

Stormwater Retrofit Investment Prioritization
11-3-14 DRAFT*

Program Provision	Redmond Watershed Management Plan –	WSDOT Stormwater Control Transfer Program	King County Small Basin Retrofit Program	Kitsap County	Tacoma	Seattle Public Utility Integrated Plan to Protect Seattle’s Waterways
<p>1. What do you use prioritization for - retrofits, new development and/or redevelopment?</p>	<p>All 3. Redmond uses the prioritization to focus stormwater retrofits, in stream projects, and buffer improvements into watersheds where the moderately degraded stream will see the most ecological lift with investments. Development/redevelopment can buy in to retrofits in “highest restoration” watersheds, allowing for consolidation of stormwater controls in watersheds where they will have the most immediate benefit.</p>	<p>All 3. This includes, standalone retrofits as well as project-triggered retrofits tied to new development and redevelopment (including the Puget Sound-triggered retrofit requirement which only appears in the WSDOT municipal stormwater permit.)</p>	<p>Small basin retrofits. A stormwater capital needs assessment completed by Stormwater Services (SWS) in 2012 identified over 64 small streams/lakes in unincorporated King County considered to be degraded as a likely result of stormwater runoff from developed land because of (1) fair to poor biological health and/or a water quality impairment documented through County or State monitoring, and (2) the extent and age of development within the basin.</p>	<p>Retrofits only. Program goals are:</p> <ul style="list-style-type: none"> • Enhance groundwater recharge • Reduce local flooding • Stabilize stream channels • Reduce pollutant loading and improve water quality • Improve habitat and ecological integrity 	<p>All 3. Use regional locations to get best improvements to receiving waters. Leverage redevelopment/development dollars by creating “in-Lieu of” program for flow control and water quality treatment.</p>	<p>Seattle uses prioritization for its Integrated Plan, a plan to integrate the control of combined sewer overflows with the reduction of pollutants from stormwater discharges and defer some low priority combined sewer overflow (CSO) projects beyond 2025. The focus is on the most impacted water bodies, and to implement stormwater projects with greater water quality benefits.</p>
<p>2. How did you develop your prioritization criteria?</p>	<p>Redmond initially used data (discussed below) to characterize individual fish bearing water bodies and their watersheds. Redmond worked with Ecology to rerun the Puget Sound watershed characterization model locally, to prioritize watersheds based on hydrologic metrics (output bottom right). Output from the characterization was adjusted based on local data compilation.</p>	<p>WSDOT initially applied a stormwater outfall ranking index that was very data intensive and expensive to implement. WSDOT developed a new strategy in collaboration with Ecology, USFWS, and NOAA Fisheries (i.e., Resource Agencies). The approach utilizes aspects of the original method, but is much more streamlined. It aims to identify and protect the remaining relatively healthy receiving waters and their habitats. The emphasis is placed on preventing degradation, rather than on attempting to correct the damage after it occurs (i.e., conservation biology approach). The criteria and their associated weighting reflect the priorities and values of these resource agencies & contributed greatly to building buy-in from the regulators and other stakeholders.</p>	<p>The prioritization criteria for small basins were developed by the Stormwater Services Section Manager ,Curt Crawford. King County then used the prioritization criteria for project selection within the small basin. The project selection criteria were derived from the North Kitsap County, LID Retrofit Project Implementation Plan, 2013.</p>	<p>County staff know where most of the problems are – areas with the biggest pollutant loading. Staff took a quick approach from assessment to implementation and retrofits.</p> <p>Retrofit Program targets:</p> <ul style="list-style-type: none"> • Replace or upgrade failing or damaged drainage infrastructure • Add water quality enhancements to areas where there is little or no stormwater treatment • Upgrade stormwater flood/flow-control in areas where runoff controls are inadequate 	<p>Tacoma created prioritization criteria for a built-out environment. Tacoma tailored existing prioritization criteria and added ones based on our local needs.</p> <p>Programs reviewed:</p> <ul style="list-style-type: none"> • EPA • City of Redmond • WSDOT • Hood Canal Regional SW Retrofit Plan and In-Lieu of Program • Other US City/County programs 	<p>Criteria were developed based on a consent decree with EPA to defer costly CSO projects with limited stormwater water quality benefits, and to implement stormwater projects with greater water quality benefits.</p> <p>The Integrated Plan addresses a number of criteria or requirements described in the Consent Decree, including:</p> <ul style="list-style-type: none"> • Stormwater quality project(s) that result in significant benefits to water quality beyond those that would be achieved by implementation of a Long-Term Control Plan (LTCP) alone. • Stormwater quality project(s) that will be in addition to all CSO control measures required in the LTCP, but that may affect the schedule of CSO control measures and CSO project completion by the compliance date of 2025. • A schedule for implementation of the Integrated Plan projects and the deferred CSO control measures that would be completed after 2025.

