DEPARTMENT OF
ECOLOGY
State of Washington

# IAA No. C2200016

## INTERAGENCY AGREEMENT (IAA)

## BETWEEN

## THE STATE OF WASHINGTON, DEPARTMENT OF ECOLOGY

## AND

## WASHINGTON STATE UNIVERSITY

**THIS INTERAGENCY AGREEMENT** ("Agreement" or "IAA") is made and entered into by and between the state of Washington, Department of Ecology, hereinafter referred to as "ECOLOGY," and the Washington State University hereinafter referred to as the "WSU" and "CONTRACTOR," pursuant to the authority granted by Chapter 39.34 RCW.

**THE PURPOSE OF THIS AGREEMENT** is for **WSU** to conduct a monitoring study to evaluate the effectiveness of roadside ditch maintenance and planting plans to improve stormwater management.

**WHEREAS,** parties other than WSU and ECOLOGY may lend equipment to WSU to reduce costs incurred under this contract, however costs are included in the event the lent equipment is not suitable or functional. WSU will own any equipment purchased under this contract.

**WHEREAS,** ECOLOGY has legal authority (RCW 90.48 and WAC 173-220) and WSU has legal authority (RCW 28B.20.130) that allows each party to undertake the actions in this agreement.

**THEREFORE, IT IS MUTUALLY AGREED THAT:**

### 1) SCOPE OF WORK

**WSU** shall furnish the necessary personnel, equipment, material and/or service(s) and otherwise do all things necessary for or incidental to the performance of the work set forth in Appendix A, *Statement of Work and Budget,* attached hereto and incorporated herein.

### 2) PERIOD OF PERFORMANCE

The period of performance of this IAA will commence on **July 1, 2021** and be completed by **September 30, 2024**, unless the Agreement is terminated sooner as provided herein. Amendments extending the period of performance, if any, shall be at the sole discretion of ECOLOGY.

## 3) COMPENSATION

Compensation for the work provided in accordance with this IAA has been established under the terms of RCW 39.34.130 and RCW 39.26.180(3). This is a performance-based agreement, under which payment is based on the successful completion of expected deliverables.

he source of funds for this IAA is **General Fund/ Private-Local account for Stormwater Action Monitoring.** Both parties agree to comply with all applicable rules and regulations associated with these funds.

The parties have determined that the cost of accomplishing the work identified herein will not exceed $497,403 dollars, including any indirect charges. Payment for satisfactory performance of the work shall not exceed this amount unless the parties mutually agree via an amendment to a higher amount. Compensation for services shall be based on the terms and tasks set forth in Appendix A, *Statement of Work and Budget*. ECOLOGY will not make payment until it has reviewed and accepted the work.

ECOLOGY may, at its sole discretion, terminate or suspend this Contract, or withhold payments claimed by the CONTRACTOR for services rendered, if the CONTRACTOR fails to satisfactorily comply with any term or condition of this Agreement.

## 4) BILLING AND PAYMENT PROCEDURE

Payment requests shall be submitted on state form, Invoice Voucher A19-1A. Invoice voucher shall reference the Agreement (IAA) number and clearly identify those items that relate to performance under this Agreement. Invoices shall describe and document to ECOLOGY's satisfaction a description of the work performed, the progress of the work, and related costs. Attach supporting documentation to the invoice.

Send invoices to:

| |
|---|
| State of Washington |
| Department of Ecology |
| Water Quality Program |
| Attn: Brandi Lubliner |
| P.O. Box 47600 |
| Olympia, WA 98504-7600 |

Payment requests may be submitted on a quarterly basis or at the completion of the work. Upon expiration of this Agreement, any claim for payment not already made shall be submitted to ECOLOGY within 30 days after the expiration date or the end of the fiscal year, whichever is earlier.

Payment will be made within thirty (30) days of submission of a properly completed invoice (form A19-1A) with supportive documentation. All expenses invoiced shall be supported with copies of invoices paid.

Payment will be issued through Washington State's Office of Financial Management's Statewide Payee Desk. To receive payment, CONTRACTOR must register as a statewide vendor by submitting a statewide vendor registration form and an IRS W-9 form at website, https://ofm.wa.gov/it-systems/statewide-vendorpayee-services. For questions about the vendor registration process, contact Statewide Payee Help Desk at (360) 407-8180 or email PayeeRegistration@ofm.wa.gov.

### 5) ALTERATIONS AND AMENDMENTS

This Agreement may be amended by mutual agreement of the parties. Such amendments shall not be binding unless they are in writing and signed by personnel authorized to bind each of the parties.

