Item 5Bii.
BCWMC 8-17-17

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Memorandum

To: Bassett Creek Watershed Management Commission
From: Barr Engineering Co.
Subject: Item 5B – Consider Approval of 90% Design Plans for Plymouth Creek Restoration Project, Annapolis Lane through Plymouth Creek Park (CIP 2017 CR-P), Plymouth BCWMC August 17, 2017 Meeting Agenda
Date: August 9, 2017
Project: 23270051 2017 635

5B. Consider Approval of 90% Design Plans for Plymouth Creek Restoration Project, Annapolis Lane through Plymouth Creek Park (CIP 2017CR-P), Plymouth

Summary

Proposed Work: 2017 Plymouth Creek Restoration Project (CIP 2017CR-P)

Basis for Commission Review: 90% plan review

Change in Impervious Surface: N.A.

Recommendation:

1) Conditional approval of 90% drawings
2) Authorize BCWMC Engineer to provide administrative approval after final plans have been revised and comments have been sufficiently addressed.

The 2017 Plymouth Creek Restoration project (CIP 2017CR-P) is being funded by the BCWMC's ad valorem levy (via Hennepin County). The City of Plymouth provided 90% design plans to the BCWMC for review and comment at the Commission's July meeting. Based on the comments and discussion at the July meeting, the Commission took no action on the plans, but requested that the City bring the 90% plans back to the Commission, along with additional information. The City of Plymouth provided revised 90% design plans for review at the August Commission meeting.

Feasibility Study Summary

The BCWMC completed the 2017 Plymouth Creek Restoration Project Feasibility Report (Barr, March 2016) to examine the feasibility of restoring sites along the 2,500-foot reach of the creek in Plymouth Creek Park and between Fernbrook Lane North and Annapolis Lane North (Figure 1). The feasibility report identified 21 sites where bank erosion, bank failure, and infrastructure repairs were needed, in addition to removal of debris and fallen trees.

The feasibility report identified 2-4 design options for each site and a final recommendation for each site. For most sites, the feasibility report included two alternative designs: 1) a bioengineering (or soft armoring) approach that uses techniques that rely primarily on vegetation; 2) a more structural (or hard

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Imagery Source: Aerial Express (2009)

- Project Location
- Bassett Creek
- WMC Boundary
- Major Subwatershed
- Municipality
- Stream

Feet

0 300 600

Bassett Creek Watershed Management Commission

LOCATION MAP
APPLICATION 2017CR-P
Plymouth Creek Stream Restoration Project
Plymouth, MN

armoring) approach that uses rock and other non-vegetative materials. Some sites included additional alternatives that did not focus on preserving the existing alignment or channel configuration, such as remeandering the channel or reconnecting to the floodplain. Recommendations, based on site-specific considerations, included a mix of hard and soft armoring approaches, and additional alternatives to realign the channel.

The feasibility report estimated that this restoration project would require the removal of approximately 100-150 trees and estimated that project implementation would reduce the total phosphorus load by 52 pounds per year and the total suspended sediment load by 90,800 pounds per year.

Project Summary

The 90% design plans follow many of the recommendations from the feasibility study and include the use of root wads, log vanes, rock/cross vanes, debris clearing and vegetation management. The plans also include the use of vegetated riprap and specific measures to improve the disc golf course adjacent to the creek in Plymouth Creek Park. Measures to improve the disc golf course include a low flow crossing where it was observed that golfers are frequently retrieving discs; disc stop poles to prevent discs from damaging trees and going into the creek; installation of boardwalk sections; and improvements to greens to improve erosion control.

The plans differ from the feasibility recommendations in a few areas, primarily involving the use of hard armoring slightly more than the feasibility recommendations. A concise summary of the differences between the design plans and the feasibility study was provided in the 60% design review.

Temporary and permanent erosion and sediment control measures include:

- Rock construction entrances
- Silt fence
- Inlet protection
- Bioroll
- Floating silt curtain
- Erosion control blanket
- Seeding

The plans show the removal of approximately 120 trees over the project length, including 94 to be re-used as part of bioengineering techniques and 26 trees that are too small (< 10" diameter) to be re-used on site.