*NOTE: This summary was compiled by Heather Ballash. It has been reviewed and edited by agency staff, except for Kitsap County.

<p>3. What are the criteria?</p>	<p>Puget Sound Flow metrics included: storage, delivery, recharge, and discharge. Local data included: land cover (forest/impervious/landscape), land use (residential/commercial), fish use, habitat (LWD, buffer canopy), water quality (BIBI, DO, temp), stormwater characteristics (High AADT, area without flow/treatment, culverts, outfalls).</p>	<p>Three-stage assessment process:</p> <p><i>Stage 1.</i> GIS screen applied to entire highway system – criteria:</p> <ul style="list-style-type: none"> • Large, frequently travelled highways • Drinking water supply source • Fish bearing streams • Summer spawning areas • Small streams • High quality surface receiving waters • Urban fringe <p><i>Stage 2.</i> Reconnaissance of top scoring Stage 1 sites – criteria:</p> <ul style="list-style-type: none"> • Untreated closed, curbed, and/or impervious-lined conveyance systems • WSDOT observed erosion, pollution, or flooding problems • Discharges to 303(d) listed water bodies for certain pollutants of concern • Locally identified erosion, pollution, or flooding problems • Habitat suitability and value <p><i>Stage 3.</i> Detailed site assessment:</p> <ul style="list-style-type: none"> • Stage 2 with high scores • Highway drainage areas > 5 acres 	<p><u>Basin selection using:</u></p> <ul style="list-style-type: none"> • Benthic Index of Biotic Integrity (B-IBI) • 303(d) listing • Stream Channel Stability Indices • Percentage of basin developed • Catchment size • Ecology stormwater target watersheds <p><u>Project selection</u> (using North Kitsap County LID Retrofit Project Implementation Plan, 2013)</p> <p><i>Level 1:</i></p> <ul style="list-style-type: none"> • Site slopes • Available area • Effective Impervious Area Managed • Meets multiple objectives – water quality improvement, peak flow reduction, or local drainage improvement • Risk to the environment <p><i>Level 2, Part 1:</i></p> <ul style="list-style-type: none"> • Water quality • Drainage & local flooding • Utility coordination <p><i>Level 2, Part 2:</i></p> <ul style="list-style-type: none"> • Constructability • Operation and maintenance • Ease of funding <p>Fish bearing streams are not a criterion.</p>	<p>Basic retrofit strategy:</p> <ol style="list-style-type: none"> 1. Retrofit scoping/goals 2. Desktop (GIS) analysis 3. Reconnaissance 4. Retrofit Inventory 5. Evaluation/Ranking <p>Used different consultants with prioritization criteria for four districts (two examples – similar criteria):</p> <ol style="list-style-type: none"> 1. <u>North Kitsap LID</u> Evaluated retrofit opportunities and constraints to identify areas where potential LID projects would offer the greatest benefit. <i>Level 1:</i> <ul style="list-style-type: none"> • Shallow and deep infiltration potential • Site slopes • Available area • Utility coordination • Effective Impervious Area Managed • Meets multiple objectives • Risk to the environment <p>Field assessment of top ranked sites for existing infrastructure, potential utility conflicts, estimate of drainage areas, available area in public right-of-way, and potential risk to surrounding environment.</p> <p><i>Level 2 Prioritization:</i></p> <ul style="list-style-type: none"> • Water quality • Drainage and local flooding improvement • Constructability • Operation and maintenance • Ease of funding <ol style="list-style-type: none"> 2. <u>Manchester LID Retrofit</u> <i>Step 1. Preliminary feasibility assessment:</i> <ul style="list-style-type: none"> • GIS layers for existing topographical, civic, environmental, land use and infrastructure systems • Drainage complaints • Regional Opportunities and Constraints • Geotechnical evaluation and 	<p>Site Selection and Feasibility Evaluation Local data included: GIS layers for MS4, other utilities, critical areas (slopes and wetlands), drainage area, land cover (impervious/landscape), land use (residential/commercial/industrial/mixed use), stormwater characteristics (High AADT, area without flow/treatment, culverts, outfalls), flooding complaints and regional opportunities.