### 6) ASSIGNMENT

The work to be provided under this Agreement, and any claim arising thereunder, is not assignable or delegable by either party in whole or in part, without the express prior written consent of the other party, which consent shall not be unreasonably withheld.

### 7) ASSURANCES

Parties to this Agreement agree that all activity pursuant to this agreement will be in accordance with all the applicable current federal, state, and local laws, rules, and regulations.

### 8) CONFORMANCE

If any provision of this Agreement violates any statute or rule of law of the state of Washington, it is considered modified to conform to that statute or rule of law.

### 9) DISPUTES

Parties to this Agreement shall employ every effort to resolve a dispute themselves without resorting to litigation. In the event that a dispute arises under this Agreement that cannot be resolved among the parties, it shall be determined by a Dispute Board in the following manner. Each party to this Agreement shall appoint one member to the Dispute Board. The members so appointed shall jointly appoint an additional member to the Dispute Board. The Dispute Board shall review the facts, agreement terms, and applicable statutes and rules, and then make a determination of the dispute. The determination of the Dispute Board shall be final and binding on the parties hereto, unless restricted by law. The cost of resolution will be borne by each party paying its own cost. As an alternative to this process, if state agencies, either of the parties may request intervention by the Governor, as provided by RCW 43.17.330, in which event the Governor's process will control. The parties may mutually agree to a different dispute resolution process.

### 10) FUNDING AVAILABILITY

ECOLOGY's ability to make payments is contingent on availability of funding. In the event funding from state, federal, or other sources is withdrawn, reduced, or limited in any way after the effective date and prior to completion or expiration date of this Agreement, ECOLOGY, at its sole discretion, may elect to terminate the Agreement, in whole or part, for convenience or to renegotiate the Agreement subject to new funding limitations and conditions. ECOLOGY may also elect to suspend performance of the Agreement until ECOLOGY determines the funding insufficiency is resolved. ECOLOGY may exercise any of these options with no notification restrictions, although ECOLOGY will make a reasonable attempt to provide notice.

In the event of termination or suspension, ECOLOGY will reimburse eligible costs incurred by the CONTRACTOR through the effective date of termination or suspension. Reimbursed costs must be agreed to by ECOLOGY and the CONTRACTOR. In no event shall ECOLOGY's reimbursement exceed ECOLOGY's total responsibility under the agreement and any amendments.

### 11) GOVERNING LAW AND VENUE

This Agreement is entered into pursuant to and under the authority granted by the laws of the state of Washington and any applicable federal laws. The provisions of this Agreement shall be construed to conform to those laws. This Agreement shall be construed and interpreted in accordance with the laws of the state

of Washington, and the venue of any action brought hereunder shall be the Superior Court for Thurston County.

### 12) INDEPENDENT CAPACITY

The employees or agents of each party who are engaged in the performance of this Agreement shall continue to be employees or agents of that party and shall not be considered for any purpose to be employees or agents of the other party.

### 13) ORDER OF PRECEDENCE

In the event of an inconsistency in the terms of this Agreement, or between its terms and any applicable statute or rule, the inconsistency shall be resolved by giving precedence in the following order:

a. Applicable federal and state of Washington statutes, regulations, and rules.
b. Mutually agreed upon written amendments to this Agreement.
c. This Agreement, number C2200016.
d. Appendix A, *Statement of Work and Budget*.
e. Any other provisions or term of this Agreement, including materials incorporated by reference or otherwise incorporated.

### 14) RECORDS MAINTENANCE

The parties to this Agreement shall each maintain books, records, documents, and other evidence that sufficiently and properly reflect all direct and indirect costs expended by either party in the performance of the service(s) described herein. These materials shall be subject to inspection, review, or audit by personnel of both parties, other personnel duly authorized by either party, the Office of the State Auditor, and federal officials so authorized by law. All books, records, documents, and other materials relevant to this Agreement must be retained for six years after expiration of this Agreement. The Office of the State Auditor, federal auditors, and any persons duly authorized by the parties shall have full access and the right to examine any of these materials during this period. Each party will utilize reasonable security procedures and protections for all materials related to this Agreement. All materials are subject to state public disclosure laws.

### 15) RESPONSIBILITIES OF THE PARTIES

Each party of this Agreement hereby assumes responsibility for claims and/or damages to persons and/or property resulting from any act or omissions on the part of itself, its employees, its officers, and its agents. Neither party will be considered the agent of the other party to this Agreement.