Previous Reviews

The City of Plymouth submitted the 60% design plans for this project, and the BCWMC conditionally approved the 60% plans at its June 15, 2017 meeting. Following the conditional approval of the 60% design plans, the City of Plymouth revised and submitted the design drawings to the 90% level with the inclusion of the comments from the BCWMC's 60% review comments. The 90% design drawings submitted in June sufficiently addressed the majority of the BCWMC Engineer's comments provided as

part of the review of the preliminary 60% plans. At its meeting in July, the Commission discussed the 90% plans and heard concerns from adjacent landowners. The Commission requested that Commission and city staff meet with landowners and develop plans that satisfy all parties, while maintaining the primary project objective of improved water quality. As a result, one on-site meeting was held with landowners, in addition to communications by phone and email. The City of Plymouth provided revised plans and supporting information on August 1, 2017.

While the revised plans address some landowner concerns with regards to tree loss, the 90% plans do not sufficiently address the Commission Engineer's comment requiring no change in the flood level resulting from the proposed design. The modeling results provided with the revised 90% plans no longer show an increase in the modeled flood elevation on private property; however the results still show a 0.2-foot increase in the modeled flood elevation at one cross section on City property within Plymouth Creek Park. The City is requesting a variance from BCWMC requirements to allow for this increase in the modeled flood elevation. The formal variance request and supporting information will be provided at the Commission meeting.

The Commission Engineer technically supports the variance request, as the increase is relatively small (0.2 foot = 2.4 inches), does not affect other properties and causes no damages to structures on the city property. However, the Commission should consider the following policy-related items in its decision-making:

- The Commission (as far as we know) has not granted a variance that increases flood elevations in the past, so granting the variance would be precedent-setting.
- The Commission will likely receive similar variance requests in the future from public and private property owners, based on precedence.

If the Commission does not grant the variance, then the plans must be revised so there is no increase in the modeled flood elevation. If the Commission grants the variance, the City may need to obtain a FEMA Letter of Map Revision (LOMR) to allow the increased flood elevation. The Commission Engineer recommends that the City consult with Minnesota Department of Natural Resources (MDNR) floodplain staff regarding whether a LOMR will be required.

The City's consultant sufficiently addressed and provided responses to many comments on the 60% plans with their June 30th submittal, and the responses were included in the memo for the July BCMWC meeting. The Commission Engineer's July 90% design review memo included the following additional comments (Wenck August 1st responses and the Commission Engineer's comments are noted):

