Development of Low Impact Development Standards
Advance Materials for Technical Advisory Committee Meeting #1
November 2, 2009

These materials are provided to support Technical Advisory Committee preparation for the November 2 meeting.

These are preliminary, draft materials compiled by Ecology, just to stimulate discussion.

1. Ecology's thoughts re: permit requirements based on performance standards
2. Definitions of Low Impact Development
3. Goals of Low Impact Development
4. Preliminary list of site and subdivision scale LID techniques and development principles
5. Preliminary list of basin-scale LID techniques and development principles

Public Input

Meetings are open to the public. Meeting agendas will have specific times set aside for public input.

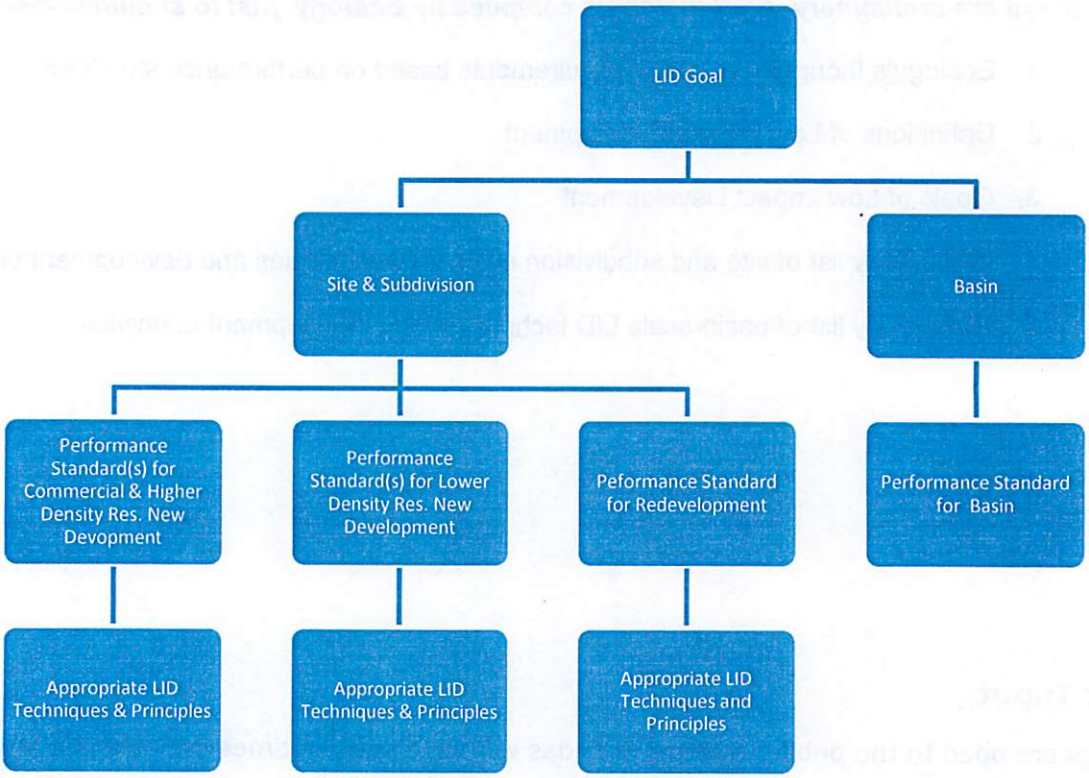
To receive meeting agendas, handouts and summaries, you may sign up for Ecology's LID Standards Listserv.

You also may submit written input to Ecology on the LID stakeholder advisory process at LID@ecy.wa.gov. We will summarize the comments to provide to the committee members.

http://www.ecy.wa.gov/programs/wq/stormwater/municipal/lidTECHadvisory.html 11/12/2009

Permit Requirements Based on Performance Standards

Ecology suggests that the municipal stormwater permits could incorporate hydrology-related performance standards that municipalities adopt and enforce for new development and redevelopment. The permit could also require revision of all local development-related codes and rules for incorporation of LID principles.



Site and Subdivision Performance Standards may be set in consideration of:

- the feasibility of LID techniques/principles for the development type and site; and
- time frames for adoption and implementation of LID techniques/updated development standards by local governments. The standard may become more stringent over time.

Basin-level Performance Standards may be set in consideration of:

- the amount of existing development
- the beneficial uses that are to be restored and maintained

Definitions of Low Impact Development

1. USEPA: http://www.epa.gov/owow/nps/lid/

   LID is an approach to land development (or re-development) that works with nature to manage stormwater as close to its source as possible. LID employs principles such as preserving and recreating natural landscape features, minimizing effective imperviousness to create functional and appealing site drainage that treat stormwater as a resource rather than a waste product. There are many practices that have been used to adhere to these principles such as bioretention facilities, rain gardens, vegetated rooftops, rain barrels, and permeable pavements. By implementing LID principles and practices, water can be managed in a way that reduces the impact of built areas and promotes the natural movement of water within an ecosystem or watershed. Applied on a broad scale, LID can maintain or restore a watershed's hydrologic and ecological functions. LID has been characterized as a sustainable stormwater practice by the Water Environment Research Foundation and others.

2. LID and "Green Infrastructure"

   Green infrastructure" is a relatively new and flexible term, and it has been used differently in different contexts. However, for the purposes of EPA's efforts to implement the Green Infrastructure Statement of Intent, EPA intends the term "green infrastructure" to generally refer to systems and practices that use or mimic natural processes to infiltrate, evapotranspirate (the return of water to the atmosphere either through evaporation or by plants), or reuse stormwater or runoff on the site where it is generated. Green infrastructure can be used at a wide range of landscape scales in place of, or in addition to, more traditional stormwater control elements to support the principles of LID.