### 16) RIGHTS IN DATA

Unless otherwise provided, data which originates from this Agreement shall be "work made for hire" as defined by the United States Copyright Act, Title 17 U.S.C. section 101 and shall be owned by the State of Washington. Data shall include, but not be limited to, reports, documents, pamphlets, advertisements, books magazines, surveys, studies, computer programs, films, tapes, and/or sound reproductions. Ownership includes the right to copyright, patent, and register these items, and the ability to transfer these rights.

### 17) SEVERABILITY

If any provision of this Agreement or any provision of any document incorporated by reference shall be held invalid, such invalidity shall not affect the other provisions of this Agreement which can be given effect without the invalid provision, if such remainder conforms to the requirements of applicable law and the fundamental purpose of this Agreement, and to this end the provisions of this Agreement are declared to be severable.

**18) SUBCONTRACTORS**

CONTRACTOR agrees to take complete responsibility for all actions of any Subcontractor used under this Agreement for the performance. When federal funding is involved there will be additional contractor and subcontractor requirements and reporting.

Prior to performance, all subcontractors who will be performing services under this Agreement must be identified, including their name, the nature of services to be performed, address, telephone, WA State Department of Revenue Registration Tax number (UBI), federal tax identification number (TIN), and anticipated dollar value of each subcontract. Provide such information to ECOLOGY's Agreement manager.

**19) SUSPENSION FOR CONVENIENCE**

ECOLOGY may suspend this Agreement or any portion thereof for a temporary period by providing written notice to the CONTRACTOR a minimum of seven (7) calendar days before the suspension date. CONTRACTOR shall resume performance on the first business day following the suspension period unless another day is specified in writing by ECOLOGY prior to the expiration of the suspension period.

**20) TERMINATION FOR CAUSE**

If for any cause, either party does not fulfill in a timely and proper manner its obligations under this Agreement, or if either party violates any of these terms and conditions, the aggrieved party will give the other party written notice of such failure or violation. The responsible party will be given the opportunity to correct the violation or failure within fifteen (15) business days. If failure or violation is not corrected, this Agreement may be terminated immediately by written notice of the aggrieved party to the other.

**21) TERMINATION FOR CONVENIENCE**

Either party may terminate this Agreement without cause upon thirty (30) calendar day prior written notification to the other party. If this Agreement is so terminated, the parties shall be liable only for performance rendered or costs incurred in accordance with the terms of this Agreement prior to the effective date of termination.

**22) WAIVER**

A failure by either party to exercise its rights under this Agreement shall not preclude that party from subsequent exercise of such rights and shall not constitute a waiver of any other rights under this Agreement unless stated to be such in a written amendment to this Agreement signed by an authorized representative of the parties.

**23) AGREEMENT MANAGEMENT**

The representative for each of the parties shall be responsible for and shall be the contact person for all communications, notifications, and billings questions regarding the performance of this Agreement. The parties agree that if there is a change in representatives, they will promptly notify the other party in writing of such change, such changes do not need an amendment.

| The ECOLOGY Representative is: | The WSU Representative is: |
|---|---|
| Name: Brandi Lubliner<br>Address: 300 Desmond Dr. SE (FedEx)<br>P.O. Box 47600 (USPS)<br>Olympia, WA 98504-7600<br>Phone: 360-407-7140<br>Email: Brandi.Lubliner@ecy.wa.gov | Name: Anand Jayakaran, Ph.D, P.E.<br>Address: Puyallup Research & Extension Center, 2606 W Pioneer Ave., Puyallup, WA 98371<br>Phone: 253-445-4523<br>Email: anand.jayakaran@wsu.edu |

**24) ALL WRITINGS CONTAINED HEREIN**

This Agreement contains all the terms and conditions agreed upon by the parties. No other understandings, oral or otherwise, regarding the subject matter of this Agreement shall be deemed to exist or to bind any of the parties hereto.

The signatories to this Agreement represent that they have the authority to bind their respective organizations to this Agreement.