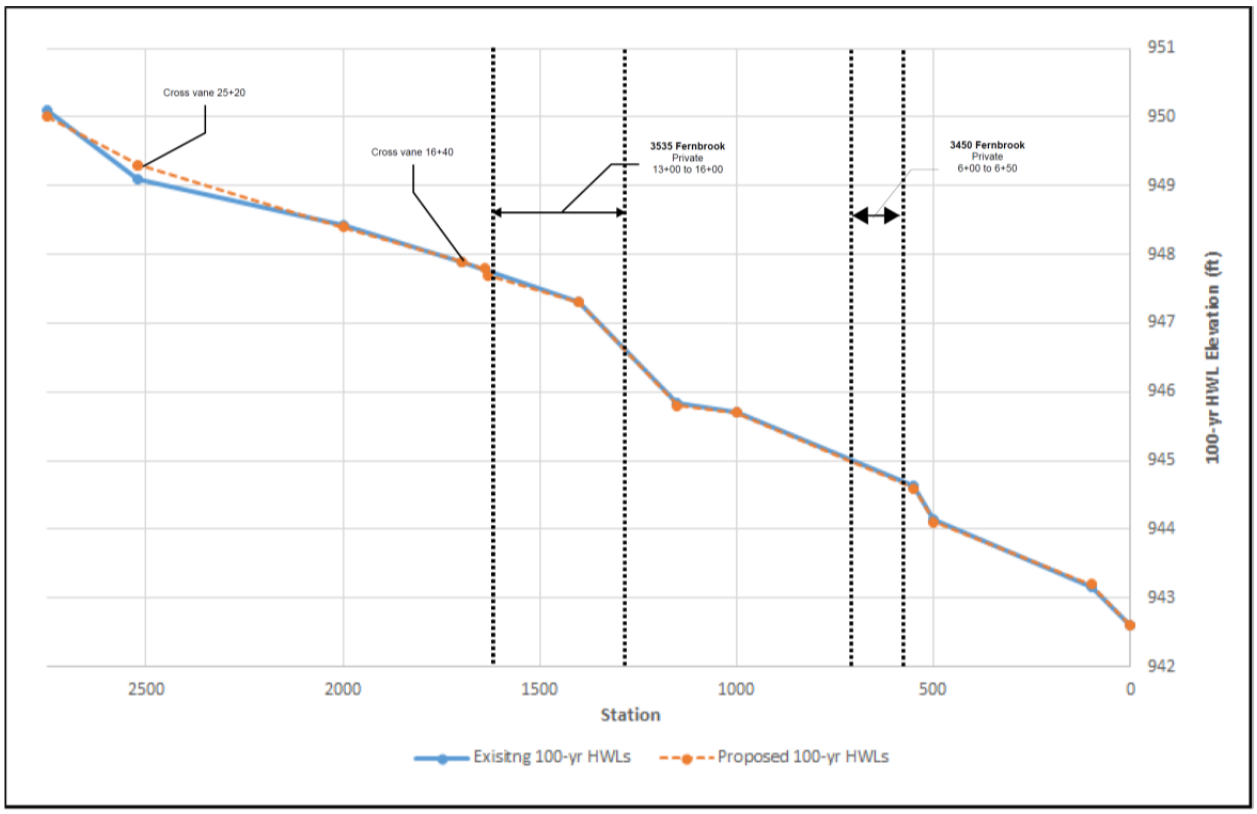
1. Modeling or other documentation must be submitted to verify no change in the flood level caused by the proposed design
   Wenck response:
   At the July 20, 2017 commission meeting we discussed our approach to modify the design by taking out the cross vanes causing flood elevation increase on the private properties. Instead,

installing rock check dams set into the streambed, matching existing elevation, in their place to protect against future head cutting.

The design plans were revised and the model rerun to show that there will be no increase in the flood level on the private properties at 3535 Fernbrook Lane N and 3450 Fernbrook Lane N. 5 of the 7 cross vanes originally proposed have been replaced with rock check dams. 2 of the 7 cross vanes originally proposed remain at stations 25+20 and 16+40.

The modeling results of the corrected effective XPSWMM model we received from Barr Engineering and updated is shown below. There is no increase in the flood level on the private properties at 3535 Fernbrook Lane N and 3450 Fernbrook Lane N.

100-yr HWL Comparison			
XPSWMM Node	Project Station	Existing HWL (ft)	Proposed HWL (ft)
N-PCE-239	2750	950.1	950.0
CV-25+20	2520		949.3
N-PCE-141	2520	949.1	949.3
N-PCE-140	2000	948.4	948.4
N-PCE-139	1700	947.9	947.9
CV-16+40	1640		947.8
N-PCE-139.2	1632		947.7
N-PCE-139.1	1400	947.3	947.3
N-PCE-039	1150	945.8	945.8
N-PCE-137	1000	945.7	945.7
N-PCE-136.3	550	944.6	944.6
N-PCE-136.2	500	944.1	944.1
N-PCE-136.0	100	943.2	943.2
PCE-037A	0	942.6	942.6



Commission Engineer comment:

The results still show a 0.2-foot increase in the modeled flood elevation at one cross section on City property within Plymouth Creek Park (Station 25+20). If the Commission does not grant the City's variance request, then the plans must be revised so there is no increase in the modeled flood elevation.

2. Construction limits on the plan sheets should be shown, including all access routes to (and between) stabilization areas.

   Wenck response:

   Construction limits have been added to the plan sheets. The revised final plan set is attached.

   Commission Engineer comment:

   Comment addressed.

