

The Process and Schedule for Selecting Pilot Projects and Brief Descriptions of the Eight Pilot Project Candidates

Updated Based on Discussion of the Technical Advisory Committee on November 27, 2007

01.10.08

9. In-Line Ditch Stormwater Treatment Best Management Practice Program

Much stormwater draining to Puget Sound runs untreated from rural, agricultural, and residential lands into roadside ditches. Runoff is identified as a leading contributor of pollution discharging untreated from roadside ditches into local surface water bodies. As the focus on improved stormwater management for roadways increases, regional needs include development of affordable and effective structural BMPs to treat stormwater runoff within existing roadside ditches.

Phase I jurisdictions are required to monitor the effectiveness of Municipal NPDES permit actions. This project to develop and evaluate potential roadside ditch BMPs is identified as a collaborative effort by several Phase I jurisdictions.

Structural in-line ditch stormwater treatment retrofit BMPs evaluated by this project are intended to be simple, low-cost, low-maintenance, treatment BMPs or cells intended to attenuate or infiltrate flows and provide stormwater treatment. BMP cells can be applied within roadside ditches, requiring no additional footprint outside of the road right-of-way. The BMP cells are simple designs, readily modified to suit site conditions such as soil type, ditch gradient, flow regime, and observed pollutants. The anticipated low cost for design, installation, and maintenance of BMP cells provide more cost effective treatment than traditional stormwater facilities and would promote broader application of stormwater retrofitting. This in turn, should promote a greater aggregate regional decrease in hydrologic impacts and pollutant loading due to roadside ditch discharges and increase local stormwater retention.

The roadside ditch BMP cell approach focuses on capturing most small storms and “first flush” from larger storms, primarily through retention and filtration using various filtering media. The designs also decrease or attenuate stormwater flow peaks using a combination of delay, filtration, and infiltration methods. The project will estimate the costs for design, implementation, and maintenance of BMP cells, and since the purpose of the permit project is to monitor effectiveness of a targeted action it will also monitor and report on flow reduction and pollutant removal effectiveness.

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Also helping to scope this potential project: Richard Tveten, WSDOT; Rod Swanson, Clark County;

1. What problem(s) is being addressed by the proposal, and what would be the expected outcome(s) of the project?

A significant portion of the Puget Sound was developed either without, or with ineffective, stormwater controls and the primary stormwater control is roadside ditches that provide little or no treatment or hydrologic control due to their function as drainage systems. The problem is that BMP manuals, including the SWMMWW and LID manuals

do not include standards for public domain structural BMPs in roadside ditches. This limits the affordable options available to stormwater managers attempting to address exiting pollutant problems such as TMDLs for bacteria and turbidity, outfalls contributing to a water quality violation, and outfalls contributing to stream erosion.

The retrofit designs are intended to be flexible, easily-constructed and affordable so that small jurisdictions across the region can apply the design concepts to their programs resulting in a larger-scale decrease in pollutant loads conveyed by roadside ditches.

Retrofits that use the ditch system are attractive because ditches are so numerous and widespread and retrofits within them would save the considerable costs of purchasing land for new, or expanded, treatment or control facilities.

The project will attempt begin to remedy this problem by developing and testing the effectiveness of low cost treatment and control retrofits for ditches that could treat the majority of runoff in roadside ditches to improve water quality and moderate flows throughout the state. The project will produce:

- a menu of BMP options
- description of BMP selection criteria and applicability including anticipated pollutant removal
- design standards
- construction standards
- maintenance standards

2. What is the current status of the situation? In other words, is anything underway today to address or resolve the problem or are the “tools” needed to address it in place? Has there been some success, or is the problem getting worse?

This project is intended to address a completely unmet need. No manuals exist that include the application of public domain roadside ditch retrofit BMPs in Western Washington. There are limited studies examining the effectiveness of structural BMPs for use in ditches. An important step in this project is review of existing literature to incorporate that information into the designs to be used in this program. Many of these systems are either costly or proprietary.

Roadside ditch BMPs have been applied in other regions, for example Oregon Department of transportation has retrofitted flowing ditches along Interstate 205 in the Portland area with cobble check dams to create detention and habitat features.

The problem of untreated stormwater from roadside ditches is difficult to manage because much of the runoff flows from adjoining private lands where BMPs are largely voluntary. Municipal stormwater permittees face the prospect of being required to treat stormwater from roadside ditches to address their contribution to a water quality violation in a receiving water.

3. Who should participate in the project, and why?

Several municipal NPDES Phase I and Phase II jurisdictions, have expressed interest in participating. WSDOT has also expressed interest in collaborating in related studies on state roads. Any jurisdiction that is responsible for managing stormwater runoff that

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travels through roadside ditches could benefit from this program. The development of low-cost, low-maintenance, ditch BMPs would be applicable state wide.

