

Memorandum



To: Mike Winslow and Allie Dinwiddie (ACRPC), Valerie Capels (Town of Bristol)

From: Watershed Consulting

Date: July 8, 2019

Re: ***Stormwater Master Plan for Bristol, VT – Task 4 – 30% Concept Design – Concepts Summary***

ATTACHMENTS:

4.1 – 30% Designs

4.2 – Dry Well Concept Memo

4.3 – Geotechnical Assessment

1.0 Introduction

Watershed Consulting Associates, LLC (Watershed) is pleased to submit deliverables in fulfillment of Task 4 for the Bristol Stormwater Master Plan project. Task 4 concerns development of 30% Concept Designs as a result of Task 3 – Site Prioritization. Watershed also submitted ‘sketch’ concepts for stakeholder outreach and submitted a 30% design drawing for the Main Street Dry Wells that the Town of Bristol expects to fund and construct in the near future. Please note that the plan for the Main Street Dry Wells was submitted as a concept drawing that the Town of Bristol elected to construct as a ‘design-build’ recognizing that full 100% of the design concept had not been performed. The Town of Bristol also elected to ‘redline’ in certain features or aspects of the plan that they deemed necessary based on their knowledge of their infrastructure and their plans for paving and other infrastructure changes. Watershed did not verify any of this in the field and can make no claims as to the applicability of these changes.

As part of this Task, we conducted soil profiles and infiltration testing. Those results are included as Attachment 4.3 – Geotechnical Assessment. Please note that there was an equipment malfunction during the infiltration test at the park, which was to be used for modeling infiltration for School St 001 and Main St 001. We instead used a rate of 6”/hour as the soil profile supports the use of such a rate. Note that we used this same rate for the School sites (School 1 and 2) as it is more conservative than the 15”/hour measured on the site.

2.0 Results

The four projects selected for 30% Concept Design are:

- School St 001

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- North St 001
- School 1 & 2
- Main St Dry Wells

Each section below describes each project in more detail.

School St 001

Description:

A system of sub-surface chambers is envisioned for the School St 001 site. These chambers would sit under the road and parking spaces adjacent to the park and essentially be invisible, other than a manhole structure that would be used for operation and maintenance access. This structure would be flush with the ground.

We propose to use ADS StormTech MC-4500 chambers at this location as they will maximize storage and infiltration potential. There will be 3 rows of chambers laid out so that the total number of chambers equals 68 for a total storage volume of 12,466 cubic feet. This asymmetric configuration was chosen to minimize disturbance to the park and its associated features such as trees, play structures, and gardens.

Impervious Treated (ac)	Total Drainage Area (ac)	Total Phosphorus Removed Annually (WinSLAMM) (lbs.)	Total Phosphorus Removed Annually (VT DEC STP) (lbs.)	Total Solids Removed (WinSLAMM) (lbs.)	Total Cost Per Pound P Removed (VT DEC)	Total Cost Per Pound P Removed (WinSLAMM)
10.2	32.12	9.86	33.99	14,117	\$4,560	\$15,720

Cost:

