Memorandum

To: Mel Hawley, Manager, City of Vergennes

From: Watershed Consulting Associates, LLC

Date: May 7, 2018

Re: ***City of Vergennes - Stormwater Master Plan (SWMP) – 30% Designs and Landscape Renderings***

ATTACHMENTS:

4.1 – 30% Concept Design Plans
4.2 – Landscape Renderings

Introduction

Watershed Consulting Associates, LLC (WCA) is pleased to submit this memo describing the 30% concept design and landscape rendering sites for the Vergennes Stormwater Master Plan (SWMP). These sites were chosen as the result of the process described in the Task 3 – Preferred Sites Summary Memo. A meeting was held with the City of Vergennes Manager, members of the Planning Commission, and Claire Tebbs of the Addison County Regional Planning Commission to discuss the results of the Task 3 process and to choose the final two landscape rendering sites (the collection of Main Street practices had already been decided on previously) and the three 30% concept design sites.

During that meeting the group chose to pursue 30% concept design for

- Vergennes High School (gravel wetland)
- Vergennes Wastewater Treatment Facility (gravel wetland)
- West Main Street Parking Lot (or Settler's Park parking lot if an agreement with the owner of the West Main Street Parking Lot could not be reached) (sub-surface chambers)

City Manager Mel Hawley reached out to the owner of the West Main Street Parking Lot about purchasing the property but a suitable price could not be agreed upon by both parties. It was then decided that 30% concept design would be pursued for Settler's Park.

All three sites were surveyed for infrastructure and topography. Modeling was updated to reflect any changes necessary with respect to site constraints. The following narrative describes each practice, along with the modeled pollutant load reduction and provides a preliminary cost estimate for each.

Vergennes High School – Gravel Wetland:

Description:

The proposed gravel wetland at the Vergennes High School would treat a total of 9.77 acres, 5.77 acres of which is impervious. The gravel wetland would fully filter the 1" water quality volume (WQv) storm and detain the Channel Protection volume (CPv) storm for 24 hours in accordance with regulatory guidelines. The total volume managed (CPv) is approximately 70,000 cubic feet. WinSLAMM modeling, along with pollutant load reduction percentages obtained from the UNH Stormwater Center's 2012 Biennial report, show that up to 13,133.76 pounds of sediment (96%) could be filtered out of runoff annually while up to 19.19 pounds of phosphorus (58%) would be removed every year. This practice would replace a much smaller stormwater pond that is currently permitted for the site (stormwater permit # 4913-9010). This pond appears to be undersized and would do little to treat for phosphorus.

Urban Rain | Design (URD) developed a detailed landscape plan for the gravel wetland that would ensure that the feature integrate with the school's campus. This is important as the gravel wetland will have to be expanded to provide adequate treatment for CPv and is situated between the high-use student parking lot and one of the school's ballfields. In order to integrate with these uses, URD designed features such as raised wooden and concrete boardwalks that span the gravel wetland between the parking lot and the ballfield to facilitate pedestrian traffic from one side to the other. URD also envisions incorporating two seating and viewing platforms that would look out over the wetland with a pedestrian pathway that surrounds the perimeter of the wetland and integrates with an existing informal pathway that connects to Mountain View Lane.

Cost Projection:

VTrans Code	Description	Unit	Quantity	Unit Price	Amount
Site Preparation					
	Mobilization	LS	1	$ 1,000.00	$ 1,000.00
653.55	Project Demarcation Fencing	LF	1400	$ 1.17	$ 1,638.00
653.20	Temporary Erosion Matting	SY	2500	$ 2.20	$ 5,500.00
649.51	Geotextile for silt fence	SY	225	$ 4.13	$ 929.25
652.10	EPSC Plan	LS	1	$ 1,000.00	$ 1,000.00
652.20	Monitoring EPSC Plan	HR	10	$ 37.22	$ 372.20
	Construction Staking	HR	8	$ 90.00	$ 720.00
				Subtotal:	$ 11,159.45
Gravel Wetland					
203.15	Common Excavation	CY	3000	$9.86	$ 29,580.00
651.35	Muck Soil (Topsoil)	CY	250	$30.96	$ 7,740.00
629.54	3/4" to 1 1/2" Crushed Stone (Crushed Stone Bedding)	TON	700	$34.04	$ 23,828.00
629.54	Pea Stone (Crushed Stone Bedding)	TON	100	$34.04	$ 3,404.00
613.11	Type II Stone (overflow)	CY	10	$42.49	$ 424.90
613.10	Type I Stone (hydraulic inlet, forebays)	CY	100	$43.91	$ 4,391.00
649.31	Geotextile Under Stone Fill	SY	1200	$2.51	$ 3,012.00
N/A	Wetland Plant Seeds	LBS	35	$125.00	$ 4,375.00
651.15	Seed (grass)	LBS	200	$7.66	$ 1,532.00
605.11	8" Underdrain Piping	LF	30	$27.04	$ 811.20
601.0915	18" CPEP Outlet Works	LF	165	$64.04	$ 10,566.60
N/A	18" Beehive Grate with Anti-Vortex Baffle	EACH	1	$615.00	$ 615.00
				Subtotal:	$ 90,279.70
New Infrastructure					
604.20	New Catch Basin (outlet structure)	EACH	1	$3,387.59	$ 3,387.59
601.0920	24" CPEP	LF	140	$61.37	$ 8,591.80
	Wooden Boardwalk (lump sum)	LS	1	$20,000.00	$ 20,000.00
				Subtotal:	$ 31,979.39
Subtotal:					$ 133,418.54
	Construction Oversight**	HR	24	$ 100.00	$ 2,400.00
	Construction Contingency - 10%**				$ 13,341.85
	Incidentals to Construction - 5%**				$ 6,670.93
	Minor Additional Design Items - 5%**				$ 6,670.93
	Final Design	HR	40	$ 100.00	$ 4,000.00
	Permit Review and Applications (exclusive of permit fees)	HR	12	$ 100.00	$ 1,200.00
Total (Rounded)					**$ 168,000.00**

Cost per pound Phosphorus Removed:

The cost per pound of phosphorus removed is expected to be approximately $8,754.00.

Vergennes Wastewater Treatment Facility – Gravel Wetland:

Description:

The proposed gravel wetland at the Vergennes Wastewater Treatment Facility will treat 12.53 acres, 3.24 of which is impervious. As this practice will discharge to the Otter Creek, only the WQv will be treated. This volume is approximately 4,200 cubic feet. However, given the high removal rate of gravel wetlands for sediment, the practice is modeled to remove 33,137 pounds of sediment (96%) and up to 27.12 pounds of phosphorus (58%).

Cost Projection:

VTrans Code	Description	Unit	Quantity	Unit Price	Amount
Site Preparation					
	Mobilization	LS	1	$ 1,000.00	$ 1,000.00
653.55	Project Demarcation Fencing	LF	350	$ 1.17	$ 409.50
653.20	Temporary Erosion Matting	SY	500	$ 2.20	$ 1,100.00
649.51	Geotextile for silt fence	SY	45	$ 4.13	$ 185.85
652.10	EPSC Plan	LS	1	$ 500.00	$ 500.00
652.20	Monitoring EPSC Plan	HR	4	$ 37.22	$ 148.88
	Construction Staking	HR	8	$ 90.00	$ 720.00
				Subtotal:	$ 4,064.23
Gravel Wetland					
203.15	Common Excavation	CY	1000	$9.86	$ 9,860.00
651.35	Muck Soil (Topsoil)	CY	250	$30.96	$ 7,740.00
629.54	Pea Stone (Crushed Stone Bedding)	TON	65	$34.04	$ 2,212.60
301.26	Gravel (Subbase of Gravel, Fine Graded)	CY	200	$40.03	$ 8,006.00
613.10	Type I Stone (weirs and overflow)	CY	200	$43.91	$ 8,782.00
649.31	Geotextile Under Stone Fill	SY	750	$2.51	$ 1,882.50
N/A	Wetland Plant Seeds	LBS	10	$125.00	$ 1,250.00
651.15	Seed	LBS	45	$7.66	$ 344.70
605.11	8" Underdrain Piping	LF	35	$27.04	$ 946.40
601.0915	18" CPEP Outlet Works	LF	110	$64.04	$ 7,044.40
N/A	18" Anti-Seep Collar	EACH	1	$250.00	$ 250.00
N/A	18" Beehive Grate with Anti-Vortex Baffle	EACH	1	$615.00	$ 615.00
				Subtotal:	$ 48,933.60
Subtotal:					$ 52,997.83
	Construction Oversight**	HR	24	$ 100.00	$ 2,400.00
	Construction Contingency - 10%**				$ 5,299.78
	Incidentals to Construction - 5%**				$ 2,649.89
	Minor Additional Design Items - 5%**				$ 2,649.89
	Final Design	HR	60	$ 100.00	$ 6,000.00
	Permit Review and Applications (exclusive of permit fees)	HR	16	$ 100.00	$ 1,600.00
Total (Rounded)					**$ 74,000.00**

