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MEMORANDUM

DATE: 26 May 2016

TO: Eli Mackiewicz, Engineering Technician, City of Bellingham

CC: Bill Taylor, Taylor Aquatic Science and Policy
Jenny Saltonstall, Associated Earth Sciences, Inc.
Bryan Berkompas, Cardno GS, Inc.
Chris Wright, Raedeke Associates, Inc.
Anne Cline, Raedeke Associates, Inc.

FROM: Doug Beyerlein, P.E.

SUBJECT: Bioretention Hydrologic Performance Phase II Deliverable 4.1 Proposed Equipment List and Approximate Cost

For Task 4 of the Bioretention Hydrologic Performance Phase II we have compiled the following attached proposed equipment list and approximate cost to monitor ten bioretention facilities, as described in the QAPP.

This proposed equipment list includes input from all of the project team members. This is the minimum equipment required for accurate monitoring of inflows, outflows, and ponding and groundwater levels at each of the selected bioretention facilities. The approximate cost of this equipment is based on quotes received from appropriate vendors.

The City of Bellingham should proceed to use their own internal procurement practices to acquire the needed monitoring equipment. According to the contract, the City needs to purchase the equipment by August 1, 2016 (Deliverable 4.2) and deliver it to the consultant team by September 1, 2016 (Deliverable 4.3). This will allow the consultant team members to test and install the equipment before the start of the monitoring period (October 1, 2016).

The budget amendment with Ecology should be completed before the start of the procurement schedule to provide sufficient funding for the equipment purchase.

In addition to the proposed equipment list and approximate cost information we are including cost information for additional monitoring beyond the currently budgeted five-month period (October 2016 through February 2017). This additional monitoring cost

information was requested by the Department of Ecology and the PSEMP Stormwater Work Group.

Table 1. Proposed Equipment List and Approximate Cost

Item	Quantity	Unit	Unit Cost	Total Cost	Vendor
Solinst Levelogger Edge	50	each	$ 551.95	$ 27,597.50	Solinst
Solinst Barologger	40	each	$ 288.80	$ 11,552.00	Solinst
Solinst Rainlogger	8	each	$ 282.15	$ 2,257.20	Solinst
Solinst download cable	4	each	$ 149.00	$ 596.00	Solinst
Thel-mar 6" weir	7	each	$ 235.00	$ 1,645.00	Whitney Equipment
Thel-mar 8" weir	9	each	$ 267.00	$ 2,403.00	Whitney Equipment
Thel-mar 12" weir	8	each	$ 309.00	$ 2,472.00	Whitney Equipment
Hydrological Services TB-6 Rain Gauge+ TB334 mounting plate	8	each	$ 870.00	$ 6,960.00	Hydrological Services America
Misc pipe, fasteners, etc	10	each site	$ 100.00	$ 1,000.00	
Freight				$ 155.66	Hydrological services
Total Cost				$ 56,638.36	

The approximate total cost is $56,600 plus tax and shipping.

Details:

Solinst Levelogger Edge: Quantity 50
3001 LT Levelogger Edge, M5/F15

Solinst Barologger Edge: Quantity 40
3001 LT Barologger Edge, M1.5/F5

Solinst Rainlogger Edge: Quantity 8
3002 Rainlogger Edge c/w Connection Cable

Solinst Download Cable: Quantity 4
3001 Optical Reader (USB) for the Levelogger

Thel-Mar 6-inch weir: Quantity 7

Thel-Mar 8-inch weir: Quantity 9

Thel-Mar 12-inch weir: Quantity 8

Hydrological Services TB-6 Rain Gauge: Quantity 8
TIPPING BUCKET RAIN GAUGE 0.01 INCH RESOLUTION INCLUDING 5 METER CONNECTING LEAD. WITH HIGH-PRESSURE INJECTION MOLDED UV RESISTANT ABS BASE; ANTI-CORROSIVE POWDER COATED CAST ALUMINUM RIM & FUNNEL ASSEMBLY 3.1MM THICK (1/8 INCH), ANTI-CORROSIVE POWDER COATED ALL ALUMINUM OUTER ENCLOSURE, HARDENED STAINLESS STEEL PIVOTS, DUAL REED SWITCH OUTPUTS WITH VARISTER PROTECTION, LONG TERM STABLE CALIBRATION, 2 YEAR PARTS & LABOR WARRANTY. ACCURACY: BETTER THAN 1% FOR INTENSITIES FROM 0 TO 50 MM/HR; BETTER THAN 2% FOR INTENSITIES FROM 50 TO 75 MM/HR; BETTER THAN 4% FOR INTENSITIES FROM 75 TO 100 MM/HR. MEASURING RANGE: 0-700 M/HR. S/NO.

Including TB334 mounting plate: Quantity 8
POLE MOUNTING PLATE WITH LEVELING SCREWS FOR TB3, TB4 AND TB6. POWDER COATED ALUMINUM - MATES TO STANDARD 2INCH NOMINAL BORE GAL PIPE.

The price quotes received from each vendor are attached.

Additional Monitoring Cost Information

We estimate that the additional monitoring cost per month for the ten bioretention sites for the months beyond February 2017 is $10,600 per month. This additional monitoring cost breaks down as follows:

Task		Lead $150	Field 1 $95	Field 2 $85	
3.4.1	Visit sites to download avg. bi-weekly (39 visits * 6 sites, variable timing)	10	36	26	assumes 2 visits per month
3.4.2	Organize downloaded data and manage data base (from 10 sites)	1	5		
3.4.3	Data review and correction	4	20		
	Monthly Total Hours	15	61	26	
	Monthly Labor Costs	$2,250	$5,795	$2,210	
	Monthly ODCs			$ 344.52	
	Total Monthly costs			**$10,600**	

Summary

We recommend discussing with Ecology the number of additional monitoring months they are willing to fund plus the cost of the monitoring equipment (which exceeds the current budget). Following Ecology's response we can assist the City in preparing a contract amendment with Ecology to fund the additional costs. Please let us know how we can best provide this assistance.