IN WITNESS WHEREOF, the parties below, having read this Agreement in its entirety, including all attachments, do agree in each and every particular as indicated by their signatures below.

| **State of Washington Department of Ecology** | **Washington State University** |
|---|---|
| By: | By: |
| Signature Date | Signature Date |
| Heather R. Bartlett | Print Name: |
| Deputy Director | Title: |

# APPENDIX A
# STATEMENT OF WORK AND BUDGET

## *Ditch maintenance and redesign for improved stormwater management*

### *Project Purpose*

From the Stormwater Work Group's (SWG) 2019 list of priority topics for SAM studies, the following two topics will be addressed here:

1. Priority topic 14: Compare cleaned/uncleaned ditches to assess effectiveness of ditch cleaning at removing legacy pollutants. Include evaluation of likely release of pollutants.
2. Priority topic 15: Evaluate effectiveness of ditch enhancement techniques at removing pollutants.

We will work with the City of Tacoma and Herrera Environmental Consultants Inc. to identify ditches in Tacoma's jurisdiction for instrumentation and testing of alternative practices to improve stormwater management. The City of Kirkland, Kitsap County, City of Puyallup, City of Seattle have been identified as potential partners to serve on a technical advisory committee and share maintenance practices.

### *Background*

Roadside ditches and swales directly receive road runoff which carries contamination from the road surface, spills, vehicles (oil, fuel, tires, brakes), atmospheric deposition, surrounding land use, and road maintenance chemicals (Maestre and Pitt, 2006; Opher and Friedler, 2010). The contaminants in roadside runoff can include trash, bacteria, sediment, many different types of metals, organic chemicals from deicing and agricultural chemicals, and a set of emerging pollutants yet to be identified (Bannerman et al., 1993; Peter et al. 2018). In addition, the ditch itself is a source of potential sediment from bank and bed erosion.

Ditches and swales have potential to mitigate stormwater quality draining catchments of varying sizes. The standard trapezoidal ditch shape has been shown to erode, requiring constant maintenance, and offering little in terms of water quality treatment. As sediments accumulate within a roadside ditch, a 'clean out' of the ditch is the common maintenance practice where the ditch is restored to its original trapezoidal shape by simply re-grading the system, removing sediments, and reestablishing the original trapezoidal cross-section with a backhoe bucket. While erosion control measures are installed, there can be still releases of sediment and pollutants downstream if erosion control measures are compromised, or if large storm events occur right after construction.

Ditches are the primary conveyance mechanism for roadside runoff, which can include transporting contaminants (Herrera 2008, Tian et al., 2021). Ditches represent a largely untapped resource for improvement of stormwater quality if they could be managed and maintained as a best management practice for stormwater quality and quantity.

After multiple conversations with permittees to develop this project we found, installing ditches that require the least maintenance over time was their priority aspect of ditch management in the Puget Sound region. Reportedly, constant ditch maintenance is a huge expense, and poorly

maintained ditches (either neglected or maintained in a manner that promotes erosion) can themselves become pollutant sources.

Ditch maintenance is often triggered by complaints from local residents (overgrown with invasive plants) or when the jurisdiction determines the ditch has lost conveyance, due to sediments or vegetation. With hundreds of miles of roadside ditches in western Washington, ditch maintenance methodologies when not implemented properly waste money and could be contributing pollutant loads to waterways. These systems with some simple alternatives to shape and planting palette, could be more optimally managed as both conveyance with water quality treatment.

The overall goal of this work is to determine improved strategies to retrofit ditches through a tactical choice of ditch form and plant palettes, to promote pollutant removal, convey higher storm flows, and lower long-term maintenance effort. If we can find ways to alter these conveyance systems so that they act as treatment systems, then a powerful new tool would become available for these permittees. This research will lay the foundation for improved ditch management techniques across the region

### *Project Outcomes*

The project outcomes are to:

- Characterize the ability of alternative retrofit strategies to mitigate pollutant loads and peak flows in roadside ditches;
- Characterize the ability of alternative plant palettes to mitigate pollutant loads and peak flows in roadside ditches.

**Task 1.0: Project Management**

Project administration will be led by Washington State University (WSU) staff. This includes initiating agreements, subcontracting with project partners, tracking progress of deliverables, and reimbursing partner project work based on detailed reports of deliverables. WSU will develop a Technical Advisory Committee (TAC) for this project. The TAC will comprise representatives from Ecology, other state agencies, and one permittee stormwater manager or coordinator from three or four jurisdictions. The TAC will advise the project team on site selection, planting palettes, and technical issues by meeting as needed throughout the project.

Semi-annual reports will include status of the contract tasks and decisions related to the tasks made during the calls, meetings and coordination with the advisory committees and communication with Ecology as appropriate. The four semi-annual reports will include project updates, data quality assurance review, results, and findings to date.