</p> <p>Project Prioritization (Ranked 1 to 3):</p> <p>Economic/Cost Factors</p> <ul style="list-style-type: none"> • Life Cycle Costs • Funding • Potential to replicate/leverage <p>Social/Community Factors</p> <ul style="list-style-type: none"> • Multiple benefits • Conflicting uses • Community goals • Education value <p>Other factors:</p> <ul style="list-style-type: none"> • Protection of cleanup sites • Groundwater protection • Local capacity/pollution problem • Priority area (development/redevelopment, mixed use) 	<p>The prioritization criteria have two components/indexes - the Environmental Value to Protect, or Use Index, and the Threat to the Environmental Value, or the Pollution Potential Index. The prioritization is based on the Use Index multiplied by the Pollution Potential Index.</p> <p>The Use Index includes:</p> <ul style="list-style-type: none"> • Protect existing uses <ul style="list-style-type: none"> ○ Water-based recreation ○ Catch and eat fish ○ Habitat for ESA-listed species • Restore impaired uses <ul style="list-style-type: none"> ○ Water column, fish tissue and sediment exceedance ○ Beach closure advisory ○ Fish consumption advisory • Maintain restored uses (regulatory driver) <ul style="list-style-type: none"> ○ Current/future sediment cleanup plan ○ Current/future Total Maximum Daily Load (TMDL) <p>The Pollution Potential Index includes:</p> <ul style="list-style-type: none"> • Normalized load – Total Suspended Solids (TSS) kilogram/year per acre • Flow (watercourses only) – Two-year event Factor
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<p>4. How do you apply the criteria – weighting, etc.?</p>	<p>No weighting was used; the data did not lend itself to weighting. Puget Sound watershed characterization was the basis, then adjusted based on local data.</p>	<p>Criteria used in <i>Stages 1 and 2</i> are weighted per the direction of the Resource Agencies. In defining candidate sites from <i>Stage 1</i>, the “point bar” is intentionally low to avoid narrowing the eligibility pool prematurely during <i>Stage 1</i>. The scoring is not cumulative, but gets “zeroed out” for each stage. <i>Stage 3</i> is used to evaluate whether to package nearby retrofit priorities or bundle retrofit priorities with programmed improvement projects. Standalone retrofit priorities are queued by geographic region.</p>	<p>Each of the criteria are weighted.</p>	<p>North Kitsap - Yes, Levels 1 and 2 are weighted.</p> <p>Manchester – Yes, Steps 2 and 4 are weighted.</p>	<p>No weighting was used for Feasibility Evaluation. Prioritization criteria are weighted.</p>	<p>The Integrated Planning team employed the following steps to develop a list of stormwater treatment projects:</p> <ul style="list-style-type: none"> • develop pollutant and average annual runoff volume (AARV) estimates for each storm sewer system basin • rank receiving water bodies and identify primary pollutant(s) of concern (POCs) for each water body • rank storm sewer system drainage basins using the pollutant estimates and rank of receiving water body • create a geographic information system (GIS) basin atlas for high-ranking storm sewer system basins in Seattle • use the GIS basin atlas information and knowledge of stormwater treatment technologies to identify potential locations for stormwater treatment considering the general and project-specific screening criteria

						<ul style="list-style-type: none"> • develop planning-level stormwater project descriptions and cost estimates for each of the stormwater projects to be considered in the Integrated Plan • evaluate the stormwater projects against criteria to further refine the list of projects for consideration in the Integrated Plan (see Question #3) <p>The City then scored and ranked the candidate stormwater projects using a Multiple Objective Decision Analysis (MODA). Based on water quality comparisons and MODA, the City selected a suite of stormwater projects for implementation by 2025 and LTCP projects for deferral until 2028–30.</p>
