

## APPENDIX B

### LOW IMPACT DEVELOPMENT (LID) and GREEN DEVELOPMENT GUIDE

#### Sections:

<b>25.010</b>	<b>Purpose</b>
<b>25.020</b>	<b>Definitions</b>
<b>25.030</b>	<b>Applicability</b>
<b>25.040</b>	<b>General Green Standards</b>
<b>25.050</b>	<b>Figures and Diagrams</b>

#### **25.010 Purpose**

- A. The purpose of this chapter is to provide alternative development regulations within Mono County to accomplish the following:
  - 1. Keep polluted runoff water out of the rivers and lakes;
  - 2. Use the chemical properties of soil and plants to remove pollutants from water;
  - 3. Design subdivisions to clean their own stormwater rather than dumping it into streams or lakes; and
  - 4. Preserve the natural water flow of the site.
- B. This chapter shall be known and may be cited as the Mono County LID ordinance.
- C. The figures shown on informational sheets produced by Mono County are provided as guidelines for the public and staff to use in meeting the intent of this chapter. The figures serve only as examples.

**Definitions.** Unless specifically defined below, the words and phrases used in this chapter shall be interpreted to give the meaning they have in common usage and to give this chapter its most reasonable application.

“Low Impact Development (LID)” means a design method for stormwater management that seeks to control stormwater at the source, using small-scale integrated site design and management practices to mimic the site’s natural hydrology. LID techniques include using permeable pavements, rain gardens, rain barrels, grassy swales, soil amendments, and native plants. Preserving natural vegetation and natural drainage patterns are also important LID tools. The basic design criterion for LID is to drastically reduce the volume of runoff water. Volume reduction can be accomplished only by one of three methods; infiltration, evapo-transpiration or capture and reuse.

“Infiltration” means the passage or movement of water from the land surface into the subsurface soil. Once infiltrated, the water becomes soil moisture or groundwater

“Evapo-transpiration” means the natural process by which water is evaporated into the air and soaks into the vegetation by the aid of a rain garden or swale.

“Rain Garden” means a depression in the landscape where stormwater is designed to flow into and filter down into the ground. Native trees and plants are planted in the rain garden. Rain gardens retain water on site to prevent water from running into the streets

or streams. They use the chemical, biological, and physical properties of plants, microbes, and soils to **remove, retain** pollutants from stormwater. The bottom soil in the rain garden is often replaced with 60% sand, 20 % compost, and 20% topsoil to create a highly permeable layer.

“Swale” means a shallow depression or wide, shallow ditch used to convey, store or filter runoff. It diverts water runoff after heavy rains and allows the water to infiltrate the soil down-slope. It is vegetated. Soil and water runoff are caught in the swale, which becomes a fertile area.

“Permeable” means the characteristic of a material that allows water to pass through it.

#### **Applicability.**

LID is an optional regulation. Certain incentives detailed below may encourage the use of LID. These standards apply to new land development but also act as a guide for implementation of LID for existing developed parcels.

#### **General Recommended Standards.**

- A. Maintain the natural flow of water on the property as much as possible. The excess water from buildings and driveways should be managed on site rather than with large retention basins or underground stormwater systems.
- B. Runoff from driveways shall not drain onto the street. Runoff shall be managed on site by use of filter strips, landscaping, swales, or rain gardens. Polluted runoff must be prevented from flowing directly down the street, into the culvert, and into the waterways.
- C. Design rain gardens into the landscaping. Rain gardens use the chemical, biological and physical properties of plants, microbes and soils to remove/retain pollutants from water.
- D. Use channels and swales to carry excess water to ponds or infiltration systems for treatment. Channels and swales minimize the erosive velocity of water and filter pollutants. These systems must have a minimum slope of one degree to avoid standing water. Where density, topography, soils and slope permit, open channels should be placed in the street right of way to convey stormwater runoff.
- E. Pedestrian paths that run alongside roads shall be separated from the road (\*applicable to neighborhoods of significant size.)
- F. A channel or swale shall be placed between the pedestrian path and road (\*applicable to neighborhoods of significant size with large amounts of runoff).
- G. Runoff from impervious surfaces shall be collected in on-site infiltration basins and trenches. They shall be designed for a 20-year, one-hour storm event at minimum. The Director may require a larger design when topographic and/or drainage conditions of the surrounding area or watershed warrant more drainage.
- H. Runoff shall be diverted to an on-site retention basin using a slot drain, culvert, depressed swale, rock-lined trench, or other approved facilities. Surface and subsurface water shall not drain over sidewalks or adjoining parcels.

