CONSULTANT:	Shannon & Wilson, Inc.
CONTACT PERSON:	Tyler Stephens, Associate
ADDRESS:	400 N 34th Street, Suite 100 Seattle, WA 98103
FEDERAL TAX ID NUMBER/U.B.I. NUMBER:	91-0745357/578-058-2007
TELEPHONE/EMAIL:	206-632-8020/TJS@shanwil.com
COUNTY DEPT:	DCNR – Parks, Recreation & Tourism
DEPT. CONTACT PERSON:	Logan Daniels, P.E.
TELEPHONE/EMAIL:	425-388-6619/Logan.Daniels@snoco.org
PROJECT:	Meadowdale Beach Park & Estuary Restoration
AMOUNT:	$98,480
FUND SOURCE:	309-51094621326599 / 3109-51094621346599
CONTRACT DURATION:	April 15, 2023

AMENDMENT NO. 1 TO AGREEMENT FOR PROFESSIONAL SERVICES

THIS AMENDMENT No. 1 to that certain Agreement For Professional Services dated April 15, 2021 is made by and between SNOHOMISH COUNTY, a political subdivision of the State of Washington (the County) and Shannon & Wilson, Inc., a Washington State Corporation (the "Contractor").

NOW THEREFORE, for and in consideration of the mutual benefit and promises set forth below, the parties mutually agree that the Agreement For Professional Services be amended as follows:

1. Schedule A-1, attached hereto and incorporated by this reference, is added to Section 1, of the Agreement as additional work to be performed under this Agreement.

2. Schedule B-1, attached hereto and incorporated by this reference is added to Section 3.a. of the Agreement as additional compensation for additional work to be performed under Schedule A-1, this Agreement.

3. Schedule C-1, attached hereto and incorporated by this reference is added to Section 3.b. of the Agreement for reimbursable expenses for additional work to be performed under Schedule A-1, this Agreement.

4. Section 3.f. of the Agreement is amended in its entirety as follows:

> Contract Maximum: Total charges under this Agreement, all fees and expenses included, shall not exceed $497,917 for the initial term of this Agreement (excluding extensions or renewals, if any).

IN ALL OTHER RESPECTS, THE AGREEMENT FOR PROFESSIONAL SERVICES, TO WHICH THIS IS AN AMENDMENT, SHALL REMAIN IN FULL FORCE AND EFFECT EXCEPT AS EXPRESSLY MODIFIED BY THIS AMENDMENT NO. 1.

SNOHOMISH COUNTY:

Lacey Harper Digitally signed by Lacey Harper Date: 2021.09.29 11:51:03 -07'00'

County Executive Date

Shannon & Wilson, Inc.

Senior Associate 15 Sept 2021

Title Date

Approved as to insurance and indemnification provisions:

Risk Management Date

Approved as to form only:

Legal Counsel to the Contractor Date

Approved as to form only:

/s/ *Sean Reay DPA* 9/14/2021

Deputy Prosecuting Attorney Date

COUNCIL USE ONLY

Approved 9/29/2021

ECAF # 2021-0741

MOT/ORD Motion 21-335

SHANNON & WILSON
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

September 13, 2021

Ms. Logan Daniels, PE
Snohomish County Parks & Recreation
6705 Puget Park Drive
Snohomish, WA 98296

RE: SCHEDULE A.1 – SCOPE OF SERVICES FOR AMENDMENT NO. 1 TO GEOTECHNICAL CONSTRUCTION PHASE SERVICESFOR MEADOWDALE BEACH ESTUARY RESTORATION PROJECT, SNOHOMISH COUNTY, WASHINGTON

Dear Ms. Daniels:

This letter presents our scope of services for additional road reinforcement effort required along the park access road, additional efforts required to address City of Edmonds concerns on the haul route and additional construction observation tools and techniques associated with railroad bridge pile driving for the Meadowdale Beach Park Estuary Restoration Project in Snohomish County, Washington.

Several road stability or related issues have surfaced since construction implementation requiring additional geotechnical input. A fourth reinforcement area was added by Shannon & Wilson after observing tension cracks and vertically downset soil along the road shoulder from approximately Station 0+61 to Station 1+21, and annotated plans were provided to the County and their Contractor. Test nails installed prior to start of construction confirmed that additional nails were needed within the design reinforcement area from Station 5+39 to Station 6+39. The City of Edmonds and an adjacent homeowner brought to Parks attention a gravity block wall outside the park adjacent to the road right of way that requires protection during construction. Additionally, the contractor has made a claim that subsurface conditions vary from contract documents which requires geotechnical review and claim response assistance. Finally, the City of Edmonds and Snohomish County are working through an agreement regarding potential haul route damage which requires geotechnical input. This work is in addition to the monitoring task associated with the portion of the haul route through City of Edmonds Earth Subsidence and Landslide Hazard Area as described in the approved scope of work.