Deliverables:
D 1.1: Semi-annual Project Report – Target: December 2021
D 1.2: Semi-annual Project Report – Target: June 2022
D 1.3: Semi-annual Project Report – Target: December 2022
D 1.4: Semi-annual Project Report – Target: June 2023
D 1.5: Semi-annual Project Report – Target: December 2023

**Task 2.0: Planning and Quality Assurance Project Plan (QAPP) - (June 1 to July 31, 2021)**

A QAPP will be created before instruments are deployed or measurements are taken. The QAPP will list the ditch treatments to be investigated, the number of sensors that will be deployed, the plant species selection procedure, the type of data, how often data are collected, maintenance protocols for the system, how data will be managed, and lastly how data will be analyzed. Costs associated with QAPP development are related to time taken to write and revise the QAPP document.

For QAPP development, we will use the QAPP template provided by the SAM coordinator and follow the Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies, July 2004 (Ecology, 2001). The QAPP will be submitted to Ecology's SAM Coordinator for review and approval before the start of any fieldwork.

Deliverables:
D 2.1: Draft QAPP – Target: July 31, 2021
D 2.2: Final QAPP – Target: September 30, 2021

**Task 3.0: Site instrumentation - (June 1 to September 30, 2021)**
Three ditches in Pierce County will be selected for this study. A split arrangement of three alternate vegetation and retrofit experimental setups. One of each experimental setup will be implemented in a ditch – with three ditch sites total (Figure 1).

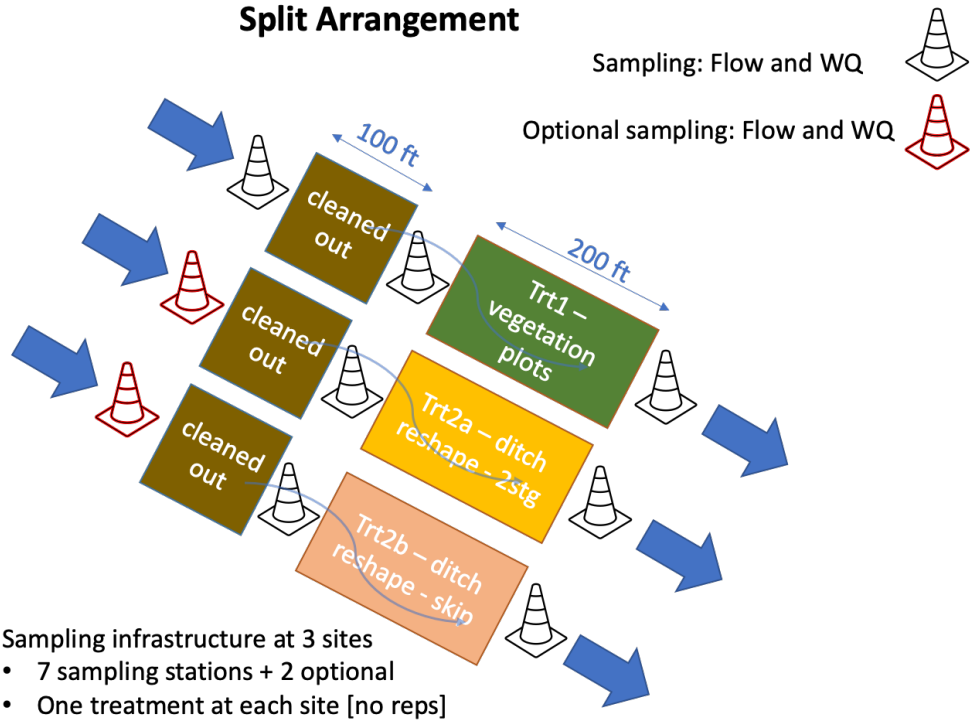


Figure 1: Split arrangement experimental setups. One of each experimental setup will be implemented at a site – with three sites total. Arrows denote flow direction.

Prerequisites for sites will include the following:
1. Linear with no culverts and no tributary ditches
2. Dry between storm events

3. Approximately 300 feet
4. Low gradient (<2-3%)
5. The willingness of adjacent property owner to allow installation of sampling equipment

Instrumentation required for all 3 sites is presented below:
1. Seven flumes
2. Seven water level sensors
3. Seven automated samplers, preferably ISCO-6712 series
4. Three dataloggers with cellular modems
5. Three rain gauges
6. Seven secure enclosures

To reduce costs, the samplers and sensors will be interfaced with only three dataloggers (one datalogger per site). Suitable automated samplers from prior SAM projects may be available for this project and if so will be used to offset costs. A rain gauge will be interfaced with each datalogger. The selected equipment was chosen based on cost-effectiveness and instrument accuracy and reliability. Equipment purchases by WSU are allowed upon signing of the contract with the exception of the ISCOs. A lender, King County, has identified available equipment for lending to WSU. If any of the seven ISCOs are unsuitable or cannot be borrowed, the WSU project manager will ask for approval to purchase ISCOs using the budget available for ISCO purchases in this contract. The SAM coordinator will authorize ISCO purchases in writing.