VTrans Code	Description	Unit	Quantity	Unit Price	Amount
Site Preparation					
N/A	MOBILIZATION	LS	1	\$ 1,500.00	\$ 1,500.00
653.55	PROJECT DEMARCATION FENCE	LF	500	\$ 1.17	\$ 585.00
653.20	TEMPORARY EROSION MATTING	SY	200	\$ 2.20	\$ 440.00
652.10	EPSC PLAN	LS	1	\$ 500.00	\$ 500.00
652.20	MONITORING EPSC PLAN	HR	8	\$ 37.22	\$ 297.76
N/A	CONSTRUCTION STAKING	HR	6	\$ 125.00	\$ 750.00
<i>Subtotal:</i>					\$ 4,072.76
Chambers - Excavation and Materials					
EXCAVATION					
203.15	COMMON EXCAVATION	CY	1000	\$ 9.86	\$ 9,860.00
203.28	EXCAVATION OF SURFACES AND PAVEMENTS	CY	100	\$ 21.94	\$ 3,291.00
204.20	TRENCH EXCAVATION OF EARTH	CY	150	\$ 14.05	\$ 2,107.50
MATERIALS					
BASE / COVER / SURROUNDING STONE					
629.54	CRUSHED STONE BEDDING (3/4" - 1 1/2" STONE)	TON	650	\$ 34.04	\$ 22,126.00
PIPING					
601.0915	18" CPEP	LF	30	\$ 64.04	\$ 1,921.20
601.0920	24" CPEP	LF	100	\$ 61.37	\$ 6,137.00
STRUCTURES AND APPURTENANCES					
604.18	PRECAST REINFORCED CONCRETE DROP INLET WITH CAST IRON GRATE	EACH	2	\$ 4,009.29	\$ 8,018.58
GRASS REPLACEMENT					
656.41	PERENNIALS	EACH		\$ 8.77	\$ -
651.15	SEED	LB	25	\$ 7.66	\$ 191.50
653.20	TEMPORARY EROSION MATTING	SY	225	\$ 2.20	\$ 495.00
PAVEMENT REPLACEMENT (ABOVE CHAMBERS IN PAVED AREAS)					
401.10	AGGREGATE SURFACE COURSE	CY	40	\$ 43.60	\$ 1,744.00
406.25	BITUMINOUS CONCRETE PAVEMENT	TON	160	\$ 127.86	\$ 20,457.60
616.26	PRECAST REINFORCED CONCRETE CURB, TYPE B	LF	85	\$36.50	\$ 3,102.50
CHAMBERS - ALL COSTS (FROM ADS STORMTECH)					
N/A	MC4500	EACH	60	\$ 483.00	\$ 28,980.00
N/A	MC4500 PLAIN END CAP	EACH	4	\$ 494.50	\$ 1,978.00
N/A	MC4500 24B END CAP	EACH	1	\$ 682.81	\$ 682.81
N/A	MC4500 18T END CAP	EACH	3	\$ 682.81	\$ 2,048.44
N/A	18" TEE	EACH	4	\$ 230.01	\$ 920.05
N/A	18" 90 BEND	EACH	1	\$ 144.80	\$ 144.80
N/A	18" COUPLERS	EACH	8	\$ 23.54	\$ 188.32
N/A	18" N12 FOR MANIFOLD (AASHTO)	LF	60	\$ 15.28	\$ 917.01
N/A	24" N12 for Isolater Row (AASHTO)	LF	5	\$ 23.06	\$ 115.29
N/A	601TG to wrap system (SY)	SY	1000	\$ 0.67	\$ 667.00
N/A	315WTM for scour protection (SY)	SY	100	\$ 0.69	\$ 69.00
N/A	6" INSERTA TEE	EACH	1	\$ 86.32	\$ 86.32
N/A	6" RED HOLE SAW	EACH	1	\$ 132.43	\$ 132.43
N/A	12" INLINE DRAIN	EACH	1	\$ 310.50	\$ 310.50
<i>Subtotal:</i>					\$ 116,691.85
Subtotal:					
	Construction Oversight**	HR	16	\$ 125.00	\$ 2,000.00
	Construction Contingency - 10%**				\$ 12,076.46
	Incidentals to Construction - 5%**				\$ 6,038.23
	Minor Additional Design Items - 5%**				\$ 6,038.23
	Final Design	HR	55	\$ 125.00	\$ 6,875.00
	Permit Review and Applications (exclusive of permit fees)	HR	10	\$ 125.00	\$ 1,250.00
Total (Rounded to nearest \$1,000)					\$ 155,000.00

North St 001

Description:

A system of sub-surface chambers is envisioned for the North St 001 site. These chambers would sit under the park and a portion of the road and essentially be invisible, other than a manhole structure that would be used for operation and maintenance access. This structure would be flush with the ground.

We propose to use ADS StormTech MC-4500 chambers at this location as they will maximize storage and infiltration potential. There will be 7 rows of approximately 18 chambers each for a total storage volume of 22,279 cubic feet. Note that these chambers were shifted slightly out on to North Street in order to minimize impact on the adjacent water fountain and were shifted slightly south to avoid impacts to the fire hydrant on the northeast corner of the park.