Shannon & Wilson is proposing to use geotechnical pile dynamic analyzer (PDA) data collection and interpretation services to provide more accurate estimates of driven pile capacity and to establish site-specific pile driving criteria for use in determining when pile driving is complete for each pile. PDA methods measure dynamic pile capacity during driving and are a widely accepted industry standard method for reducing the uncertainty inherent to driven piling construction. The method BNSF uses for determining when required pile capacity has been achieved is less accurate than the proposed method and can provide either conservative or unconservative pile capacities. It is possible that PDA methods could indicate the required pile capacities have been achieved at more shallow piling embedment, which would reduce the pile driving effort and duration, to the project schedule benefit. BNSF indicated in a meeting on August 19 with the County and Shannon & Wilson that they would accept using PDA methods for the project.

SCOPE OF SERVICES

Additional Haul Route Reinforcement Effort

Work proposed for the road stability and related issues includes additional geotechnical engineering and analysis, beyond what was scoped in the approved contract dated April 15, 2021, for the following tasks:

- Construction Management and Team Meetings
- Submittal Review
- Requests for Information
- Construction Observation
- Geotechnical Engineering and Analysis

Deliverables will be as described in the approved contract.

BNSF Bridge Foundation Pile Dynamic Analysis (PDA)

We will provide geotechnical PDA construction services for the proposed bridge. The following sections present our proposed scope of services, which consist of field preparation, PDA testing and analysis, and a letter report. These services would be concurrent with and in addition to the pile driving observation services we are currently scoped to provide.

Task Setup and Coordination

We have included effort to setup task accounting and invoicing and for coordination amongst the various parties involved.

Field Preparation

To prepare for PDA instrumentation and data collection we will:

- Coordinate with Snohomish County and BNSF to pre-drill instrument mounting locations on production HP 14x117 pile webs once they are on site but before production pile driving begins. This will facilitate rapid instrument installation.
- Coordinate with Snohomish County and BNSF to communicate the specific piling and portion of the drive during which the PDA instruments will be monitored.

PDA Testing

We will perform PDA testing on four of the HP 14x117 piling; one at either abutment and one each at two selected interior bents. We will perform PDA testing by attaching two sets of strain gauges and accelerometers to opposite sides of the pile. This instrumentation monitors pile performance during driving and will provide an indication of range of ultimate pile resistance. Signal matching analysis (CAPWAP analysis) will be performed on one high energy blow from the end of initial drive from each pile to compute the pile capacity.

The PDA tests will be performed during the initial drive, with up to two being repeated as a restrike following a brief setup period. Restrike testing provides an estimate of pile capacity increases that occur due to pile setup, when elevated porewater pressure that develops during driving dissipates with time after driving ceases. With additional elapsed time, depending on soil type, pore pressures dissipate causing effective stress increases throughout the soil adjacent to and in contact with the pile, increasing pile capacity.

The restrike would be accomplished by driving the initial pile segment during a previous shift, then splicing and driving the second, instrumented pile segment early in a subsequent shift, leaving the top of pile several feet above ground surface to facilitate a restrike. Just prior to the end of shift, BNSF would complete a brief restrike while we collect data for analysis. Upon completion of the restrike, BNSF would cut the pile as necessary to return the track to service. Because both tracks are likely to be returned to service after each work window, the length of setup time is limited by how early in the shift they can drive the

second pile segment and how late that day's work window extends. Probable maximum setup time is about 4 to 5 hours and will likely be less.

Analyses and Report

We will collect PDA data with a PDA-8G using site link technology that transmits the PDA data to the office via a cell phone connection. We will connect to the datalogger remotely to download data after each test. Signal matching analysis (CAPWAP) will be performed on one high energy blow from the end of initial drive and one high energy blow from the beginning of each restrike to compute the axial pile capacity. Combined with our field observations regarding total pile embedment, pile hammer strokes per foot or inch of penetration, pile hammer stroke length, and other observations, we will establish site-specific pile driving criteria for use at the bridge site. If conditions vary substantially, site-specific criteria would be applied for each test location and expanded to nearby locations as appropriate. We anticipate PDA data analysis and site-specific pile driving criteria could be delivered in about one or two days after the data is collected.