Cost per pound Phosphorus Removed:

The cost per pound of phosphorus removed is expected to be approximately $2,728.00.

Settler's Park Parking Lot – Sub-surface chamber filter:

Description:

The proposed system of sub-surface chambers underneath the Settler's Park parking lot would treat 3.17 acres, 2.38 of which is impervious surfaces. This practice is envisioned in combination with the system of streetscape

bioretention practices shown in Attachment 4.2 for Main Street. Those practices would treat the maximum amount of runoff possible for their respective drainage areas given the available space along Main Street for individual bioretention features. The overflow from each would then be conveyed via overflows into a separate storm sewer system (proposed to be installed by the City of Vergennes as part of a comprehensive Main Street renovation project as there is currently no separate storm sewer system along this street) to then be treated by the chamber system under the Settler's Park parking lot. The soils in this area are presumed unsuitable for infiltration, therefore the system will be configured as a sub-surface sand filter to fully treat WQv. CPv and above will not be treat at this location as the discharge is to the Otter Creek. Volume managed is approximately 6,000 cubic feet. Pollutant load modeling indicates that up to 440 pounds of sediment (51%) could be removed annually along with 4.35 pounds of total phosphorus (33%). In reality these amounts may actually be higher given the in-series treatment configuration of this treatment system with the streetscape bioretention features.

URD developed a landscape plan for this site as it was deemed a priority site by the City of Vergennes in light of the City's need for a 'gateway park' to serve as a welcoming entry to the City for boaters coming from the Otter Creek. URD envisions developing the existing park in such a way as to stabilize the parking lot surface using pavement (currently gravel) to limit fine particle transport, surround the lot with a vegetated swale that would pre-treat runoff from the lot before directing it to the chamber system, and install an ADA-compliant ramp to the Creek with boat launch dock, as well as a defined boat portage path separate from parking spaces. A new crossing of Main Street is also envisioned.

Main Street – Landscape Rendering - Streetscape Bioretention:

In addition to the rendering developed for Settler's Park, URD also developed a comprehensive vision for the inclusion of stormwater features, as well as pedestrian and bicycle access in Vergennes' core downtown area. This can be seen in Attachment 4.2. It is envisioned that these streetscape bioretention practices would be integrated with the chamber system at Settler's Park by installing new separate storm sewer infrastructure along Main Street. This is critical as the soils in Vergennes do not support infiltration generally, therefore an underdrain must be used with these streetscape bioretention practices. However, as there is no separate storm sewer currently, one would have to be installed. This new pipe system would then serve as the underdrain and overflow receptor for the streetscape bioretention features. This pipe system would then feed into the chamber system at Settler's Park.