Impervious Treated (ac)	Total Drainage Area (ac)	Total Phosphorus Removed Annually (WinSLAMM) (lbs.)	Total Phosphorus Removed Annually (VT DEC STP) (lbs.)	Total Solids Removed (WinSLAMM) (lbs.)	Cost per Pound P removed (WinSLAMM) (\$)	Cost per Pound P removed (VT DEC STP) (\$)
16.09	190.26	29.9	118.36	537,622	\$7,325	\$1,850

Cost:

VTrans Code	Description	Unit	Quantity	Unit Price	Amount
Site Preparation					
N/A	MOBILIZATION	LS	1	\$ 1,500.00	\$ 1,500.00
653.55	PROJECT DEMARCATION FENCE	LF	500	\$ 1.17	\$ 585.00
653.20	TEMPORARY EROSION MATTING	SY	250	\$ 2.20	\$ 550.00
649.51	GEOTEXTILE FOR SILT FENCE	SY	250	\$ 4.13	\$ 1,032.50
653.35	VEHICLE TRACKING PAD	CY	30	\$ 50.48	\$ 1,514.40
652.10	EPSC PLAN	LS	1	\$ 500.00	\$ 500.00
652.20	MONITORING EPSC PLAN	HR	8	\$ 37.22	\$ 297.76
N/A	CONSTRUCTION STAKING	HR	6	\$ 125.00	\$ 750.00
<i>Subtotal:</i>					\$ 6,729.66
Chambers - Excavation and Materials					
EXCAVATION					
203.15	COMMON EXCAVATION	CY	1625	\$ 9.86	\$ 16,022.50
203.28	EXCAVATION OF SURFACES AND PAVEMENTS	CY	25	\$ 21.94	\$ 548.50
204.20	TRENCH EXCAVATION OF EARTH	CY	100	\$ 14.05	\$ 1,405.00
MATERIALS					
BASE / COVER / SURROUNDING STONE					
629.54	CRUSHED STONE BEDDING (3/4" - 1 1/2" STONE)	TON	1050	\$ 34.04	\$ 35,742.00
PIPING					
601.0915	18" CPEP	LF	100	\$ 64.04	\$ 6,404.00
601.0920	24" CPEP	LF	80	\$ 61.37	\$ 4,909.60
STRUCTURES AND APPURTENANCES					
604.18	PRECAST REINFORCED CONCRETE DROP INLET WITH CAST IRON GRATE	EACH	3	\$ 4,009.29	\$ 12,027.87
PLANTING (ABOVE CHAMBERS IN GREENSPACE)					
651.15	SEED	LB	50	\$ 7.66	\$ 383.00
653.20	TEMPORARY EROSION MATTING	SY	500	\$ 2.20	\$ 1,100.00
PAVEMENT REPLACEMENT (ABOVE CHAMBERS IN PAVED AREAS)					
401.10	AGGREGATE SURFACE COURSE	CY	25	\$ 43.60	\$ 1,090.00
406.25	BITUMINOUS CONCRETE PAVEMENT	TON	115	\$ 127.86	\$ 14,703.90
616.26	PRECAST REINFORCED CONCRETE CURB, TYPE B	LF	100	\$ 36.50	\$ 3,650.00
CHAMBERS - ALL COSTS (FROM ADS STORMTECH)					
N/A	MC4500	EACH	112	\$ 483.00	\$ 54,096.00
N/A	MC4500 PLAIN END CAP	EACH	7	\$ 494.50	\$ 3,461.50
N/A	MC4500 24B END CAP	EACH	1	\$ 682.81	\$ 682.81
N/A	MC4500 18T END CAP	EACH	6	\$ 682.81	\$ 4,096.88
N/A	18" TEE	EACH	7	\$ 230.01	\$ 1,610.08
N/A	18" 90 BEND	EACH	1	\$ 144.80	\$ 144.80
N/A	18" COUPLERS	EACH	7	\$ 23.54	\$ 164.78
N/A	18" N12 FOR MANIFOLD (AASHTO)	LF	100	\$ 15.28	\$ 1,528.35
N/A	24" N12 for Isolater Row (AASHTO)	LF	20	\$ 23.06	\$ 461.15
N/A	601TG to wrap system (SY)	SY	2000	\$ 0.67	\$ 1,334.00
N/A	315WTM for scour protection (SY)	SY	400	\$ 0.69	\$ 276.00
N/A	6" INSERTA TEE	EACH	1	\$ 86.32	\$ 86.32
N/A	6" RED HOLE SAW	EACH	1	\$ 132.43	\$ 132.43
N/A	12" INLINE DRAIN	EACH	1	\$ 310.50	\$ 310.50
<i>Subtotal:</i>					\$ 166,371.97
Subtotal:					
	Construction Oversight**	HR	24	\$ 125.00	\$ 3,000.00
	Construction Contingency - 10%**				\$ 17,310.16
	Incidentals to Construction - 5%**				\$ 8,655.08
	Minor Additional Design Items - 5%**				\$ 8,655.08
	Final Design	HR	55	\$ 125.00	\$ 6,875.00
	Permit Review and Applications (exclusive of permit fees)	HR	12	\$ 125.00	\$ 1,500.00
Total (Rounded to nearest \$1,000)					\$ 219,000.00