- I. Runoff from structures that is not directed into a retention basin shall be directed into a graveled infiltration trench. The trench shall be designed under all eaves and decks for a 20-year, one-hour event storm. They shall include a gravel depth of eight inches and width of two feet, minimum.
- J. Limitation on runoff. The net rate release of runoff from a site onto adjoining parcels and rights of way after construction shall not be greater than pre-construction levels of the runoff release from the site based on a 20-year, one-hour storm event. The County may require a design to accommodate a larger storm even when topographic or drainage conditions of the area or watershed warrant more stringent drainage improvements.
- K. Maintenance. All required drainage and erosion control improvements shall be maintained for the life of the project, including routine maintenance, repair and replacement of the improvements. Maintenance shall include:
  - 1. Unclogging of basins, pipes, swales and trenches by debris, ice and sediment;
  - 2. Repair of damaged basins, pipes, swales, and trenches;
  - 3. Replacement of unhealthy, damaged or nonproductive vegetation; and
  - 4. Restabilization of erosion on slopes.
- L. Porous material is encouraged for use on driveways and parking lots. Permeable pavements allow stormwater to drain through the pavement into the ground below, where soil and microbes filter out and break down many pollutants. Parking lots, driveways, sidewalks and patios can all be constructed using permeable pavement.
- M. Various permeable pavement types are acceptable, including pervious concrete, porous asphalt, permeable interlocking concrete pavers, and reinforced turf pavements. Pervious concrete and porous asphalt are constructed without the smaller particles that are mixed into conventional pavements, thus leaving voids for stormwater to seep through. Permeable interlocking concrete pavers feature openings between the paving blocks to allow stormwater to infiltrate. Reinforced turf pavements can be planted with grass or other plants, and look more like a lawn than a driveway or parking lot. Use of these materials will qualify for an impervious credit as mentioned in Incentives.
- N. Curb-adjacent sidewalks create an undesirable urban appearance and are strongly discouraged. Detached sidewalks or pedestrian paths separated from the road with variable-width walkways are preferred. Gravel pedestrian ways are permitted where it is determined that traffic volumes are light. Gravel walks should be a minimum of six feet wide and be designed to drain properly. Where curbs are used, they shall have cutouts in the concrete to allow stormwater to flow past the curb and into the landscaping.
- O. Street layout should be designed to minimize the street lengths and total paved area on site. The more natural soil that exists on a site, the better the hydrology.
- P. Use narrow roadways (18-24 feet of paved area) for low-traffic, residential areas.
- Q. Decrease the size of the right of way to the minimum amount needed.
- R. Green roofs and/or two track driveways (like a jeep trail) are permitted.

- S. **Open Space/Cluster Design.** Development that reserves part of the site for open space and retains the natural vegetation is strongly encouraged. Water and land resources are greatly enhanced by untouched, natural terrain. Developers will be allowed to maintain the original net density of the site while building on a smaller area within the site. In addition, density bonuses may be awarded for increasing the amount of open space.

**Incentives.**

- A. Impervious lot coverage is limited to 45%. However, the use of pervious material will be considered a credit. The use of pervious materials will count at 75% (instead of 100%) of the surface area of the pavement or driveway.
- B. Reduction in the minimum lot size may be permitted when using Open Space/Cluster design.
- C. Trails and pedestrian paths and LID techniques such as rain gardens are encouraged to exist in the designated open space.
- D. Narrow roadways should be used, which can reduce the cost of street paving and open up more land for development.
- E. A density bonus provides developers with a number of additional units if they use Open Space/ Cluster development. A density bonus percentage equal to half of the percentage of land dedicated to open space may be awarded through the Use Permit process and otherwise allowed by land use designations. For example, a 15% density bonus may be awarded for 30% of the land being dedicated to open space.

**Other General Standards.**

- F. Existing healthy mature trees should be preserved and incorporated into project landscaping to the greatest extent feasible and that is safe.
- G. Site design should not change natural drainage patterns. Site grading should be sensitive to existing landforms and topography so that the natural setting may be preserved to the greatest extent possible. When modifications are necessary, surface drainage with retention facilities is preferred to underground systems
- H. Varied front-yard setbacks are encouraged. Long, monotonous rows of homes at the same setback are strongly discouraged.
- I. Single-family parcels should avoid a patterned “cookie cutter” look by employing a variety of lot sizes, widths, and shapes, whenever possible, except where the pattern has already been established in the neighborhood.
- J. Build curvilinear streets for low-traffic, residential areas to instinctively reduce the speed of drivers.
- K. When designing a home, orient the garage to be hidden on the side of the home, the rear of the home, or the rear half of the lot for aesthetic reasons and to reduce the dominance of automobiles in the neighborhood.

**Energy Conservation from Solar Orientation.**

Passive solar energy techniques are strongly encouraged where not in conflict with preserving the natural features of the site.

L. Home Orientation

South-wall glass is important to maximize passive solar heating. The likelihood of houses sited with solar access to the south is greater if streets run generally east and west. However, solar access can still be provided by creative lot configuration and siting of units on the lots.

M. Compact design. Minimize heat loss by reducing the area of exterior wall and roof surfaces. Use a compact design (i.e., a two-story house) rather than have the same amount of floor space spread out on a single story.