D 3.1: Instrumentation installation memo – Target: September 30, 2021

**Task 4.0: Evaluating alternative planting palettes - (October 1, 2021 to December 31, 2023)**
Plant palettes will be evaluated to determine the efficacy of current roadside blends as well as the potential for new blends to be incorporated for use in Western Washington. Test plots will be established as an element of Treatment 1 (see detail below).

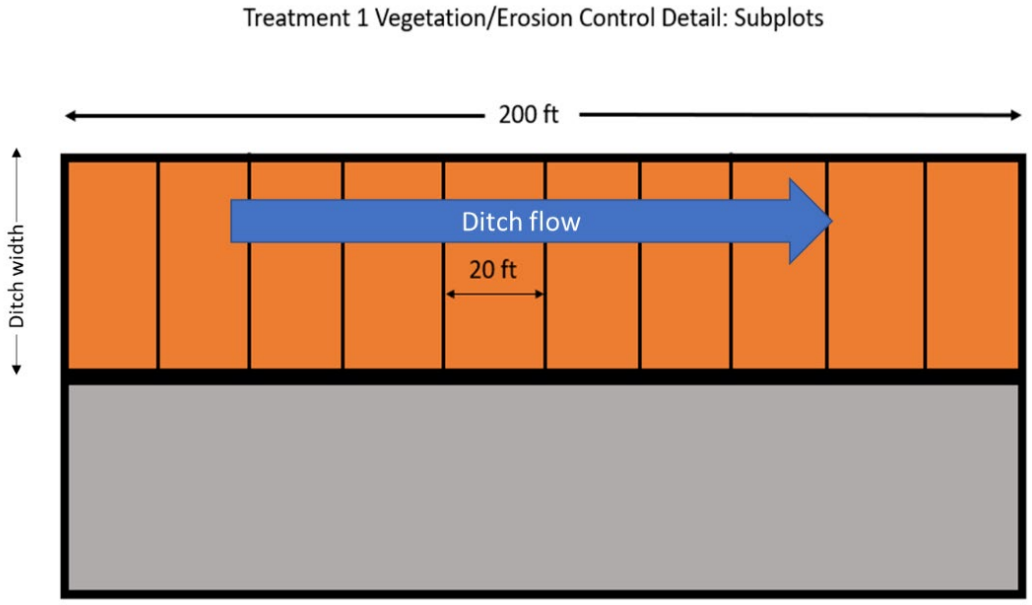


Figure 2: Arrangement of 20-feet wide vegetation plots in treatment section 1

Vegetation plots will be 20 ft wide with lengths dependent on the ditch width. Palette evaluation will comprise of 10 vegetation plots at each ditch site. Plots will include vegetation grown from a City of Tacoma seed mix blend specified in WSDOT's Temporary Erosion and Sediment Control manual Specification 8-01.3(2)B for temporary seeding[1]. Other blends designed by WSU will also be tested. Palettes will be replicated at each site and arranged in a random complete block design. Below are a few options for potential palette compositions. Actual palettes may differ slightly depending on seed availability at the time of planting.

WSDOT PLS Blend used by the City of Tacoma:

1. 25% Meadow Barley, 15% California Oatgrass, 10% Blue Wildrye, 10% California Brome, 10% Roemer's Fescue, 10% Tufted Hairgrass, 10% Spike Bentgrass, 5% Water Foxtail, 5% Slender Hairgrass

WSU Blends:

1. 50% Creeping Red Fescue, 40% Chewings Fescue, 10% Highland Bent
2. 50% Hard/Sheep Fescue, 35% Strawberry Clover, 15% Yarrow
3. 35% Idaho Fescue, 35% Tufted Hairgrass, 30% Strawberry Clover
4. 55% Creeping Red Fescue, 15% Yarrow, 15% Meadow Foxtail, 15% Sweet Vernal Grass
5. 50% Redtop, 50% Highland Bent
6. 50% Slender Creeping Red Fescue, 40% Chewings Fescue, 10% Redtop

Data Measurements include:

[1] Temporary grass seed shall be a commercially prepared mix, made up of low growing grass species that will grow without irrigation at the project location, and accepted by the Engineer. The application rate shall be two pounds per 1000 square feet.