School 1 & 2

Description:

A system of sub-surface chambers is envisioned for the School 1 (northern) and School 2 (southern) sites. These chambers would sit under the playground and essentially be invisible, other than a manhole structure that would be used for operation and maintenance access. This structure would be flush with the ground. Both of these systems may require additional drainage infrastructure (catch basins and pipes) to adequately convey runoff to them. This may complicate construction and increase cost, but not to a prohibitive degree. The system described for School 1 would also be able to treat runoff from the large area above Mountain Street. This could alleviate strain on the existing drainage infrastructure along that road. Note that additional 24" pipe will be need to convey safely overflow from the new splitter structure on Mountain Street down to an existing catch basin. This splitter structure and pipe is necessary to ensure that not all runoff from the large drainage area above Mountain Street is routed to the chamber system on the School property. That could result in more nuisance flooding or groundwater mounding, both conditions that the splitter and pipe will help avoid.

School 1 (northern) Site:

We propose to use ADS StormTech MC-4500 chambers at this location as they will maximize storage and infiltration potential. There will be 1 row of approximately 11 chambers each for a total storage volume of 2,200 cubic feet. The table below shows the potential drainage area, impervious cover, and total amount of phosphorus washoff in pounds, annually.

Impervious Treated (ac)	Total Drainage Area (ac)	Total Phosphorus Removed Annually (WinSLAMM) (lbs.)	Total Phosphorus Removed Annually (VT DEC STP) (lbs.)	Total Solids Removed (WinSLAMM) (lbs.)	Cost per Pound P removed (WinSLAMM) (\$)	Cost per Pound P removed (VT DEC STP) (\$)
2.00	59.59	5.11	24.64	94,720	\$20,547	\$4,261

Cost:

VTrans Code	Description	Unit	Quantity	Unit Price	Amount
Site Preparation					
N/A	MOBILIZATION	LS	1	\$ 1,000.00	\$ 1,000.00
653.55	PROJECT DEMARCATION FENCE	LF	300	\$ 1.17	\$ 351.00
653.20	TEMPORARY EROSION MATTING	SY	250	\$ 2.20	\$ 550.00
649.51	GEOTEXTILE FOR SILT FENCE	SY	200	\$ 4.13	\$ 826.00
653.35	VEHICLE TRACKING PAD	CY	30	\$ 50.48	\$ 1,514.40
652.10	EPSC PLAN	LS	1	\$ 500.00	\$ 500.00
652.20	MONITORING EPSC PLAN	HR	8	\$ 37.22	\$ 297.76
N/A	CONSTRUCTION STAKING	HR	6	\$ 125.00	\$ 750.00
<i>Subtotal:</i>					\$ 5,789.16
Chambers - Excavation and Materials					
EXCAVATION					
203.15	COMMON EXCAVATION	CY	195	\$ 9.86	\$ 1,922.70
203.28	EXCAVATION OF SURFACES AND PAVEMENTS	CY	10	\$ 21.94	\$ 219.40
204.20	TRENCH EXCAVATION OF EARTH	CY	20	\$ 14.05	\$ 281.00
MATERIALS					
BASE / COVER / SURROUNDING STONE					
629.54	CRUSHED STONE BEDDING (3/4" - 1 1/2" STONE)	TON	125	\$ 34.04	\$ 4,255.00
PIPING					
601.0915	18" CPEP	LF	200	\$ 64.04	\$ 12,808.00
601.0920	24" CPEP	LF	430	\$ 61.37	\$ 26,389.10
STRUCTURES AND APPURTENANCES					
604.18	PRECAST REINFORCED CONCRETE DROP INLET WITH CAST IRON GRATE	EACH	3	\$ 4,009.29	\$ 12,027.87
PLANTING (ABOVE CHAMBERS IN GREENSPACE)					
651.15	SEED	LB	10	\$ 7.66	\$ 76.60
653.20	TEMPORARY EROSION MATTING	SY	100	\$ 2.20	\$ 220.00
PAVEMENT REPLACEMENT					
401.10	AGGREGATE SURFACE COURSE	CY	50	\$ 43.60	\$ 2,180.00
406.25	BITUMINOUS CONCRETE PAVEMENT	TON	50	\$ 127.86	\$ 6,393.00
CHAMBERS - ALL COSTS (FROM ADS STORMTECH)					
N/A	MC4500	EACH	11	\$ 483.00	\$ 5,313.00
N/A	MC4500 PLAIN END CAP	EACH	1	\$ 494.50	\$ 494.50
N/A	MC4500 18T END CAP	EACH	1	\$ 682.81	\$ 682.81
N/A	18" TEE	EACH	1	\$ 230.01	\$ 230.01
N/A	18" COUPLERS	EACH	1	\$ 23.54	\$ 23.54
N/A	18" N12 FOR MANIFOLD (AASHTO)	LF	15	\$ 15.28	\$ 229.25
N/A	601TG to wrap system (SY)	SY	250	\$ 0.67	\$ 166.75
N/A	315WTM for scour protection (SY)	SY	100	\$ 0.69	\$ 69.00
N/A	6" INSERTA TEE	EACH	1	\$ 86.32	\$ 86.32
N/A	6" RED HOLE SAW	EACH	1	\$ 132.43	\$ 132.43
N/A	12" INLINE DRAIN	EACH	1	\$ 310.50	\$ 310.50
<i>Subtotal:</i>					\$ 74,510.79
Subtotal:					
	Construction Oversight**	HR	16	\$ 125.00	\$ 2,000.00
	Construction Contingency - 10%**				\$ 8,030.00
	Incidentals to Construction - 5%**				\$ 4,015.00
	Minor Additional Design Items - 5%**				\$ 4,015.00
	Final Design	HR	40	\$ 125.00	\$ 5,000.00
	Permit Review and Applications (exclusive of permit fees)	HR	10	\$ 125.00	\$ 1,250.00
Total (Rounded to nearest \$1,000)					\$ 105,000.00

School 2 (southern) Site:

We propose to use ADS StormTech MC-4500 chambers at this location as they will maximize storage and infiltration potential. There will be 1 row of approximately 12 chambers each for a total storage volume of 2,356 cubic feet. The table below shows the potential drainage area, impervious cover, and total amount of phosphorus washoff in pounds, annually.

Impervious Treated (ac)	Total Drainage Area (ac)	Total Phosphorus Removed Annually (WinSLAMM) (lbs.)	Total Phosphorus Removed Annually (VT DEC STP) (lbs.)	Total Solids Removed (WinSLAMM) (lbs.)	Cost per Pound P removed (WinSLAMM) (\$)	Cost per Pound P removed (VT DEC STP) (\$)
1.25	2.54	0.35	3.92	335.5	\$217,142	\$19,387

Cost:

VTrans Code	Description	Unit	Quantity	Unit Price	Amount
Site Preparation					
N/A	MOBILIZATION	LS	1	\$ 1,000.00	\$ 1,000.00
653.55	PROJECT DEMARCATION FENCE	LF	300	\$ 1.17	\$ 351.00
653.20	TEMPORARY EROSION MATTING	SY	250	\$ 2.20	\$ 550.00
649.51	GEOTEXTILE FOR SILT FENCE	SY	200	\$ 4.13	\$ 826.00
653.35	VEHICLE TRACKING PAD	CY	30	\$ 50.48	\$ 1,514.40
652.10	EPSC PLAN	LS	1	\$ 500.00	\$ 500.00
652.20	MONITORING EPSC PLAN	HR	8	\$ 37.22	\$ 297.76
N/A	CONSTRUCTION STAKING	HR	6	\$ 125.00	\$ 750.00
<i>Subtotal:</i>					\$ 5,789.16
Chambers - Excavation and Materials					
EXCAVATION					
203.15	COMMON EXCAVATION	CY	205	\$ 9.86	\$ 2,021.30
203.28	EXCAVATION OF SURFACES AND PAVEMENTS	CY	12	\$ 21.94	\$ 263.28
204.20	TRENCH EXCAVATION OF EARTH	CY	22	\$ 14.05	\$ 309.10
MATERIALS					
BASE / COVER / SURROUNDING STONE					
629.54	CRUSHED STONE BEDDING (3/4" - 1 1/2" STONE)	TON	135	\$ 34.04	\$ 4,595.40
PIPING					
601.0915	18" CPEP	LF	225	\$ 64.04	\$ 14,409.00
STRUCTURES AND APPURTENANCES					
604.18	PRECAST REINFORCED CONCRETE DROP INLET WITH CAST IRON GRATE	EACH	3	\$ 4,009.29	\$ 12,027.87
PLANTING (ABOVE CHAMBERS IN GREENSPACE)					
651.15	SEED	LB	10	\$ 7.66	\$ 76.60
653.20	TEMPORARY EROSION MATTING	SY	100	\$ 2.20	\$ 220.00
PAVEMENT REPLACEMENT					
401.10	AGGREGATE SURFACE COURSE	CY	50	\$ 43.60	\$ 2,180.00
406.25	BITUMINOUS CONCRETE PAVEMENT	TON	50	\$ 127.86	\$ 6,393.00
CHAMBERS - ALL COSTS (FROM ADS STORMTECH)					
N/A	MC4500	EACH	12	\$ 483.00	\$ 5,796.00
N/A	MC4500 PLAIN END CAP	EACH	1	\$ 494.50	\$ 494.50
N/A	MC4500 18T END CAP	EACH	1	\$ 682.81	\$ 682.81
N/A	18" TEE	EACH	1	\$ 230.01	\$ 230.01
N/A	18" COUPLERS	EACH	1	\$ 23.54	\$ 23.54
N/A	18" N12 FOR MANIFOLD (AASHTO)	LF	15	\$ 15.28	\$ 229.25
N/A	601TG to wrap system (SY)	SY	275	\$ 0.67	\$ 183.43
N/A	315WTM for scour protection (SY)	SY	120	\$ 0.69	\$ 82.80
N/A	6" INSERTA TEE	EACH	1	\$ 86.32	\$ 86.32
N/A	6" RED HOLE SAW	EACH	1	\$ 132.43	\$ 132.43
N/A	12" INLINE DRAIN	EACH	1	\$ 310.50	\$ 310.50
<i>Subtotal:</i>					\$ 50,747.15
Subtotal:					\$ 56,536.31
	Construction Oversight**	HR	16	\$ 125.00	\$ 2,000.00
	Construction Contingency - 10%**				\$ 5,653.63
	Incidentals to Construction - 5%**				\$ 2,826.82
	Minor Additional Design Items - 5%**				\$ 2,826.82
	Final Design	HR	40	\$ 125.00	\$ 5,000.00
	Permit Review and Applications (exclusive of permit fees)	HR	10	\$ 125.00	\$ 1,250.00
Total (Rounded to nearest \$1,000)					\$ 76,000.00

West St 002 and 003 (Dry Wells)

Description

A series of dry wells of different sizes could be used in this area to replace existing catch basins. The dry wells would capture runoff and slowly bleed it off through the perforations in the bottom and sides, with a grate and overflow pipe that would function similarly to a normal catch basin. Each of these structures would be sized to treat the WQv to the maximum extent possible (DW-1 and DW-2 can only treat up to 50% of the WQv). The table below summarizes the cumulative benefits of all five dry wells if installed.