5. Have you implemented policy or prioritized budget based on the prioritization (have you used the prioritization)?	<p>Yes. Used to prioritize capital budget, allocating millions to restoring streams. Used prioritization in Ecology grant applications. Used to focus programs in prioritized watersheds.</p>	<p>Yes, the results of the prioritization scoring are used in allocating funds to construct standalone stormwater retrofit projects as well as directing the expenditure of funds to meet offsite stormwater obligations incurred by highway projects.</p>	<p>King County used the small basin prioritization criteria to pick the highest priority small basins for the Ecology Stormwater Grants. They then used the project selection criteria from the North Kitsap County, LID Retrofit Project Implementation Plan, 2013 to pick projects for three predesign reports for the Ecology Stormwater Grant.</p>	<p>Yes. About six projects have been funded to date.</p>	<p>Prioritization hasn't been used for current Projects. Funded Projects were selected based source control issues, flooding, and opportunity.</p>	<p>The outcome of the Integrated Plan prioritization was used to help determine the Drainage Rate fee proposal submitted to City Council and the Mayor. The rate package and Integrated Plan are part of a Strategic Business Plan that set the rate increases from 2016-2020.</p>

<p>6. Who were the stakeholders when you set out to prioritize?</p>	<p>Washington Department of Ecology, Internal departments, Muckleshoot Tribe, Washington Department of Fish and Wildlife.</p>	<p>The new prioritization approach emerged through collaborative engagement with the WA Ecology, USFWS, and NOAA Fisheries. The criteria and approach went through public review and comment during the issuance of the 2009 WSDOT municipal stormwater permit and its reissuance in 2014.</p>	<p>The residents of unincorporated King County and Ecology.</p>	<p>Kitsap County's <i>Water as a Resource</i> policy guides everything related to stormwater. Surface and Stormwater Management also coordinates with other departments to partner on projects – e.g. sewer and roads. They meet quarterly with sewer, transportation, parks, etc. to look at projects together.</p> <p>The County engages the public early in the process with education outreach, postcards, signs, community advisory committee meetings, walkabouts and surveys.</p>	<p>Current Projects Stakeholders: Tacoma Residents, Cheney Stadium, EPA, Ecology (Grants), Local residents, UW-Tacoma, Tacoma Community College, Metro Parks, SAMI, and FHWA.</p>	<ul style="list-style-type: none"> • Seattle Public Utility (SPU) staff • SPU management • Citizen Advisory Groups • Environmental Groups • Neighborhood Groups • Expert Panel
<p>7. What data sources did you use, and how readily available is the data?</p>	<p>We used local data, Puget Sound wide data, statewide data, and national data.</p>	<p><i>Stage 1</i> uses existing statewide GIS data sets. <i>Stage 2</i> uses information from 303(d)-listed waterbody reports; information and data contained in basin plans, recovery plans, TMDL implementation documents; local staff knowledge (i.e., WDFW and tribal biologist, city & county staff, WSDOT field staff); and field information collected by Stage 2 reconnaissance crews.</p>	<p>See the list of criteria under #3.</p>	<p>North Kitsap: GIS data, flow monitoring, historical flood complaints, and relevant as-built drawings for capital drainage projects recently built but not in GIS data.</p> <p>Manchester: See the criteria above, plus the Manchester Community Plan Update (2007), Kitsap County Stormwater Design Manual, Kitsap County LID Guidance Manual, 1999 and Manchester Drainage Plan.</p>	<ul style="list-style-type: none"> • City of Tacoma GIS data, most publically available on Tacoma's GovMe site • Thea Foss Waterway Stormwater Monitoring Reports • MikeURBAN Capacity model • Tacoma's STRAP Program • Flood complaints • As-built or design drawings for existing facilities 	<ul style="list-style-type: none"> • City of Seattle State of the Waters Report (2007) • Ecology web site • State Department of Health web site • City of Seattle & Tacoma 2007 NPDES Phase I stormwater monitoring data • City of Seattle storm drain solids data • City of Portland stormwater data • National Water Quality Database
