Guide to Low Impact Development

Green Infrastructure for Storm Water Runoff

About this Guide

Low Impact Development is a soft-technology approach to site development that slows, detains, and infiltrates storm water runoff in order to reduce impacts to creeks, rivers, groundwater and the ocean.

In new development, the goal is to mimic the pre-development storm water runoff characteristics: flow rates, duration, and volume.

In redevelopment, the goal is to prevent further impacts to impaired water bodies.

Certain types of new and redevelopment projects in the unincorporated area must include Low Impact Development measures.

This guide provides an overview of the types of measures that would meet County requirements for Low Impact Development, and how those measures relate to other County requirements such as policy and zoning consistency, and public health and safety.

Permitting Process

The Planning & Development Department (P&D) has primary responsibility for reviewing and approving new and redevelopment in the unincorporated areas of Santa Barbara County consistent with County Code and policies.

P&D’s Development Review Division oversees the initial permit submittal, review, and approval process, while the Building & Safety Division oversees the construction and building process.

Planners coordinate closely with other County departments for technical support.

Those departments include:

Fire Department for private roadways and driveways;

Public Works Department for public roadways (Traffic & Transportation), peak runoff control and development within the floodplain (Flood Control District), and storm water treatment (Project Clean Water); and

Public Health Department for septic systems, mosquito management, and waste management (Environmental Health Services).
Applicability

The following types of discretionary projects must incorporate Low Impact Development (LID) measures:

1. Any new or redevelopment* 1 acre or more impervious area
2. Commercial new or redevelopment* 0.5 acre or more impervious area
3. Automotive repair shops
4. Retail gasoline outlets
5. Restaurants
6. Residential development 10 units or more
7. Parking of 5,000 sf or more, or 25 or more stalls (exposed to stormwater)

* see WQO 2003-0005-DWQ Attachment 9

LID Groups

One or more measures from each LID group must be included on all applicable projects.

1. Site Layout / Setting
Reduce overall disturbance by conserving and protecting natural areas, drainages, top-soils, and vegetation and minimizing overall impervious area.

2. Disconnect Impervious
Safely direct runoff from impervious surfaces (e.g. roof downspouts, driveways, roads) to a variety of decentralized, distributed pervious areas (e.g. open space, landscape, or permeable pavement with base).

3. Rate / Volume / Duration
Slow and reduce runoff using infiltration (e.g. trench, basin), biofilters (e.g. swales, bioretention, buffer strips, landscape planter box) and/or rainwater reuse (e.g. drywell, cisterns, rain barrels).

LID measures can be integrated with other County requirements (e.g., peak runoff control, significant protected resources, safe drainage control, minimum road widths, geotechnical constraints, etc.) but do not supersede them.

Acceptable Design Manuals

Design varies from site-to-site, but the general approach and technical considerations are essentially the same in any geographic area.

There are a number of excellent design manuals. Here are just a few that would be acceptable for use within the County of Santa Barbara.

- County of San Diego
- County of Los Angeles
- County of Ventura
- County of Contra Costa
- Start at the Source (BASMAA)

- City of Los Angeles
- City of Santa Barbara
- City of Sacramento
- San Mateo County Greenstreets & Parking Lot Design Guidebook
- Bay Friendly Landscaping
- CASQA’s Low Impact Development Manual for Southern California

You may confirm additional resources with your planner.
Departmental Coordination

Planning & Development Department

Development Review Division (DRev) - Reviews applications for new and redevelopment for consistency with County Land Use codes and policy.

Makes determination of Application Completeness.

Performs CEQA analysis and documentation.

Sets schedule for review and approval/denial.

Forwards discretionary project information to other County Depts through the Subdivision Review Committee (SDRC).

Applies conditions to discretionary permits.

Building & Safety Division (B&S) - Reviews Building Plans, and Grading & Drainage Plans prior to issuance of building or grading permits.

Implements Grading Code and Building Code for drainage and plumbing requirements.

Implements Grading Code for long-term site stabilization.

Public Works Department

Flood Control District (Flood) - Reviews applications and plans for peak runoff controls and consistency with Floodplain Management Ordinance (Chapter 15A).

Sets criteria and applicability for detention basins.

Applies requirements for development in special flood hazard designated areas.

Requires long-term maintenance agreement for detention basins.

Transportation Division (TRANS) - Reviews development within public ROW, including circulation and public safety.

Project Clean Water (PCW) - Reviews applicable projects for treatment of storm water runoff.

Requires long-term maintenance agreement for structural measures.

Fire Department

Fire (Fire) - Reviews for all-weather access capable of supporting a minimum of 20-ton load.

Sets criteria for private road / driveway design including width, structural material, emergency access and vehicle turnaround, and percent slope.