3. The information in the tree survey and on the plan sheets must be reviewed for discrepancies and corrected as needed.

   Wenck response:

   Tree removals have changed slightly because of the meeting on July 26, 2017 with landowners around reach 3 of the project (Between Fernbrook lane and Annapolis Lane). The trees previously noted as, "harvest, if needed," are now being shown as remove or not to be more clear on what is actually being removed. The information in the tree survey and on the plan sheets has been

updated with the final design changes and reviewed to remove discrepancies. The revised final plan set and updated tree survey/tree removal appendix are attached.

Commission Engineer comment:

Comment addressed (the tree survey is included in the electronic packet).

4. We recommend that the following trees not be removed: #495, 499, 501-505, and 509 (shown on sheet C-103 and called out in tree survey).

   Wenck response:

   These trees were reviewed during the meeting with landowners around reach 3 of the project (Between Fernbrook lane and Annapolis Lane). Attendees included:

   - Ed Matthiesen, Wenck Associates
   - Seth Bossert, Wenck Associates
   - Derek Asche, City of Plymouth
   - Jim Prom, City of Plymouth
   - Various Homeowners
   - Representative with St. Paul Properties, Inc.
   - Laura Jester, Bassett Creek Watershed Management Commission

   These trees were reviewed on an individual basis and a group consensus was reached to keep or remove trees in this area based on species, size, health and the objectives of this project. The final design plan sheets have been updated with this information and are attached.

   Commission Engineer comment:

   Comment addressed (tree removals are listed in the tree survey and shown on sheets C-101, C-102, and C-103 of the attached construction plans).

5. A stilling basin downstream of the Fernbrook Lane culvert calls for Class III riprap but the detail on sheet D-104 calls for Class IV. The appropriate riprap size should be verified and the plan sheets modified accordingly.

   Wenck response:

   Class IV riprap is required per the City of Plymouth standard plate based on the size of the Fernbrook lane box culvert. The plan sheets have been updated and are attached.

   Commission Engineer comment:

   Comment addressed.

6. The erosion and sediment control plans show installation of erosion control blanket only after final grading. We recommend using additional erosion control measures (e.g., compost logs) during construction on the banks and along the stream side of access routes to provide additional erosion control prior to final stabilization.

   Wenck response:

   The erosion and sediment control plans have been updated to separate out areas that will be

seeded and blanketed per the bank stabilization details at the time of construction (most likely winter 2017/2018) and are considered final stabilization.

The remaining areas will be hydro-seeded and hydro-mulched during the spring 2018 buffer establishment. These areas will have trees and brush removed, but the banks will not be disturbed and will not require temporary or permanent stabilization practices.

A note has been added to the construction plans that, "all disturbance during construction of the bank stabilization practices shall be stabilized with temporary vegetative cover spread at 1.5 times the usual rate per acre. If temporary cover is to remain in place beyond the present growing season, two-thirds of the seed mix shall be composed of perennial grasses."

Another note has been added that, "if construction occurs when the ground is not frozen, erosion control logs shall be installed along the stream side of access routes to provide additional erosion control prior to final stabilization."

Commission Engineer comment:
All disturbed areas should be seeded with a cover crop, at minimum, within 7 days after work in the area is complete. Even if areas are not graded, they may be disturbed due to construction traffic and turning vehicles, and erosion control will be required. For example, access routes on sheets EC-103 and EC-104 of the plans do not show any stabilization; however, these areas will likely be disturbed enough during construction that temporary stabilization measures will be necessary. The extent of stabilization measures should be reviewed and modified as necessary.

The hatching for erosion control blanket and hydromulch in the legend on sheets EC-103 and EC-104 of the plans do not match the call-outs for which areas will be stabilized with these measures. The discrepancy should be corrected. The legend also includes hatching for disk anchored mulch, which is shown to be used on graded banks. We suggest using erosion control blanket or hydromulch on stream banks because disk anchored mulch can be washed away too easily.

7. Temporary vegetative cover must be spread at 1.5 times the usual rate per acre. If temporary cover is to remain in place beyond the present growing season, two-thirds of the seed mix shall be composed of perennial grasses.

