

HOMEOWNER'S GUIDE TO

Standard Storm Water Requirements (Low Impact Development)



Low Impact Development (LID)

Low impact development aims to protect pollution in our environment, emphasizing the use of existing natural site features and small scale storm water facilities to more closely mimic natural rainfall runoff patterns.

Keys to low impact development

Conserve and restore vegetation and soil

- Retain existing vegetation
- Restore vegetation on previously cleared land, where feasible
- Reduce runoff through vegetated surfaces that capture rainfall
- Look for opportunities to install rain gardens or bioretention cells

Minimize hardscaped/impervious area

- Avoid or minimize the use of impervious surfaces—like concrete or asphalt—in favor of permeable surfaces
- Use pavers or stepping stones for paths, driveways and patios
- Use permeable concrete and asphalt for driveways
- Create a vegetated roof

Disconnect hardscaped/impervious areas

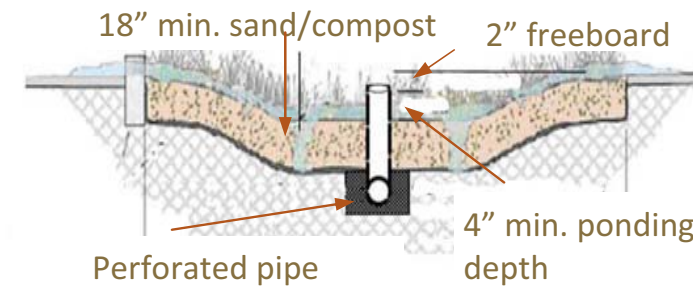
- Route rain gutter and drain run off into a landscaped area, so rain water run off can soak in before flowing to the street
- Install gravel or landscaped areas under the drip line of your eaves, if you don't have a rain gutter

Harvest rain water

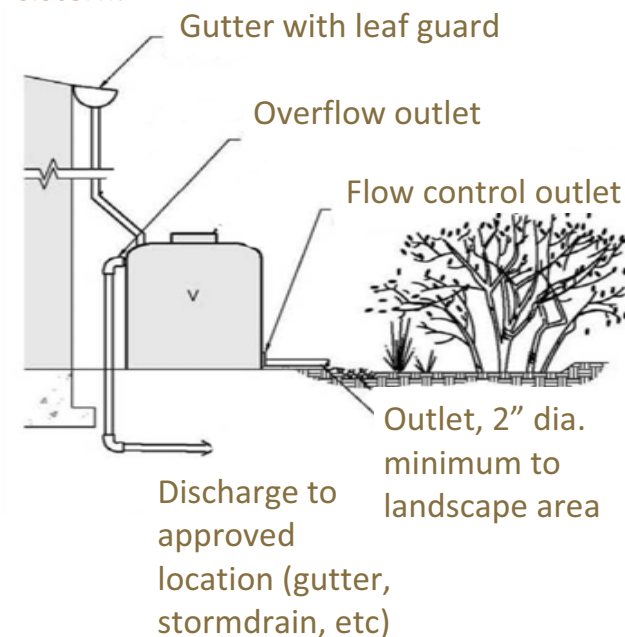
- Use rain barrels or underground cisterns to capture rainfall
- Create a rain garden to allow water to soak into the ground

Schematic Diagrams:

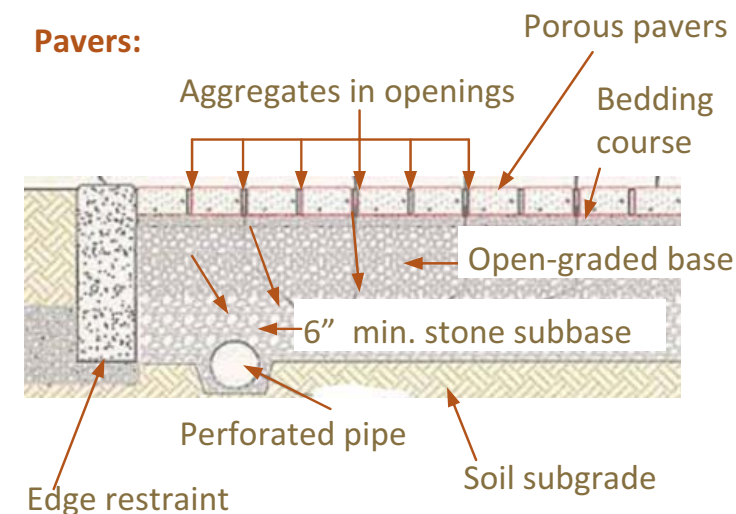
Bioretention cell:



Cistern:



Pavers:



For more information

- San Diego County Low Impact Development Handbook, www.co.san-diego.ca.us, search "low impact development handbook"
- City of Carlsbad Engineering Standards, volume 4, Storm Water Best Management Practices, www.carlsbadca.gov, search "engineering standards"

City of Carlsbad
Land Development Engineering
1635 Faraday Ave.
Carlsbad, CA 92008

Phone 760-602-2740
Fax 760-602-1052
LandDev@carlsbadca.gov



Low Impact Development (LID) Techniques

in Residential Development

1) Vegetated roof:

The benefits of a vegetated roof include reduced volume and improved quality of storm water runoff, increased energy efficiency, improved air quality, reduced temperatures, noise reduction and improved aesthetics. (LID fact sheet 29)



2) Rain water harvesting:

Cisterns and rain barrels capture roof runoff from roof downspouts and provide an effective way to store and slowly release run-off into the ground. Stored water can be used for irrigation and provides an opportunity for water conservation and reducing water utility costs. They can be located below ground or above ground. (LID fact sheet 26)



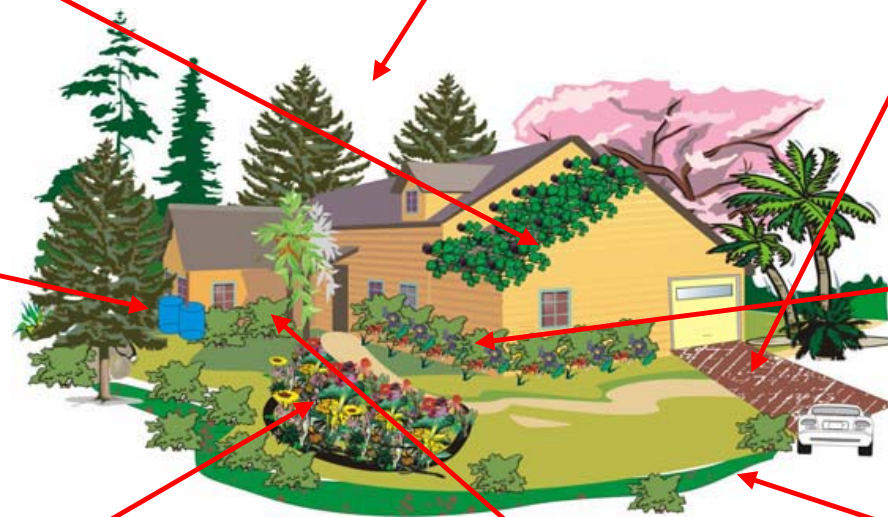
3) Bioretention cell or rain garden:

Landscape depressions that contain soil amendments that promote healthy vegetation and infiltration of storm water. Amended soil enriched with organic materials and sand increases capacity of soil to soak into the ground. (LID fact sheets 1, 2, 7, 25, 30)



4) Preserve natural vegetation and natural drainage flow:

Enhances the aesthetic quality of community and improves the evaporation rate of storm water runoff. Reduces the need for grading and construction of drainage facilities.



5) Downspout to landscaped area or flow-through planters:

Discharging downspouts to landscaped areas allows for retention and treatment of runoff. (LID fact sheets 4, 28)



6) Pervious pavement:

Pervious pavements such as pervious concrete, pervious asphalt concrete and pavers can be used to infiltrate storm water, replenish groundwater and reduce runoff volume. Base course must be designed to provide a stable load-bearing surface for the intended loads. (LID fact sheets 8-13, 17, 21-24)

7) Flow-through planter/vegetated or rock drip line:

Runoff from eaves of non-guttered roofs can cause significant erosion and resulting moisture can harm foundations. Vegetated or rock drip line protection slows runoff and promotes infiltration. The ground must slope away from home's foundation. (LID fact sheets 1, 27, 30, 32)



8) Vegetated swales / rock swales:

Swales act as linear biofilters along the perimeter of the lot or along the street front. Storm water travels slowly over rocks and vegetated surfaces allowing pollutants to settle and slowing runoff velocities. Check dams or gravel weirs can be added to further slow and spread concentrated flows. (LID fact sheet 4)