Paving required for roadways/driveways greater than 10% slope; engineered concrete for slopes greater than 15%.
Example LID Measures by Group

LID Group 1: Site Layout / Setting

Select one or more of the following measures, including but not limited to:

<table>
<thead>
<tr>
<th>Measure</th>
<th>Departmental Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Limit development to designated building envelope onsite</td>
<td>Establish building envelope to protect natural areas (DRev)</td>
</tr>
<tr>
<td>Protect existing drainageways</td>
<td>Setback 50’ from creeks (DRev)</td>
</tr>
<tr>
<td>Cluster residential units</td>
<td>Lots in designated development area or building envelope, leaving remaining portion undisturbed (DRev)</td>
</tr>
<tr>
<td>Minimize hazards through measures such as emergency vehicle access (Fire), defensible space (Fire), or safe ingress/egress</td>
<td></td>
</tr>
<tr>
<td>Shared driveways</td>
<td>Minimum width 12’ for driveways serving single parcel or residence; 16’ if serving two or more (Fire)</td>
</tr>
<tr>
<td>Preserve open space</td>
<td>Common open space or protected natural areas require management by responsible party able to maintain in perpetuity (DRev)</td>
</tr>
<tr>
<td>Minimize areas of soil compaction</td>
<td>Grading Code provisions for compaction in areas supporting structures, sloped fill, etc. (B&amp;S)</td>
</tr>
<tr>
<td>Alternative surfacing methods</td>
<td>Roads/driveways capable of carrying 20-ton capacity (Fire)</td>
</tr>
<tr>
<td>Revegetate disturbed areas</td>
<td>All-weather gravel acceptable on slopes &lt; 10 % (Fire)</td>
</tr>
<tr>
<td>Street trees</td>
<td>Can get credit for 0% IMP on clean water treatment control (PCW) and increased Tc (Flood)</td>
</tr>
<tr>
<td>Minimize road width (private)</td>
<td>Landscape bond (B&amp;S)</td>
</tr>
<tr>
<td>Minimize pavement area</td>
<td>Defensible space 100’ (Fire)</td>
</tr>
<tr>
<td>Minimize hazards through measures such as emergency vehicle access (Fire), defensible space (Fire), or safe ingress/egress</td>
<td></td>
</tr>
<tr>
<td>Street trees</td>
<td>Encroachment permit for plantings in ROW; subject to discretionary approval. Long-term maintenance req’d (Trans)</td>
</tr>
<tr>
<td>Minimize road width (private)</td>
<td>Minimum width 24’ for roads serving ≥ 5 residences or parcels (Fire)</td>
</tr>
<tr>
<td>Minimize parking area</td>
<td>Minimum parking requirements per Article II and III, Division 6 of the Zoning Ordinance (DRev)</td>
</tr>
<tr>
<td>Fire truck turnaround req’d for driveways &gt; 150’ (Fire)</td>
<td>Circulation design for vehicles must conform with minimum turning radius (Trans or Fire)</td>
</tr>
<tr>
<td>Dead-end access roads terminate with 40’ or 48’ radius bulb turnaround (Fire)</td>
<td></td>
</tr>
</tbody>
</table>

The following measures are also suitable. For more detail see page 2, Acceptable Design Manuals.

- Design new landscape elements to mimic natural systems
- Orient lots & buildings to maximize infiltration or open conveyance through swales or rain gardens to downstream storm water facilities
- Conserve natural areas using creative lot layouts & roadway configurations
- Protect and preserve topsoils during construction
- Protect existing vegetation
- Limit disturbance to minimum necessary for construction
- Incorporate decentralized storm water strategies
- Onsite reuse of storm water runoff
- Vegetated roof
- Roadway / sidewalk / driveway design, lot layout, parking, etc.
County of Santa Barbara

Pervious paver driveway, Chino, CA

Persico Commercial Center, Downey, CA

Bioretention cell for sidewalk/street/yard drainage, Los Angeles, CA

Pervious asphalt basketball court, 2nd Ward Neighborhood Park, Upper Darby, PA

Example residential subdivision (Metro)
Example LID Measures by Group

LID Group 2:Disconnected Impervious

Select one or more of the following measures, including but not limited to:

<table>
<thead>
<tr>
<th>Measure</th>
<th>Departmental Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Curb-Cuts</td>
<td>Safe drainage away from driving surfaces must be assured (Trans) Can get credit toward clean water treatment control (PCW)</td>
</tr>
<tr>
<td>Downspout to swale or landscaping</td>
<td>Downspouts within 10’ of building foundation must not result in saturated soils. May require conformance with a geotech Soil Engr. Report (B&amp;S) Slope should be 2% for 5’ away from the building foundation (B&amp;S)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Measure</th>
<th>Departmental Considerations</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driveways pitched to landscaping</td>
<td>Landscape must be lower in elevation than driveway (B&amp;S) Driveways must have positive grade toward drainage system, away from structures (B&amp;S)</td>
</tr>
<tr>
<td>Vegetated roofs</td>
<td>Structural integrity of roof system must be addressed (B&amp;S) Can get credit for 0% IMP on clean water treatment control (PCW)</td>
</tr>
<tr>
<td>Filter strips</td>
<td>Can get credit toward clean water treatment control (PCW) Safe drainage away from driving surfaces must be assured (Roads) Outside of public ROW (Trans)</td>
</tr>
<tr>
<td>Planter boxes</td>
<td>Can get credit toward clean water treatment control (PCW) Must have impermeable separation from bldg foundation (B&amp;S)</td>
</tr>
</tbody>
</table>

The following measures are also suitable. For more detail see page 2, Acceptable Design Manuals.