1. Establishment percentage (4-6 weeks post seeding)
2. 6 stand quality ratings (3 ratings per year: spring, summer, and fall on a 1-9 scale; 1 =dead 9 =ideal)
3. Winter survival percentage (at each spring stand quality rating date)
4. Percent invasive cover (at establishment and each stand quality rating date)
5. Ground cover percentage (3 ratings per year: spring, summer, and fall)
6. Species dominant (at conclusion of study).

Successful palettes will have a high percent establishment, quality rating >5, low invasive percentage, high winter survival percentage and species dominant as a component of the seed blend. Planting of sites will occur in Fall 2021, and monitoring will continue through to the end of the project in early 2024.

D 4.1: Draft report of analysis with a presentation shared at TAC meeting # 4 that outlines the total effort associated with the successes and failures of the vegetation plantings. – Target: October 30, 2023
D 4.2: Revised analysis and revised report shared with TAC meeting # 5– Target: December 31, 2023

**Task 5.0: Quantifying effects ditch maintenance and retrofit on water quality and quantity - (October 1, 2021 to August 31, 2023)**

Maintenance activity will be quantified by tallying all human plus machine hours over the duration of the study. A metric for maintenance that weights automated, and manual time differently will be developed to quantify maintenance effort. Maintenance effort for the three ditch treatments will be compared to controls (no maintenance). Alterations to peak flow rates of inflow and outflow will be used to characterize the effect of the ditch reconfiguration for each of the four sections.

We will test 11 physio-chemical pollutants (dissolved organic carbon, total suspended solids, total phosphorus, ortho-phosphorous, total and dissolved copper, total and dissolved zinc, total petroleum hydrocarbons, total Kjeldahl nitrogen, and nitrate-nitrite) during every qualifying storm event. Samples will be collected from both the influent and effluent from each ditch section. We will attempt to sample at least 4 storms a wet season, or 8 over the three-year period of study. Pollutant removal efficiencies of each ditch reshaping treatment will be evaluated by quantifying inlet and outlet contaminant concentrations and mass loading rates at each ditch station.

D 5.1: Raw data collected to date (six months) with semi-monthly report – Target: April 30, 2022.
D 5.2: Raw data collected to date (six months) with semi-monthly report – Target: October 31, 2022.
D 5.3: Draft analysis and presentation shared at TAC meeting # 2 that outlines the total effort associated with water quality remediation by ditch treatment a total of 12 ditch sections. – Target: June 30, 2023
D 5.4: Revised analysis and revised report shared with TAC meeting # 3 – Target: August 30, 2023

**Task 6.0: Communication of Findings - (December 1, 2023 to March 31, 2024)**
A final report will summarize ditch treatment effects on water quantity and quality for the four ditch treatments tested and design and maintenance recommendations.

Deliverables:
D 6.1: Draft report of study findings including the sections on data quality review and usability statement. – Target: December 31, 2024
D 6.2: Final report with complete appendices and Excel file of all QA/QC'd data collected over the project period – Target: January 31, 2024
D 6.3: Two presentations – one for the Stormwater Work Group and another for regional stormwater related conference or workshop – Target: February 29, 2024
D 6.4: Draft fact sheet per SAM format for stormwater managers who seek information – Target: March 31, 2024.

### *Project Budget and Schedule*

All deliverables need ECOLOGY approval. Table 1 shows deliverable costs, target dates and target costs.