3. Low Impact Development Center: http://www.lowimpactdevelopment.org/

   LID is an ecologically friendly approach to site development and storm water management that aims to mitigate development impacts to land, water, and air. The approach emphasizes the integration of site design and planning techniques that conserve natural systems and hydrologic functions on a site. Specifically, LID aims to:

   - Preserve open space and minimize land disturbance;
   - Protect natural systems and processes (drainage ways, vegetation, soils, sensitive areas);
   - Re-examine the use and sizing of traditional site infrastructure (lots, streets, curbs, gutters, sidewalks) and customize site design to each site;
   - Incorporate natural site elements (wetlands, stream corridors, mature forests) as design elements; and
   - Decentralize and micromanage stormwater at its source.

4. Low Impact Development Center: http://www.lowimpactdevelopment.org/

> "Low Impact Development is a new comprehensive land planning and engineering design approach with a *goal of maintaining and enhancing the pre-development hydrologic regime of urban and developing watersheds.* This design approach incorporates strategic planning with micro-management techniques to achieve superior environmental protection, while allowing for development or infrastructure rehabilitation to occur."

5. Puget Sound Partnership/WSU Pierce County Extension: Low Impact Development Technical Guidance Manual for Puget Sound

> "A stormwater management and land development strategy applied at the parcel and subdivision scale that emphasizes conservation and use of on-site natural features integrated with engineered, small-scale hydrologic controls to more closely mimic pre-development hydrologic functions."

Goals of Low Impact Development

1. Section 1.4.1 of the LID Technical Guidance Manual for Puget Sound

   "...to prevent measurable harm to streams, lakes, wetlands, and other natural aquatic systems from commercial, residential, or industrial development sites. The impact to receiving waters (and determining if a project has achieved the above goal) is estimated by hydrologic models and measured by monitoring surface and ground water quality and quantity, and biological health."

2. Washington Dept. of Ecology 1st draft as published in the call for nominations to the LID committees

   Minimal hydrologic changes that do not have an appreciable effect on the natural hydrologic cycle; achievement of surface and ground water quality standards in the receiving waters; maintenance of the designated beneficial uses.

3. Low Impact Development Center

   "*...maintaining and enhancing the pre-development hydrologic regime of urban and developing watersheds.*"

Preliminary List of Site and Subdivision Scale LID Techniques and Development Principles

LID Techniques from Chapters 6 & 7 of the ***Low Impact Development Technical Guidance Manual for Puget Sound***

- Permeable Pavements
  - Sidewalks and Patios
  - Driveways
  - Roads
- Bioretention/Rain Gardens
  - Site/Shared sites
  - Public Right of Way
- Soil Quality and Depth
- Dispersion
  - Partial dispersion
  - Full dispersion (no surface runoff)
- Reverse slope sidewalks
- Minimal Excavation Foundations
- Vegetated Roofs
  - Extensive
  - Intensive
- Rainwater Harvesting

Development Principles adapted from ***Better Site Design: A Handbook for Changing Development Rules in Your Community***, Center for Watershed Protection

- Residential Streets and Parking Lots
  - Reduced Street Width
  - Reduced Street Length
  - Reduced Right-of-Way Width
  - Less Cul-de-Sac use; reduced radius
  - Vegetated Open Channels for conveyance
  - Maximum Parking Ratio Limits
  - Lower Parking Code Requirements

Parking Lots – reduced stall size, efficient lanes

- Parking Structures and Shared Parking
- Parking Lot Runoff treatment in bioretention, strips, and islands

Lot Development

- Open Space Design with clustered small lots
- Smaller Setbacks and Narrower Frontages
- Sidewalk placement and widths
- Shared Driveways & Alternative surfaces
- Open Space Management

Conservation of Natural Areas

- Create buffers along all perennial streams to include 100-yr floodplain, steep slopes, wetlands
- Stream buffers preserved or restored with native vegetation
- Restrict clearing and grading to building footprint, access routes, and fire protection needs
- Conserve trees & other vegetation by planting additional vegetation, clustering tree areas, promoting native vegetation
- Employ incentives such as density compensation, tax reduction, by-right open space development
- No unmanaged stormwater to wetlands, sole-source aquifers, or sensitive areas

Preliminary List of Basin-Scale LID Techniques and Development Principles

Preliminary list items adapted from Better Site Design: A Handbook for Changing Development Rules in Your Community, and "Effects of Urbanization on Small Streams in the Puget Sound Lowland Ecoregion," May et al, 1997

Limits on total clearing and grading in a basin. Preservation of a high percentage of the basin in native vegetation.

Limits on total effective impervious area

Buffer widths on all streams not just streams regulated by the Shoreline Management Act

Quality stream buffers with mature, native coniferous forest and few road crossings

No development in 100-year floodplain

Protect and enhance headwater wetlands and off-channel riparian wetlands

Replanting of trees and native vegetation

Preference or mandatory use of infiltration systems for concentrated stormwater management

Preferentially locate development on soils with higher infiltration rates

Application of most of Site & Subdivision scale techniques and principles to maximize infiltration and help meet basin targets for native vegetation retention and effective impervious surfaces

Infill and redevelopment encouraged to reduce creation of new impervious surfaces

Basin-scale hydrologic modeling to predict hydrologic changes under various possible development and land management strategies