Cost Projection:

VTrans Code	Description	Unit	Quantity	Unit Price	Amount
Site Preparation					
	Mobilization	LS	1	$ 1,000.00	$ 1,000.00
653.55	Project Demarcation Fencing	LF	350	$ 1.17	$ 409.50
652.10	EPSC Plan	LS	1	$ 1,000.00	$ 1,000.00
649.51	Geotextile for silt fence	SY	75	$ 4.13	$ 309.75
652.20	Monitoring EPSC Plan	HR	6	$ 37.22	$ 223.32
	Construction Staking	HR	4	$ 90.00	$ 360.00
				Subtotal:	$ 3,302.57
Chambers - Costs					
	SC740	EACH	55	$ 234.60	$12,903.00
	SC740 Plain End Cap	EACH	7	$ 48.30	$ 338.10
	SC740 24B	EACH	1	$ 337.58	$ 337.58
	12" 90 - 1299ST	EACH	1	$ 74.19	$ 74.19
	12" Tee - 1264ST	EACH	2	$ 109.70	$ 219.40
	12" Coupler - 1265AA	EACH	8	$ 8.30	$ 66.42
	24" 22.5 Bend	EACH	1	$ 215.50	$ 215.50
	24" Coupler - 2465AA	EACH	2	$ 33.20	$ 66.40
	12" N12 AASHTO for splicing as needed	LF	20	$ 7.87	$ 157.32
	24" N12 AAHSTO for Isolater Row	LF	20	$ 21.67	$ 433.32
	601TG to wrap system (SY)	SY	2000	$ 0.67	$ 1,334.00
	315WTK for scour protection (SY)	SY	1000	$ 0.69	$ 690.00
	Inline Drain 12x6 for Inspection Port	EACH	2	$ 310.50	$ 621.00
	Inserta Tee for Inspection Port - N12 to Stormte	EACH	2	$ 86.32	$ 172.64
	6" red Hole saw	EACH	1	$ 132.43	$ 132.43
	6" AASHTO N12 for Inspection port	LF	20	$ 2.70	$ 54.05
	8" AASHTO N12 Perf for underdrain	LF	380	$ 4.61	$ 1,752.37
	8" Tee	EACH	13	$ 32.21	$ 418.75
	8" End Cap	EACH	14	$ 7.16	$ 100.30
	8" 90 Bend	EACH	1	$ 27.07	$ 27.07
				Subtotal:	$20,113.85
Materials and Excavation Costs					
604.20	Concrete Catch Basin	EACH	2	$ 3,387.59	$ 6,775.18
203.15	Common Excavation	CY	415	$ 9.86	$ 4,091.90
629.54	Crushed Stone Bedding	TON	435	$ 34.04	$14,807.40
601.0920	24" CPEP	LF	205	$ 61.37	$12,580.85
653.20	Temporary Erosion Matting	SY	150	$ 2.20	$ 330.00
651.15	Seed	LBS	25	$7.66	$ 191.50
				Subtotal:	$38,776.83
Subtotal:					$62,193.25
	Construction Oversight**	HR	16	$ 100.00	$ 1,600.00
	Construction Contingency - 10%**				$ 6,219.32
	Incidentals to Construction - 5%**				$ 3,109.66
	Minor Additional Design Items - 5%**				$ 3,109.66
	Final Design	HR	30	$ 100.00	$ 3,000.00
	Permit Review and Applications (exclusive of permit fees)	HR	16	$ 100.00	$ 1,600.00
Total (Rounded)					**$81,000.00**

Cost per pound Phosphorus Removed:
The cost per pound of phosphorus removed is expected to be approximately $18,620.00.

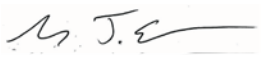
Next Steps

Please review these materials and reach out to us with any questions regarding anything presented in this memorandum.

We are now working on finalizing the final report for the stormwater master plan, to include the results from the sanitary sewer mapping and replacement prioritization project as well.

Please feel free to give us a call at (802) 497-2367 or email Dana at Dana@watershedca.com with any questions.

Sincerely,



Dana Allen
WQ Specialist