4. What process or steps would be needed to address the problem and achieve the expected outcomes?

Project steps are:

- Review literature to identify potential BMPs and past studies as supporting documentation or models for investigation here
- Identify a menu of retrofit BMP options and their applicability
- Design a monitoring program including QAPP
- Design and build BMPs and applicable monitoring structures
- Conduct water quality, flow and maintenance monitoring
- Analyze results and draft report including BMP descriptions

Overall, the project will examine the effectiveness of the BMP cells at slowing or eliminating stormwater runoff from the drainage system and treating targeted pollutants. The monitoring program will study the impact these designs have on measured flow, and/or removal of pollutants.

This task will also track the cost installing and maintaining the treatment facility. The study will determine if the designs can be built at the targeted cost range, will look at the structures lifespan, and determine if the designs can be altered to reduce costs.

The monitoring program will also try to determine the lifespan of the filtering media. Given the short span of the study, this may not be possible, but if there are significant problems such as filter break down or clogging, they should become apparent. The study will also determine if various media are effective in removing targeted pollutants/and or storing runoff to attenuate peak runoffs. The field monitoring will also provide an understanding of the maintenance standards needed to ensure performance and the most efficient timing of filter media replacement and potential filter media disposal options.

5. What would be the approximate cost of the project? What portion of the costs would be paid out of the funding Department of Ecology received to launch this program? What portion if any, would be paid by others?

Potential Costs

Program Coordination and Regional Coordination Bodies:

\$8,000 per year for staff and coordination efforts

Seed money for construction and monitoring (per jurisdiction)

\$5,000 for flow control

\$10,000 for Water Quality

Consultant services (i.e. expert input and support, literature reviews)

\$17,000

6. How would this project address interests, needs and concerns of rural communities?

Successful completion of this project would provide rural communities with an initial set of low-cost structural treatment and flow control BMPs that can be applied using existing ROW. This will help enable communities to better protect water quality and meet requirements of NPDES permits, the ESA and the GMA.

A significant portion of this stormwater is captured, conveyed, and discharged by roadside ditches that drain a variety of urban, residential and rural land uses, much of which were established prior to 1990, which means prior to any effective stormwater design or permitting. Most of this drainage also occurs outside of areas served by a regional stormwater management system. These systems have been identified by the municipal NPDES permits as needing retrofits. Thousands of miles of road with associated ditch systems convey stormwater in the Puget Sound region.

7. How would the project meet the criteria agreed to by the Committee in October? Those criteria are: a) Builds the credibility of the program. b) Tests working relationships. c) Provides credible and meaningful information that addresses the framework questions. d) Encourages leveraging of resources. e) Is voluntary (“a coalition of the willing”) and attracts additional participants over time. f) Is simple. g) Can get going in less than one year.

- a) This project puts physical structures in the systems and provides resources that are needed by the regions jurisdictions.
- b) This program would create the need to coordinate installation of these structures to ensure that the structures meet design standards that the appropriate structures are in place and meeting the needs of the drainage systems. There would also be the need to coordinate locations to ensure the one drainage system is not over serviced and another system is not under serviced, when a drainage system exists in multiple jurisdictions.
- c) This program would create a region database addressing the level and type of effectiveness for multiple BMP designs, both cells and treatment trains. The framework question is “how do the regions jurisdictions effectively treat stormwater runoff”. This program can have a major impact in addressing that question.
- d) Several jurisdictions including King, Pierce and Clark Counties; and the Cities of Kent, and Burien have already committed resources to this program. King County was recently awarded a 561K grant from Ecology to implement this program in King County. Funding could be used to encourage additional funding and commitments from other jurisdictions through regional coordination bodies; education opportunities; seed money for construction and monitoring; and literature reviews and consultant services.
- e) This program has been identified as a collaboration program by several Phase I jurisdictions that will meet one of the program effectiveness monitoring requirements of the Phase I Municipal NPDES permit. Phase II jurisdictions are not required to do monitoring this permit cycle but are required to develop a monitoring program during this cycle. There is a retrofitting requirement in the

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- Phase I permit and a similar requirement will probable be in the next permit cycle for the Phase II jurisdictions. This program could be used to address that requirement, attracting additional participants. Participation in this program is voluntary.
- f) The intent and implementation of this program is straightforward. The complexity will be coordinating the effort across multiple jurisdictions that implement the program.
 - g) This program can proceed with very short notice. Permitting, design, construction and environmental staff are already identified by the Ecology's stormwater grant awarded to King County grant. Preliminary designs are completed and there are no land purchases needed or land owner agreements required for implementation of the study as roadside ditches are located within road right-of-way. The need to obtain permitting will be minimized through careful site selection that protects critical areas and their buffers. Design staff have reviewed the initial concepts and will only need to adapt the designs to the specific locations. Staff will need to review sites for archeological and cultural resources for compliance with EO 05-05.