   Wenck response:
   A note has been added to the construction plans as explained above in item #6.

   Commission Engineer comment:
   Comment addressed.

8. Educational signage in the park/disc golf course must be provided/installed before the city receives final reimbursement for the project.

   Wenck response:
   The locations for future installation of 5 education signs by the City has been shown on the

construction plans. Each of the signs will provide public education on one of the following topics, depending on their location:

1. Overall project summary and information
2. Stream Stabilization feature (Cross Vanes)
3. Stream Stabilization feature (Root Wad)
4. Stream Stabilization feature (Vegetative Buffer)
5. Managing Traffic to Protect the Stream Buffer

The City will ensure the signs are installed before requesting final reimbursement for the project. A line item has been added to the final construction cost estimate to show that it is included in the project budget.

Commission Engineer comment:
Comment addressed – the attached revised construction cost estimate shows the addition of the educational signage. It appears that the City may be paying for the signs.

9. The final plans must be submitted to the BCWMC Engineer for review and approval after modifications have been completed.

Wenck response:
Final, for construction, plans are included with this memo for review.

Commission Engineer comment:
Final plans must be submitted to the BCWMC Engineer for review and approval after modifications have been completed.

At their July meeting, the Commission also:

- Requested that staff work with adjacent landowners to understand and address their concerns about the project, and to work towards a design that satisfies everyone; with the primary focus on improving water quality with consideration for riparian health.
  Commission Engineer comment:
  As noted earlier in this memo, a meeting was held on July 26, 2017; attendees included:
  - Ed Matthiesen, Wenck Associates
  - Seth Bossert, Wenck Associates
  - Derek Asche, City of Plymouth
  - Jim Prom, City of Plymouth
  - Various Homeowners
  - Representative with St. Paul Properties, Inc.
  - Laura Jester, Bassett Creek Watershed Management Commission

In addition to tree removals, the meeting attendees discussed the project design and construction access, and agreed that no work is needed on the steep north facing slope on the south side of the stream, adjacent to the Starr's property (which is consistent with project design).

Discussed the costs of various project components including the costs of disc golf course improvements to enhance and protect stream restoration measures vs. stream stabilization measures themselves. There was also a discussion about the disc stop poles and their high cost and some discussion about other techniques that could be used to protect trees. Commissioners requested that the City of Plymouth consider their ability to share in the costs of items that may be more related to improving/protecting the park or upland trees as opposed to items that directly improve water quality or protect stream restoration features.

Commission Engineer comment:

The attached revised construction cost estimate shows the golf course-related project components and costs vs. other restoration features and costs. The golf course-related costs ($199,740) are 28% of the total project costs ($703,863); the remaining costs ($504,123) are solely for stream stabilization work. The table (and construction plans) continues to show the use of disc stop poles, but as a bid alternate and with a much smaller number of poles (57 compared with 132). This results in a decreased estimated cost for disc stop poles ($42,750 compared with $99,000).

Recommendations

A. Authorize BCWMC Engineer to provide administrative approval after final plans have been revised and comments have been sufficiently addressed.
B. Approve the City's requested variance request to raise the modeled flood elevation 0.2 foot on city property at Station 25+20.
C. Conditional approval of 90% drawings based on the following comments:
    1. If the Commission does not grant the City's variance request, then modeling or other documentation must be submitted to verify no change in the flood level caused by the proposed design.
    2. Erosion control and seeding plans must be revised to show the correct hatching, show anticipated stabilization, and add erosion control measures for the full extent of anticipated disturbed areas within the construction limits and access paths.
    3. The final plans must be submitted to the BCWMC Engineer for review and approval after modifications have been completed.
D. If the Commission grants the City's variance request, the City should consult with MDNR floodplain staff regarding whether a FEMA Letter of Map Revision (LOMR) will be required to allow the increased flood elevation.