We previously submitted the 30% concept for the West St 002 and 003 dry wells to the Town of Bristol as a 'design/build' concept plan that they plan on constructing prior to paving, which is set to occur this summer. That memo is included as Attachment 4.2 – Dry Well Concept Memo.

Also note that the Town of Bristol elected to modify the concept design the Watershed provided in order to conform with their knowledge of their infrastructure and project goals. Watershed can make no verifications as to the applicability of these changes as the plan was provided as a concept only for 'design/build' by the Town or the Town's chosen contractor. In modifying the concept, the Town also included additional piping that was not part of Watershed's concept design. This affected the overall cost of the project. The cost provided here is the cost for the modifications proposed by Watershed only – not any additional piping between them.

Please note that the table below presents the dry wells cumulatively.

Impervious Treated (ac)	Total Drainage Area (ac)	Total Phosphorus Removed Annually (WinSLAMM) (lbs.)	Total Phosphorus Removed Annually (VT DEC STP) (lbs.)	Total Solids Removed (WinSLAMM) (lbs.)	Cost per Pound P removed (WinSLAMM) (\$)	Cost per Pound P removed (VT DEC STP) (\$)
3.56	8.93	2.69	8.5	47,675	\$11,150	\$3,530

Cost:

VTrans Code	Description	Unit	Quantity	Unit Price	Amount
Site Preparation					
N/A	MOBILIZATION	LS	1	\$ 500.00	\$ 500.00
<i>Subtotal:</i>					\$ 500.00
Materials and Excavation					
EXCAVATION					
203.15	COMMON EXCAVATION	CY	175	\$ 9.86	\$ 1,725.50
203.28	EXCAVATION OF SURFACES AND PAVEMENTS	CY	80	\$ 21.94	\$ 1,755.20
204.20	TRENCH EXCAVATION OF EARTH	CY	20	\$ 14.05	\$ 281.00
MATERIALS					
PIPING (CULVERTS)					
601.0905	12" CPEP	LF	20	\$ 39.24	\$ 784.80
601.0910	15" CPEP	LF	10	\$ 34.05	\$ 340.50
601.5814	18" CPEP ELBOW	EACH	5	\$200.00	\$ 1,000.00
601.0915	18" CPEP	LF	20	\$ 64.04	\$ 1,280.80
DRY WELLS OR OTHER STRUCTURES					
N/A	DRY WELL STRUCTURE - 8' DIAMETER X 4' HIGH SECTION	EACH	8	\$ 800.00	\$ 6,400.00
N/A	DRY WELL STRUCTURE - 8' COVER	EACH	5	\$ 625.00	\$ 3,125.00
613.10	STONE FILL, TYPE I (BACKFILL AROUND STRUCTURE)	CY	100	\$ 43.91	\$ 4,391.00
604.46	CAST IRON GRATE WITH FRAME, TYPE B	EACH	5	\$826.00	\$ 4,130.00
649.31	GEOTEXTILE UNDER STONE FILL	SY	150	\$ 2.51	\$ 376.50
<i>Subtotal:</i>					\$ 25,590.30
Subtotal:					\$ 26,090.30
	Construction Contingency - 10%**				\$ 2,609.03
	Incidentals to Construction - 5%**				\$ 1,304.52
Total (Rounded to nearest \$1,000)					\$ 30,000.00

Next Steps

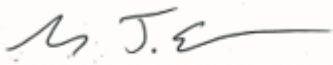
We ask that you review these concepts and make sure that you don't have any questions regarding them. We'd be happy to discuss them if you do. If any require any sort of revision based on your knowledge of the site or the solution, we would also be happy to discuss that.

We also propose that, once you have had a chance to review these plans, that we arrange a project team meeting to discuss the plans, ensure that we understand them, and discuss potential next steps with respect to finalizing design and planning for potential implementation.

Thank you.

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

Sincerely,

A handwritten signature in black ink, appearing to read 'D. J. E.', with a long horizontal flourish extending to the right.

Dana Allen
Water Quality Project Manager