<p>8. What local data did you use?</p>		<p>The program factors in local knowledge (see #7 above).</p>	<p>See the list of criteria under #3.</p>	<p>GIS data, including topographic contours, geohazard areas, soils, wells, waterbodies, zoning, public right-of-way, storm drain infrastructure, and orthographic photos.</p>	<ul style="list-style-type: none"> • Outfall monitoring data, flow data and in-line stormwater sediment trap data • GIS data, including topographic contours, geohazard areas, soils, waterbodies, zoning, public right-of-way, storm drain infrastructure, other utilities, and orthographic photos. • Known flooding issues • STRAP data and Capacity Modeling Results • HFPS Pollutant Loading Model Results 	<ul style="list-style-type: none"> • City of Seattle State of the Waters Report (2007) • City of Seattle 2007 NPDES Phase I stormwater monitoring data • City of Seattle storm drain solids data

<p>9. Did you use modeling?</p>	<p>No.</p>	<p>No, the approach doesn't require modeling, although modeling results could get factored in via input from the local knowledge reconnaissance conducted during <i>Stage 2</i>.</p>	<p>Not for prioritization. The County used model to size facilities to meet Ecology's LID standard combined with its high flow detention standard (Ecology 8% from King County 2012 Juanita Creek Study). The County then used the North Kitsap County 2013 LID implementation plan to pick projects.</p>	<p>No.</p>	<p>Not for prioritization. Used model for capacity analysis on MS4. Used HSPF Model to simulate combinations of BMPs that can be used to reduce pollutant loadings on example basins (commercial and residential). Results will be used to inform BMP selection and be applied to other stormwater programs (sweeping and enhanced maintenance).</p>	<p>A model, called the Pollutant Load Model (PLM), was used to estimate the pollutant reductions of the stormwater projects and CSO projects. Part of this includes use of the Western Washington Hydrology Model to estimate runoff coefficients for land use types. Other elements of the PLM includes, BMP performance from the International BMP database, and a Monte Carlo simulation to account for the uncertainty around pollutant loads and BMP performance.</p>
<p>10. Does your program allow off-site retrofits?</p>	<p>Yes. The program carefully decouples the difference in flow control between existing conditions and forested conditions and allows stormwater controls that address the difference to be sited in other target areas within the watershed.</p>	<p>Yes. Project-trigger retrofit obligations not falling within the project boundaries may be mitigated outside the project boundaries using the following sequence: 1. Within the same sub-Water Resource Inventory Area (WRIA) basin as where the project obligation was incurred. 2. Within the same WRIA as where the project obligation was incurred. 3. Within the same region as where the project obligation was incurred. (Eastern Washington, the Puget Sound Basin, and the rest of western Washington outside Puget Sound .)</p>	<p>No.</p>	<p>No.</p>	<p>Draft Plan uses "in-Lieu of" within the designated watershed: 2 freshwater watersheds and one Marine watershed.</p>	<p>No</p>
<p>11. Does your program target areas with the highest environmental value or degraded areas?</p>	<p>The program targets areas with highest environmental value rather than degraded areas.</p>	<p>The program targets areas with highest environmental value rather than degraded areas.</p>	<p>The program targets the most degraded areas first. The tributary areas of these small basins range in size from 0.2 to just over 10 square miles. Many of these small basins drain to larger water bodies with similar documented degradation. Based on these factors, SWS deemed that all of the identified small basins were in need of some amount of stormwater retrofitting. As a result of the 2012 assessment, the Small Basin Stormwater Retrofit Program was funded in 2013/14 to begin developing basin-wide retrofit plans and identifying and implementing retrofit projects aimed at restoring stream health/water quality in each basin.</p>	<p>No. Most streams are in fairly good shape.</p>	<p>Program targets high environmental value and leverages opportunities to support development/ redevelopment</p>	<p>The focus is on the most impacted water bodies, and to implement stormwater projects with greater water quality benefits.</p>