PLYMOUTH CREEK STREAM RESTORATION
CITY PROJECT NO. 16007
FINAL ENGINEERS ESTIMATE
AUGUST 1, 2017

				Stream Stabilization Reach 1 & Reach 2		Stream Stabilization Reach 3		Disc Golf Course Improvement for Stabilization	
Bid Item	**Description**	**Units**	**Unit Price**	**Quantity**	**Entension**	**Quantity**	**Entension**	**Quantity**	**Entension**
	BASE BID - Fall/Winter 2017/2018 Construction								
1	Fall/Winter Mobilization and Demobilization	LS	$25,000.00	0.6	$15,000.00	0.4	$10,000.00	0	$0.00
2	Tree Clearing & Harvesting	LS	$25,000.00	0.6	$15,000.00	0.4	$10,000.00	0	$0.00
3	Chip Onsite and Spread Woodchips on Existing Trails & Course Greens	LS	$15,000.00	1	$15,000.00	0	$0.00	0	$0.00
4	Haul and Dispose Offsite All Unchipped Wood	LS	$15,000.00	0	$0.00	1	$15,000.00	0	$0.00
5	Remove and Dispose of 12" RCP Flared End Section	EA	$250.00		$0.00	1	$250.00	0	$0.00
6	Remove 12" RCP Pipe	LF	$10.00		$0.00	40	$400.00	0	$0.00
7	Furnish and Install 12" RCP Flared End Section	EA	$1,000.00		$0.00	1	$1,000.00	0	$0.00
8	New Tie Rod Installation	LS	$1,000.00		$0.00	1	$1,000.00	0	$0.00
9	Construct, Maintain, & Restore Site Access and Staging Areas	LS	$15,000.00	0.6	$9,000.00	0.4	$6,000.00	0	$0.00
10	Woven ECB, Rolanka BioD-Mat 40	SY	$6.00	1255	$7,530.00	2130	$12,780.00	0	$0.00
11	Non-Woven ECB Cat 3 Type Straw 2S (No Poly Netting)	SY	$3.00	1255	$3,765.00	2130	$6,390.00	0	$0.00
12	Footer Log & Log Vanes	EA	$50.00	21	$1,050.00	33	$1,650.00	0	$0.00
13	Root Wad	EA	$350.00	17	$5,950.00	37	$12,950.00	0	$0.00
14	Seating Log	EA	$450.00	0	$0.00	0	$0.00	4	$1,800.00
15	Silt Fence, Type MS - Maintained	LF	$4.00	200	$800.00	200	$800.00	0	$0.00
16	Flotation Silt Curtain Type Moving Water - Maintained	LF	$35.00	25	$875.00	25	$875.00	0	$0.00
17	Sediment Control Log Type Straw (Or Bioroll) - Maintained	LF	$6.00	3000	$18,000.00	1000	$6,000.00	0	$0.00
18	Inlet Protection - Maintained	EA	$500.00	2	$1,000.00	3	$1,500.00	0	$0.00
19	Temporary Construction Entrance - Maintained	EA	$2,500.00	2	$5,000.00	2	$5,000.00	0	$0.00
20	Street Sweeper (With Pickup Broom)	HR	$125.00	10	$1,250.00	10	$1,250.00	0	$0.00
21	Temporary Sedimentation Basin - Maintained	LS	$2,500.00	1	$2,500.00	1	$2,500.00	0	$0.00
22	Class II Riprap, No Limestone (Veg Riprap Toe, RGC, Swales & Brush Mattress)	TON	$120.00	436	$52,320.00	334	$40,080.00	0	$0.00
23	Class III Riprap, No Limestone (Channel Overflow & Plunge Pools)	TON	$120.00	0	$0.00	200	$24,000.00	0	$0.00
24	Class IV Riprap, No Limestone (Down stream of Fernbrook)	TON	$120.00	0	$0.00	65	$7,800.00	0	$0.00
25	24" to 36" Fieldstone Boulders (Cross Vanes, Rootwads, Course Greens)	TON	$150.00	60	$9,000.00	110	$16,500.00	70	$10,500.00
26	MN DOT Type V, Non-Woven Geotextile Fabric	SY	$5.00	890	$4,450.00	1020	$5,100.00	210	$1,050.00
27	Brush Mattress	SY	$65.00	30	$1,950.00	0	$0.00	0	$0.00
28	CU Structural Soils	TON	$110.00	0	$0.00	0	$0.00	70	$7,700.00
29	Common Excavation - On-site (EV)	CY	$15.00	130	$1,950.00	0	$0.00	70	$1,050.00
30	Subgrade Preparation	SY	$15.00	0	$0.00	0	$0.00	100	$1,500.00
31	Granite Charcoal Stepper	EA	$500.00	0	$0.00	0	$0.00	8	$4,000.00
32	Trap Rock Step	EA	$500.00	0	$0.00	0	$0.00	68	$34,000.00
33	Aggregate Base CL 5	TON	$45.00	0	$0.00	0	$0.00	50	$2,250.00
34	Aggregate Base CL 2	TON	$35.00	0	$0.00	0	$0.00	45	$1,575.00
35	Grass Pave2	SY	$40.00	0	$0.00	0	$0.00	100	$4,000.00
36	Timber Edge Path	LF	$50.00	0	$0.00	0	$0.00	335	$16,750.00
37	Woodchip or Gravel, If not reusing from tree removal	CY	$75.00	0	$0.00	0	$0.00	110	$8,250.00
38	Boardwalk	LF	$150.00	0	$0.00	0	$0.00	155	$23,250.00
39	4" Drain Tile Pipe	LF	$30.00	0	$0.00	0	$0.00	155	$4,650.00
40	Seeding - Dormant	AC	$2,500.00	0.25	$625.00	0.44	$1,100.00	0	$0.00
41	Native Seed Mix	LB	$50.00	5	$250.00	10	$500.00	0	$0.00
42	Fescue Seed Mix	LB	$2.50	25	$62.50	44	$110.00	150	$375.00
				Total Fall Base Bid	$172,327.50		$190,535.00		$122,700.00
ALT-1	Bid Alternate - Disc Stop Poles	EA	$750.00	0	$0.00	0	$0.00	57	$42,750.00
					$172,327.50		$190,535.00		$165,450.00

