



DEPARTMENT OF  
**ECOLOGY**  
State of Washington  
**AMENDMENT NO.1**

TO

CONTRACT NO. 1500140

BETWEEN THE

STATE OF WASHINGTON DEPARTMENT OF ECOLOGY

AND

THE CITY OF BELLINGHAM

PURPOSE: To amend the Agreement between the state of Washington, Department of Ecology, hereinafter referred to as "ECOLOGY" and THE CITY OF BELLINGHAM, hereinafter referred to as "BELLINGHAM" or "CONTRACTOR".

IT IS MUTUALLY AGREED the agreement is amended as follows:

- 1) The project end date is changed from August 31, 2015 to December 31, 2015.
- 2) Attachment A- Detailed Scope of Work is amended to extend several task and deliverable target completion dates as follows. Deletions are indicated by strikethrough (~~strikethrough~~) and additions are double underlined (double underline).

## Attachment A

### Bioretention Hydrologic Performance Study Phase I Site Selection Process and QAPP Development Scope of Work

#### A. Background

##### 1. Purpose of the Project

This project will provide adaptive management feedback from actual hydrologic performance of bioretention facilities and related site conditions that affect hydrologic performance to the Stormwater Management Manual for Western Washington (SWMMWW) design guidelines and to local jurisdiction design engineers. Regional benefits will come from working with Ecology and local jurisdictions to select and assess multiple sites that represent a wide range in geographic and design conditions. Results of the study will guide improvements to performance of facilities across the Puget Sound.

There are fundamental reasons for assuring the actual hydrologic performance of bioretention facilities. If goals for protection of receiving water habitat are based on instream hydrologic goals in a basin utilizing LID, the performance of the individual facilities needs to meet their expected hydrologic performance to ensure success of the combined hydrologic response of all the facilities at the sub-basin scale. As a practical site space issue, expecting that facilities can be accurately sized will support efficient use of space in site design layout, especially for retrofit opportunities where space may be limited by existing structures.

Overall, accurate hydrologic performance of bioretention facilities must first be met before other related performance goals (protection of downstream receiving waters, pollutant removal) can be fully realized. This research will lead to not only feedback on the design process for more dependable overall performance, but will also suggest maintenance recommendations for jurisdictions to help maintain the hydrologic performance of their facilities.

##### 2. Project Objectives

The project objective is to compare actual hydrologic performance of constructed bioretention facilities with the expected modeled performance from the original site engineering design. Modeled results using original design data will be compared with field results based on actual rainfall during the site monitoring. Using this comparison, and drawing from additional site data such as local media composition, surficial geology, infiltration rates, groundwater fluctuation, actual constructed site geometry, and vegetation density and health, working hypotheses will be proposed for factors leading to the hydrologic performance observed. These working hypotheses will be supported by published literature on bioretention hydrologic performance.

The initial project objectives are:

- develop a list of candidate bioretention sites from the Ecology Stormwater Grants Program Database, recommendations of local design firms, and the 16 participating local jurisdiction stormwater programs listed in the original proposal,
- develop a site selection criteria checklist,
- conduct a site checklist review of each of the candidate sites,
- select bioretention facilities to be monitored for flow and other site-specific data in Phase II, the Implementation Phase,

- write a report summarizing the approach and findings of the selection process, and
- write a Quality Assurance Project Plan (QAPP) to guide implementation of the monitoring and assessment to be conducted in Phase II.

B. Scope of Work

**Task 1 Project Management**

(\$9,452, May – ~~July~~ October 2015)

1. Prepare consultant contract scopes and contracting  
This task will involve conducting the process to procure and manage consultant services for Phase I. These will include Co-project manager, flow monitoring, modeling, geotechnical, and vegetation assessment team members.
2. Prepare quarterly progress reports  
This task will involve completing reporting responsibilities to Ecology.
3. Coordinate communication with Ecology and partner jurisdictions and consultants.  
This task is to conduct communications with jurisdictions and consultants related to managing their roles in the project, and communications not otherwise budgeted in other tasks.

Deliverable 1.1: Document contracting, grant reporting, and communications via quarterly progress report.

**Task 2 Prepare Site Selection Criteria and Conduct Selection Process**

(\$65,276, May – ~~June~~ October 2015)

1. Develop site selection criteria checklist  
This task will be to create the site selection criteria checklist in coordination with the Ecology staff, consultants, and participating jurisdiction partners (see Appendix 1).

Deliverable 2.1: Site selection criteria checklist submitted to Ecology. Target date: May 31, 2015 (\$7,906).

2. Communicate selection criteria to partners; receive and organize candidate sites; visit sites.  
This task will involve communicating with the individual partners submitting candidate sites; collect and evaluate background engineering and construction data; visiting candidate sites to conduct the on-site selection checklist, scoring the complete list of candidate sites and making selections of sites to be monitored. Nominal goals are to identify up to 20 candidate sites and select up to ten sites to be monitored.

Deliverable 2.2: Summary of results of site evaluation and list of final sites submitted to Ecology. Target date: ~~June 15~~ August 31, 2015 (\$51,386.16).

3. Write report on the site selection process and results including sections on: site selection criteria, candidate sites, site visit checklist results, scoring results, modeling results (if performed) and proposed list of sites to be monitored.

Deliverable 2.3: Report on the site selection process submitted to Ecology. Target date: ~~June 30~~

September 15, 2015 (\$5,984.08).

**Task 3 Write Quality Assurance Project Plan (QAPP) and Scope for Phase II, Monitoring Implementation and Analysis**

**(\$12,506, May–~~July~~ October 2015)**

1. Write common QAPP for all sites and overall project analysis

A single QAPP following Ecology guidelines will be prepared to address the overall QAQC process of site installation and monitoring, and the bioretention modeling and performance analysis process. Quality assurance steps will be identified for each activity.

Deliverable 3.1: Draft QAPP for all sites addressing monitoring methods and analysis delivered to Ecology. Target date: ~~July 15~~ September 30, 2015 (\$11,225.40).

2. Respond to Ecology's and other technical reviewers' comments and finalize QAPP and Phase II scope.

Deliverable 3.2: Final QAPP and detailed phase II scope of work delivered to Ecology. Target date: ~~July 31~~ October 15, 2015 (\$1,250.60).

**Total project costs = \$88,634**