

## Possible Hydrologic Performance Standards 12/01/09

*This is a preliminary description of how performance standards could be structured. It has been developed to support early discussion and to solicit input from the Advisory Committees.*

### DO WE WANT TO SUGGEST CRITERIA FOR A PERFORMANCE STANDARD?

- Meets intent of Board ruling
- Serves as a useful indicator of progress toward LID goal attainment
- Compliance easily determined/demonstrated
- User-friendly
- Scientifically Sound

### CONTINUOUS RUNOFF MODEL OPTIONS

1. Annual Runoff Volume Basis:
  - a. The Annual Runoff Volume as estimated by an approved continuous runoff model shall not increase (or, shall increase by not more than X%) over the annual runoff volume that is estimated for the historical condition
  - b. The Annual Runoff Volume as estimated by an approved continuous runoff model shall be reduced by X% as compared to the annual runoff volume estimated for a conventional site development
2. Runoff Flow Rate Duration Basis
  - a. Extend the existing flow duration standard into flows that occur more frequently. Detention Ponds would have to be prohibitively large to meet the standard without using LID measures. For example: Match the duration of flows produced by the historic land cover ranging from a 6-month return flow through a 50-year flow.
  - b. Establish a separate section of the Flow Duration curve which must be matched (or not exceeded by more than X%) through use of LID techniques. For example: Match the duration of flows produced by the historic land cover ranging from a 1-month flow rate through the 6-month flow rate.
3. Detention/Retention Pond Basis
  - a. Require an X percent reduction in the size of the detention or retention pond required to meet the existing flow duration standard had a conventional development been proposed for the site (see attached tables)

**Option 3 Example:**

**Tables from LID Ordinances suggested to a number of local governments by AHBL, Inc. under the Puget Sound Partnership's LID technical assistance project**

<b>Pond Reduction and Native Vegetation Requirements</b>	<b>Required Pond Reduction (Infiltration &lt;0.3 in/hr or less)<sup>1,2</sup></b>	<b>Required Pond Reduction (Infiltration of <math>\geq 0.3</math> in/hr)<sup>1,2</sup></b>	<b>Native Vegetation Area<sup>3</sup></b>
Rural Residential	100%	100%	65%
Residential < 6.1 Dwelling Units/Acre	50%	60%	35%
Residential $\geq 6.1$ Dwelling Units/Acre	50%	60%	20%
Multi-family <sup>4,5</sup>	40%	80%	20%
Commercial <sup>5</sup>	40%	80%	10%
Roads <sup>6</sup>	50%	50%	n/a

Notes:

1 The volume reduction in the table represents a reduction as compared to the volume needed for a detention pond serving a standard development.

2 Infiltration rates are as measured in the field at the proposed LID location using techniques recommended in the Stormwater Management Manual for Western Washington and the Low Impact Technical Guidance Manual for Puget Sound.

3 Native vegetation area includes native, undisturbed areas or rehabilitation of previously disturbed areas.

4 Multi-family projects contain > than 4 dwelling units attached in a single structure.

5 Multi-family & commercial projects must use pervious pavement for > 20 percent of all paved surfaces.

6 County roads should provide ecology embankment or bio-retention facilities along a minimum of 75% of the total road length.

### Impervious Surface Maximum Limits and Modeling Assumptions

Dwelling units/acre	Max. Impervious: Project	% LID	Conventional Impervious: Modeling Assumption	%	Conventional Turf: Modeling Assumption	%
Residential $\leq$ 1.4	10%		15%		85%	
Residential: 1.5-2.4	15%		5%		75%	
Residential: 2.5-3.4	20%		35%		65%	
Residential: 3.5-4.9	30%		40%		60%	
Residential: 5.0-6.9	35%		50%		50%	
Residential: 7.0-9.9	40%		60%		40%	
Residential: $\geq$ 10.0	60%		80%		20%	
Multifamily Residential	70%		90%		10%	
Commercial	70%		90%		10%	

### OPTIONS PROPOSED IN OTHER AREAS OF THE COUNTRY

1. USEPA Proposal for federal facilities
  - a. Retain 100 percent of all rainfall events equal to or less than the 95th Percentile Rain Event, OR
  - b. Post development runoff volume and peak flow discharges are equivalent to predevelopment conditions.
  
2. Minnesota
  - a. Post-development runoff hydrology (quantity and quality) and pollutant loading should not exceed pre-development runoff hydrology, based on native vegetation for the site and a design storm of 5-year frequency; AND
  - b. Peak runoff rates from regulated new development, redevelopment, or site expansion projects shall not exceed existing rates for the 2-year, 10-year, and 100-year 24-hour rainfall events.

3. City of Stockton, California

A Volume Reduction Requirement is defined as the post-project runoff volume minus the pre-project runoff volume for the area's 85th percentile, 24-hour storm depth (0.51 inches).

4. California Construction Stormwater General Permit

The discharger shall, through the use of non-structural and structural measures as described in Appendix 2, replicate the pre-project water balance (for this permit, defined as the volume of rainfall that ends up as runoff) for the smallest storms up to the 85th percentile storm event (or the smallest storm event that generates runoff, whichever is larger).

5. Washington D.C. Anacostia Redevelopment Standard

The stormwater control requirements stipulate on-site retention of the first inch of rainfall for new development and redevelopment and water quality treatment for up to the two-year storm volume along with a stated preference for vegetated controls. Where it is not technically feasible for on-site retention of stormwater, an off-set provision allows developers to provide off-site mitigation for 1½ times the volume that could not be provided for the developed area or to pay into a dedicated stormwater fund for twice the cost of an equivalent volume reduction.<sup>31</sup> The off-set provision was modeled after other environmental off-set provisions and intended to provide an incentive to maximize on-site treatment.