We will present our site-specific pile driving criteria in a summary letter report for your records. Interim criteria will be delivered as available to avoid causing schedule delays. We will deliver our report electronically; no hard copies will be submitted.

SCHEDULE AND BUDGET

We understand that BNSF has not yet provided a schedule to begin pile driving. We will coordinate with Snohomish County and BNSF to understand when the HP 14x117 materials are delivered and when BNSF plans to begin driving so we can begin predrilling PDA instrument mounts at least one day prior to beginning pile driving.

Our fee and the terms under which our services are offered will be in accordance with the Snohomish County Contract dated April 15, 2021 as amended and executed to include this scope of work. We have enclosed our estimated labor costs to perform the scope of services described above as Schedule B-1 and our estimated other direct costs as Schedule C-1. Total estimated labor and expenses for this request is $98,480.

If this proposal meets with your approval, please issue a contract amendment for our review. Shannon & Wilson, Inc. has prepared the enclosed "Important Information About Your Geotechnical/Environmental Proposal" to assist you and others in understanding the use and limitations of our proposals.

SHANNON & WILSON

We appreciate the opportunity to submit this proposal. Please contact me at 206-695-6915 if you have any questions.

Sincerely,

SHANNON & WILSON

Tyler J. Stephens, PE
Senior Associate

TJS:ECM:NDM/tjs

Enc. Schedule B-1 – Labor Estimate
Schedule C-1 – Other Direct Costs
Important Information about Your Geotechnical Proposal

SHANNON & WILSON
GEOTECHNICAL AND ENVIRONMENTAL CONSULTANTS

Attachment to and part of Proposal: 21-1-22288-P-Amend1

Date: September 13, 2021
To: Ms. Logan Daniels
Snohomish County Parks & Recreation

Important Information About Your Geotechnical/Environmental Proposal

More construction problems are caused by site subsurface conditions than any other factor. The following suggestions and observations are offered to help you manage your risks.

HAVE REALISTIC EXPECTATIONS.

If you have never before dealt with geotechnical or environmental issues, you should recognize that site exploration identifies actual subsurface conditions at those points where samples are taken, at the time they are taken. The data derived are extrapolated by the consultant, who then applies judgment to render an opinion about overall subsurface conditions; their reaction to construction activity; appropriate design of foundations, slopes, impoundments, and recovery wells; and other construction and/or remediation elements. Even under optimal circumstances, actual conditions may differ from those inferred to exist, because no consultant, no matter how qualified, and no subsurface program, no matter how comprehensive, can reveal what is hidden by earth, rock, and time.

DEVELOP THE SUBSURFACE EXPLORATION PLAN WITH CARE.

The nature of subsurface explorations—the types, quantities, and locations of procedures used—in large measure determines the effectiveness of the geotechnical/environmental report and the design based upon it. The more comprehensive a subsurface exploration and testing program, the more information it provides to the consultant, helping to reduce the risk of unanticipated conditions and the attendant risk of costly delays and disputes. Even the cost of subsurface construction may be lowered.

Developing a proper subsurface exploration plan is a basic element of geotechnical/environmental design that should be accomplished jointly by the consultant and the client (or designated professional representatives). This helps the parties involved recognize mutual concerns and makes the client aware of the technical options available. Clients who develop a subsurface exploration plan without the involvement and concurrence of a consultant may be required to assume responsibility and liability for the plan's adequacy.

READ GENERAL CONDITIONS CAREFULLY.

Most consultants include standard general contract conditions in their proposals. One of the general conditions most commonly employed is to limit the consulting firm's liability. Known as a "risk allocation" or "limitation of liability," this approach helps prevent problems at the beginning and establishes a fair and reasonable framework for handling them should they arise.

Various other elements of general conditions delineate your consultant's responsibilities. These are used to help eliminate confusion and misunderstandings, thereby helping all parties recognize who is responsible for different tasks. In all cases, read your consultant's general conditions carefully and ask any questions you may have.

HAVE YOUR CONSULTANT WORK WITH OTHER DESIGN PROFESSIONALS.

Costly problems can occur when other design professionals develop their plans based on misinterpretations of a consultant's report. To help avoid misinterpretations, retain your consultant to work with other project design professionals who are affected by the geotechnical/environmental report. This allows a consultant to explain report implications to design professionals affected by them, and to review their plans and specifications so that issues can be dealt with adequately. Although some other design professionals may be familiar with geotechnical/environmental concerns, none knows as much about them as a competent consultant.