*Table 1: Target Deliverable Due Dates and Costs.*

| Deliverable by Task | Target Deliverable Date | Target Deliverable Cost |
|---|---|---|
| **Task 1.0 Project Management** | | |
| D1.1 Semi-annual Progress Report | December 2021 | $1,910 |
| D1.2 Semi-annual Progress Report | June 2022 | $1,910 |
| D1.3 Semi-annual Progress Report | December 2022 | $1,910 |
| D1.4 Semi-annual Progress Report | June 2023 | $1,910 |
| D1.5 Semi-annual Progress Report | December 2023 | $1,910 |
| **Task 2.0 Planning and QAPP** | | |
| D2.1 Draft QAPP | July 2021 | $16,539 |
| D2.1 Final QAPP | September 2021 | $5,513 |
| **Task 3.0 Site Instrumentation** | | |
| D3.1 Installation Memo | September 2021 | $144,581 |
| **Task 4.0 Evaluating Plants** | | |
| D4.1 Draft Plant Report | October 2023 | $62,177 |
| D4.1 Final Plant Report | December 2023 | $62,177 |
| **Task 5.0 Evaluating Maintenance, Water Quality and Quantity** | | |
| D5.1 Raw Data Report | April 2022 | $26,393 |
| D5.2 Raw Data Report | October 2022 | $26,393 |
| D5.3 Draft Water Quality Report | June 2023 | $87,977 |
| D5.4 Final Water Quality Report | August 2023 | $35,191 |
| **Task 6.0 Communication** | | |
| D6.1 Whole Study Draft Report | December 2024 | $5,228 |
| D6.2 Whole Study Final Report | January 2024 | $5,228 |
| D6.3 Two Presentations | February 2024 | $5,228 |
| D6.4 Draft Fact Sheet | March 2024 | $5,228 |
| **Total** | | **$497,403** |

### Budget Detail by task

The budget may be shifted between tasks, with pre-approval from Ecology, but the total budget may not be exceeded without an approved amendment from Ecology. WSU may use an indirect rate of a maximum of 30 percent of salaries and benefits. Invoices must provide documentation on what is included in the indirect rate prior to reimbursement. This is a negotiated rate between WSU and its Ecology funding program contact, and is subject to Ecology approval.

## Budget description:

WSU: Salaries over the whole study – 2 months Jayakaran, 4 months Technician, 2 years of funding for one MS student, and one Ph.D. student.

Herrera (Subconsultant): Salaries over the whole study – 2 hours VP, 140 hours Scientist V, 151 hours Scientist III, 80 hours Scientist II.

*Table 2: Contract financial summary*

| Task Number | WSU Salaries & Benefits | Supplies & Equip. | Travel | Personal Services (incl. Herrera) | Indirect (30% on WSU salaries & benefits) | Total task |
|---|---|---|---|---|---|---|
| 1 | $7,346 | $0 | $0 | $0 | $2,204 | **$9,550** |
| 2 | $7,348 | $0 | $0 | $12,500 | $2,204 | **$22,052** |
| 3 | $15,794 | $75,000 | $0 | $49,049 | $4,738 | **$144,581** |
| 4 | $89,119 | $1,000 | $7,500 | $0 | $26,735 | **$124,354** |
| 5 | $89,119 | $47,600 | $0 | $12,500 | $26,735 | **$175,954** |
| 6 | $16,086 | $0 | $0 | $0 | $4,826 | **$20,912** |
| **Total** | **$224,812** | **$123,600** | **$7,500** | **$74,049** | **$67,442** | **$497,403** |

## *References*

Alexander, L.C., 2015. Science at the boundaries: scientific support for the Clean Water Rule. Freshwater Science, 34(4), pp.1588-1594.

Ecology, 2001. Guidelines for Preparing Quality Assurance Project Plans for Environmental Studies. Publication No. 04-03-030. Washington State Department of Ecology, Lacey WA.

Herrera, 2008. Control of Toxic Chemicals in Puget Sound: Phase 2: Pollutant Loading Estimates for Surface Runoff and Roadways. Prepared for Washington State Department of Ecology, by Herrera Environmental Consultants, Inc., Seattle, Washington.

Maestre, A. and Pitt, R., 2006. "Identification of significant factors affecting stormwater quality using the National Stormwater Quality Database." In: Stormwater and Urban Water Systems Modeling, Monograph 14. (edited by W. James, K.N. Irvine, E.A. McBean, and R.E. Pitt). CHI. Guelph, Ontario, pp. 287 - 326.

Opher, T. and Friedler, E., 2010. Factors affecting highway runoff quality. Urban Water Journal, 7(3), 155–172.

Peter, K. T., Tian, Z., Wu, C., Lin, P., White, S., Du, B., McIntyre, J.K., Scholz, N.L. and Kolodziej, E.P., 2018. Using High-Resolution Mass Spectrometry to Identify Organic Contaminants Linked to Urban Stormwater Mortality Syndrome in Coho Salmon. Environmental Science and Technology.

Tian, Z., Zhao, H., Peter, K.T., Gonzalez, M., Wetzel, J., Wu, C., Hu, X., Prat, J., Mudrock, E., Hettinger, R. and Cortina, A.E., 2021. A ubiquitous tire rubber–derived chemical induces acute mortality in coho salmon. Science, 371(6525), pp.185-189.