrial sites, unless a site-specific evaluation demonstrates that:
 - Treatment is provided to address pollutants of concern, and/or
 - High risks areas are isolated from stormwater runoff or infiltration areas with little chance of spill migration

Constraints

- Location where an increase in infiltration over natural conditions could potentially cause impairments to downstream beneficial uses, such as change of seasonality of ephemeral washes
- Projects that do not provide sufficient demand for harvested stormwater
 - Competition with use of reclaimed for irrigation
 - Low water use landscape palettes
 - Low internal demand/irregular internal demand
- Conflicts with other codes
 - Language that prevents rooftop runoff from being discharged to pervious surfaces
 - Curbing requirements for streets and parking lot landscaped islands
 - Minimum street width requirements that can contribute to wide streets
 - Grading requirements that prohibit ponding of stormwater in landscaped areas or yards

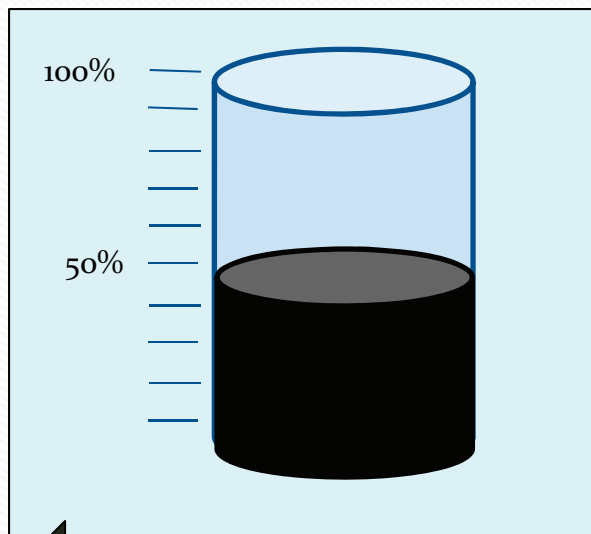
Other Considerations

- Effectiveness of Stormwater LID and Treatment BMPs is a function of:
 - Runoff Patterns
 - Pollutant types and forms
 - Storage Volume/Treatment Rate
 - Hydraulics/Hydrology of recovering storage
 - Deeper infiltration
 - Evapotranspiration
 - Harvest and use (irrigation/toilet flushing)
 - Draw-down/discharge rate
 - Treatment Process for released flows
 - Physical/Biochemical (settling, adsorption, filtering, etc.)
 - Operations and Maintenance considerations

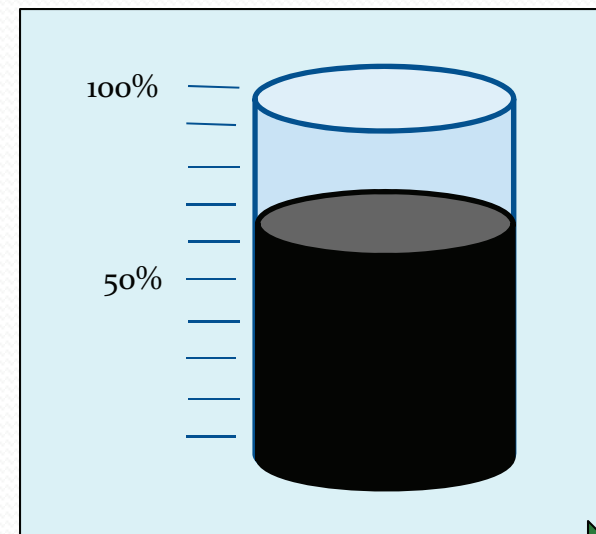
Pollutant Loading Example

- Example 100-acre residential, 0.8” cistern
- Conclusion – drawdown is important to effectiveness; bioretention may provide better pollutant load reduction

Cisterns and Re-Use: 48%



Bioretention with Underdrains: 63%



Better volume reduction;
Lower capture efficiency;
Lower TSS load reduction

Lower volume reduction;
Higher capture efficiency;
Higher TSS load reduction