- Permeable paving
- Revegetate previously impacted open areas
- Vegetated roofs
- Open vegetated swale
- Concave road median
- Cul-de-sac design
- Planter boxes / foundation planting
- Downspout to swale or landscape, directed away from building foundation
- Driveways directed to landscape, etc.

Note: Some measures may apply toward more than one LID Group
Reservoir, 12” min. depth
Reverse bend trap or hooded overflow
18” sandy loam, minimum infiltration rate 5” per hour
12” open-graded gravel, approx. ½” dia.

Drain to storm drain or discharge; bottom-out or side-out options

Downspout to planter box (Low Impact Development Center, Inc.)
**Example LID Measures by Group**

**LID Group 3: Rate / Volume / Duration**

Select one or more of the following measures, including but not limited to:

<table>
<thead>
<tr>
<th>Measure</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Rain garden</td>
<td>Overland escape or bypass must be provided (Flood, Trans)</td>
</tr>
<tr>
<td></td>
<td>Building setbacks 10’ downgradient (B&amp;S)</td>
</tr>
<tr>
<td>Micro ponding and check structures</td>
<td>Outside road ROW (Trans)</td>
</tr>
<tr>
<td></td>
<td>Potential credit for increased Tc or reduced curve number in drainage calculations (Flood)</td>
</tr>
<tr>
<td>Vegetated swale</td>
<td>Slopes &lt; 2% unless terraced (PCW)</td>
</tr>
<tr>
<td></td>
<td>Outside of Public ROW (Trans)</td>
</tr>
<tr>
<td></td>
<td>Potential credit for increased Tc or reduced curve number in drainage calculations (Flood)</td>
</tr>
<tr>
<td>Remove and save healthy topsoil</td>
<td>Sediment control measures to protect stockpiles from storm water (B&amp;S)</td>
</tr>
<tr>
<td>during construction phase</td>
<td></td>
</tr>
<tr>
<td>Permeable paving with storage volume</td>
<td>Roads/driveways capable of carrying 20-ton capacity (Fire)</td>
</tr>
<tr>
<td></td>
<td>Can apply storage toward WQDV control (PCW)</td>
</tr>
<tr>
<td></td>
<td>Can account for reduced Tc (Flood)</td>
</tr>
<tr>
<td>Infiltration trench / basin</td>
<td>Outside of Public ROW (Trans)</td>
</tr>
<tr>
<td></td>
<td>Potential credit for increased Tc or reduced curve number in drainage calculations (Flood)</td>
</tr>
</tbody>
</table>

The following measures are also suitable. For more detail see page 2, Acceptable Design Manuals.

- Soil amendments
- Vegetated filter or buffer strips
- Green roof, ecoroof, etc.
- Deep-rooted, large trees

**Note:** All rate/volume/duration measures can apply toward storm water quality treatment
Pervious concrete parking with river stone edge treatment, Finn Springs County Park, El Cajon, CA

Parking lot bioswale, Oxnard, CA

Example rain garden (or bioretention) with perforated underdrain for poorly draining soils. Source: Prince George’s County

Above-ground cistern with overflow to pervious area

Example design specifications for vegetated swale (Metro)

Pervious concrete parking with river stone edge treatment, Finn Springs County Park, El Cajon, CA
Green Infrastructure for Storm Water Runoff

Water Resources Division
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Santa Barbara CA 93101

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Fax: 805-568-3434

Images used in this publication are taken from the Low Impact Development Manual for Southern California (CASQA 2010), unless otherwise noted. Document production partially funded with qualified outer continental shelf oil and gas revenues by the Coastal Assistance Impact Program, Bureau of Ocean Energy, Management, Regulation, and Enforcement, U.S. Department of the Interior.

Department Contacts:

P&D (Development Review) 568-2000
P&D (Building and Safety) 568-3030
Fire (Planning & Engineering) 681-5500
Public Works (Flood Control District) 568-3440
Public Works (Project Clean Water) 568-3440
Public Works (Transportation) 568-3000
Public Health (Environmental Health) 681-5500

Helpful Links

For more information on LID including the links below, please visit us at www.sbprojectcleanwater.org

Public Works Department

Flood Control District
  Standard Conditions
  Floodplain Management
  Watercourse Setback
Project Clean Water
  Standard Conditions
Transportation
  Encroachment Permit
  Street Trees

Fire Department

Development Standard 1
Planning & Development Department
  Development Review
  Hillside and Watershed Protection Policy
  Building & Safety
    Building Code
Public Health Department
  Environmental Health Services