PLYMOUTH CREEK STREAM RESTORATION
CITY PROJECT NO. 16007
FINAL ENGINEERS ESTIMATE
AUGUST 1, 2017

	BASE BID - Spring 2018 Vegetation								
43	Spring Mobilization and Demobilization	LS	$3,500.00	0.6	$2,100.00	0.4	$840.00	0	$0.00
44	Tree Planting	EA	$500.00	0	$0.00	0	$0.00	2	$1,000.00
45	Shrub Planting,	EA	$50.00	560	$28,000.00	0	$0.00	0	$0.00
46	Perennial Planting Enhancement of Seeded Areas	EA	$15.00	400	$6,000.00	0	$0.00	0	$0.00
47	Bare Root Shrubs	EA	$5.00	240	$1,200.00	0	$0.00	0	$0.00
48	Live stakes	EA	$5.00	50	$250.00	0	$0.00	0	$0.00
49	Seeding	AC	$2,500.00	0.38	$950.00	0.42	$1,050.00	0	$0.00
50	Native Seed Mix	LB	$50.00	8	$400.00	9	$450.00	0	$0.00
51	Fescue Seed Mix	LB	$2.50	38	$95.00	42	$105.00	0	$0.00
52	Hydraulic Matrix, Type Mulch	LB	$2.00	760	$1,520.00	840	$1,680.00	0	$0.00
53	Vegetation Establishment and Maintenance	LS	$15,000.00	0.6	$9,000.00	0.4	$3,600.00	0	$0.00
					$49,515.00		$7,725.00		$1,000.00
		SUBTOTAL			**$221,842.50**		**$198,260.00**		**$166,450.00**
		20% CONTINGENCY			$44,368.50		$39,652.00		$33,290.00
		TOTAL BASE BID			**$266,211.00**		**$237,912.00**		**$199,740.00**
								Project Total	**$703,863.00**

City-1	Educational signage	EA	$ 600	5	$ 3,000	0	$ -	0	$ -