OBTAIN CONSTRUCTION MONITORING SERVICES.

Most experienced clients also retain their consultant to serve during the construction phase of their projects. Involvement during the construction phase is particularly important because this permits the consultant to be on hand quickly to evaluate unanticipated conditions, conduct additional tests if required, and when necessary, recommend alternative solutions to problems. The consultant can also monitor the geotechnical/environmental work performed by contractors. It is essential to recognize that the construction recommendations included in a report are preliminary, because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site.

Because actual subsurface conditions can be discerned only during earthwork and/or drilling, design consultants need to observe those conditions in order to provide their recommendations. Only the consultant who prepares the report is fully familiar with the background information needed to determine whether or not the report's recommendations are valid. The consultant submitting the report cannot assume responsibility or liability for the adequacy of preliminary recommendations if another party is retained to observe construction.

REALIZE THAT ENVIRONMENTAL ISSUES MAY NOT HAVE BEEN ADDRESSED.

If you have requested only a geotechnical engineering proposal, it will not include services needed to evaluate the likelihood of contamination by hazardous materials or other pollutants. Given the liabilities involved, it is prudent practice to always have a site reviewed from an environmental viewpoint. A consultant cannot be responsible for failing to detect contaminants when the services needed to perform that function are not being provided.

ONE OF THE OBLIGATIONS OF YOUR CONSULTANT IS TO PROTECT THE SAFETY, PROPERTY, AND WELFARE OF THE PUBLIC.

A geotechnical/environmental investigation will sometimes disclose the existence of conditions that may endanger the safety, health, property, or welfare of the public. Your consultant may be obligated under rules of professional conduct, or statutory or common law, to notify you and others of these conditions.

RELY ON YOUR CONSULTANT FOR ADDITIONAL ASSISTANCE.

Your consulting firm is familiar with several techniques and approaches that can be used to help reduce risk exposure for all parties to a construction project, from design through construction. Ask your consultant, not only about geotechnical and environmental issues, but others as well, to learn about approaches that may be of genuine benefit.

The preceding paragraphs are based on information provided by the ASFE/Association of Engineering Firms Practicing in the Geosciences, Silver Spring, Maryland

SHANNON & WILSON, INC.

SCHEDULE B-1 - LABOR ESTIMATE
ADDITIONAL HAUL ROUTE REINFORCEMENT EFFORT AND PILE DYNAMIC ANALYZER (PDA) SERVICES
MEADOWDALE BEACH PARK AND ESTUARY RESTORATION PROJECT

	HOURS						DOLLARS						
STAFF GRADE/FUNCTION	PIC	PM	Sr. ENG	ENG	CAD	CLR	PIC	PM	Sr. ENG	PROF ENG	CAD	CLR	LABOR
CONTRACT HOURLY RATE BY STAFF	VP	Sr. Associate	Sr Prof 1		Sr. Tech Svcs	Sr. Off. Svcs	$260.00	$215.00	$135.00	$115.00	$130.00	$115.00	TOTAL
TASKS/SUBTASKS													
ADDITIONAL HAUL ROUTE REINFORCEMENT EFFORT													
Field Observation and Reporting		130		320				$27,950		$36,800			$64,750
Differing Site Conditions Claim Response Assistance		40						$8,600					$8,600
PDA TESTING AND ANALYSIS													
Task Setup		4						$860					$860
Task Coordination		4	4					$860	$540				$1,400
Field Testing - Initial Drive and Restrike		8	10	50				$1,720	$1,350	$5,750			$8,820
Data Processing		24	8					$5,160	$1,080				$6,240
Pile Driving Criteria Development		16	8					$3,440	$1,080				$4,520
TOTAL		***56***	***30***	***50***				***$48,590***	***$4,050***	***$42,550***			***$95,190***

Notes:

CAD = Computer-aided Drafting
CLR = Clerical
GEOL = Geologist
ENG = Engineer
LS = lump sum
OPCC = opinion of probable construction cost
PIC = Principal-in-Charge
PM = Project Manager
TECH = Technical

SHANNON & WILSON, INC.

SCHEDULE C-1 - EXPENSES
ADDITIONAL HAUL ROUTE REINFORCEMENT EFFORT AND PILE DYNAMIC ANALYZER (PDA) SERVICES
MEADOWDALE BEACH PARK AND ESTUARY RESTORATION PROJECT

EXPENSES					
Mileage	500	EA	$0.58	$	290
PDA Equipment	6	Day	$500	$	3,000
SUBTOTAL				***$***	***3,290***