STORMWATER MANAGEMENT AND LID IN A NUTSHELL

This is the first of three newsletters devoted to the topic of Low Impact Development (LID) for stormwater management.

Until recently, LID was viewed as an alternate approach to stormwater management. The current regulatory framework evolved around traditional stormwater management practices such as detention ponds, pipes, and underground vaults. However, under new stormwater permits issued by the Department of Ecology, LID will no longer be the alternative approach, but will be the preferred method for stormwater management. LID will be the new way of doing business. This article provides an overview of what stormwater is and why it needs to be managed, what LID is, how LID differs from other types of stormwater management, and why it matters to local governments.

Q. WHAT IS STORMWATER AND WHY DO WE NEED TO MANAGE IT?

A. Stormwater runoff is generated when precipitation from rain and snowmelt flows over land or paved surfaces and does not absorb into the ground. As the runoff flows over impervious surfaces such as paved streets, parking lots, and building rooftops, it accumulates debris, chemicals, sediment, or other pollutants that contribute to water quality problems when runoff flows directly into surface waterways and is left untreated.[1]

As natural landscapes continue to be converted to urban areas, forests or other naturally vegetated landscapes give way to impervious surfaces. This has led to stormwater runoff becoming one of the largest sources of pollutants to the surface waters of Washington State and also creates high flows that can harm aquatic habitat. To address these problems, it is critical that jurisdictions adopt new stormwater management practices for urban areas. A recent stormwater management approach involves the use of LID techniques to retain vegetation, limit impervious surfaces, and infiltrate and treat stormwater runoff on-site.

[1] http://cfpub.epa.gov/npdes/home.cfm?program_id=6

Q. WHAT IS THE FEDERAL GOVERNMENT DOING TO ENSURE THAT STORMWATER IS MANAGED?

A. Under the federal Clean Water Act, a municipal National Pollutant Discharge Elimination System (NPDES) permit is required for urbanized areas that collect stormwater runoff in a municipal separate storm sewer (MS4s) and discharge it to surface waters. The permitting system is implemented in two phases:

- **PHASE I PERMITS** apply to all incorporated cities with a population over 100,000 and unincorporated counties with populations of more than 250,000 (as of the 1990 census), as well as MS4s owned by public entities located in a Phase 1 city or county (such as ports)

- Phase 1 communities include: Clark, King, Pierce, and Snohomish Counties; the cities of Seattle and Tacoma; and the Port of Seattle and Port of Tacoma

- **PHASE II PERMITS** apply to less populated areas

- Phase II Western Washington includes: Over 80 cities and the urbanized parts of five counties

- Phase II Eastern Washington includes: 18 cities and urbanized portions of six counties

The Washington Department of Ecology administers the permitting system and establishes guidelines and requirements – referred to as stormwater best management practices (BMPs) – to help local governments meet federal stormwater regulations.

Q. WHAT IS LID AND WHAT ROLE DOES IT PLAY IN STORMWATER MANAGEMENT?

A. LID refers to a suite of stormwater management and site design approaches that mimic natural drainage processes by retaining vegetation, limiting impervious surfaces, and infiltrating and treating runoff on-site. While traditional stormwater practices focus on collecting stormwater in piped networks and transporting it off-site as quickly as possible, LID manages stormwater on-site by using multiple approaches including:

- "Disconnecting" impervious surfaces by using techniques such as minimizing the length and width of roads

- Amending soils by adding components like compost and mulch

- Installing bioretention or rain gardens that capture, infiltrate and treat stormwater runoff

- Using permeable pavements that allow for the movement of stormwater runoff into the ground

- Collecting and reusing rainwater with rain barrels or cisterns

- Installing vegetated roofs that capture and slow and treat stormwater runoff in the soils and plants that cover the roof area

Q. WHY SHOULD MY JURISDICTION USE LID?

A. LID has been widely demonstrated as an effective approach for managing stormwater at both the project and landscape level. Seattle's SEA Streets LID project, for example, reduced the volume of water flowing to municipal drainage infrastructure by 98%, and the Meadow on the Hylebos LID project in Tacoma was able to retain 99% of precipitation falling on that area.[2] A six-year study by the University of Washington found that permeable pavements were much more effective per unit area than traditional pavements at reducing zinc, copper, and motor oil concentrations in stormwater runoff.[3]

LID has benefits that go beyond traditional stormwater infrastructure, to include ecological, economic, and community benefits:

- Cost effectiveness through reduced infrastructure costs because LID reduces water flow into the stormwater system
- Aesthetic benefits as LID features can be part of attractive landscaping throughout our communities and streetscapes
- Reduced urban flooding risks as LID holds or delays water on-site, reducing the amount of runoff generated during rain events
- Multiple ecological benefits including preserved habitat, improved air quality, groundwater recharge, and reduced building energy use (vegetated roofs)

Q. WHAT ARE THE IMPLICATIONS FOR LOCAL GOVERNMENT BUDGET, POLICY, AND PLANNING?

A. Local governments need to consider the budget, policy, and planning implications of LID, which will vary depending on the extent of your jurisdiction's existing LID program. In order to prepare for these new regulations, jurisdictions will need to consider the costs of implementing the new LID requirements, identify opportunities for financing, and consider this in upcoming budget deliberations for 2014. Here are some cost, policy, and planning considerations:[4]

- Regulatory transition costs: review and update ordinances, regulations and standards; tracking and reporting; procedures for inspection; equipment and procedures for maintenance
- Cross-departmental collaboration: maximize efficiencies across departments to ensure a smoother transition
- Stormwater management fees: stormwater utility fees may need to be increased
- Staff training: ensure that staff are trained with the knowledge and tools to implement the LID requirements: http://www.awcnet.org/TrainingEducation/LID/Trainingcalendar.aspx

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2 Brattebo, Benjamen and Booth, Derek. (2003). Long-Term Stormwater Quantity and Quality Performance of Permeable Pavement Systems. Water Res. Nov;37(18):4369-76.
3 http://conferencesdev.wsu.edu/conferences/lidworkshops/presentations/bioretention/Bioretention_Water_Quality_Treatment_Curtis_Hinman.pdf
4 For a comprehensive list of cost and planning considerations, please refer to the factsheet, "Cost and Planning Considerations". This factsheet can be found at the following link: http://www.awcnet.org/portals/0/documents/lid/FactSheet3CostPlanningConsiderations0513.pdf