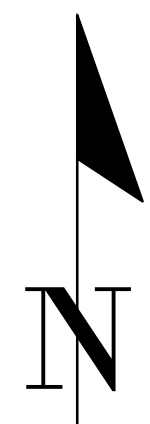
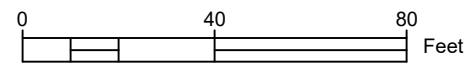


- OPTION 1 (16 MPH)
- OPTION 2 (12 MPH)
- FLOODPLAIN (SWMM)
- FLOODPLAIN (HEC-RAS)
- FLOODPLAIN (INTERPOLATED SURVEY)



Stantec
 7500 OLSON MEMORIAL HWY
 SUITE 300
 GOLDEN VALLEY, MN 55427
 PHONE: 763-252-6800
 FAX: 952-831-1268
 WWW.STANTEC.COM

CLIENT:
 MINNEHAHA CREEK
 WATERSHED DISTRICT

**MCWD CEDAR-GREENWAY
 TRAIL CONNECTION**
 CITY OF HOPKINS
 DAKOTA COUNTY, MINNESOTA

PROJECT TITLE	ISSUE NO.
MCWD CEDAR-GREENWAY TRAIL CONNECTION	0

DATE	DESCRIPTION
11/04/2022	FEASIBILITY STUDY

CERTIFICATION:
 I HEREBY CERTIFY THAT THIS PLAN SPECIFICATION OR REPORT WAS PREPARED BY ME OR UNDER MY DIRECT SUPERVISION AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MINNESOTA.

PROJECT NO.: 227703704
 DWN BY: JRP CHKD BY: RW APPD BY: CM
 ISSUE DATE: 11/04/2022
 ISSUE NO.: 0
 SHEET TITLE:
 12 MPH VEHICLE TRACKING
 SHEET NO.:
EXHIBIT 7

NOT FOR CONSTRUCTION

OPINION OF PROBABLE COST
 MINNEHAHA CREEK WATERSHED DISTRICT
 CEDAR TRAIL GREENWAY
 227703704
 FEASIBILITY STUDY
 3/3/2023



NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL PRICE
16 MPH DESIGN					
1	MOBILIZATION	LS	1	\$ 56,000.00	\$ 56,000.00
2	DEWATERINGS & EROSION/SEDIMENT CONTROL	LS	1	\$ 37,000.00	\$ 37,000.00
3	CLEAR & GRUB TREE	EA	41	\$ 1,000.00	\$ 41,000.00
4	COMMON EXCAVATION - ONSITE	CU YD	1000	\$ 20.00	\$ 20,000.00
5	COMMON EXCAVATION (FLOODPLAIN) - ONSITE	CU YD	1500	\$ 20.00	\$ 30,000.00
6	COMMON EXCAVATION - OFFSITE	CU YD	500	\$ 25.00	\$ 12,500.00
7	COMMON BORROW	CU YD	820	\$ 30.00	\$ 24,600.00
8	REMOVE RIPRAP	LS	1	\$ 15,000.00	\$ 15,000.00
9	AGGREGATE BASE CLASS 5	TON	800	\$ 22.00	\$ 17,600.00
10	3" BITUMINOUS WALK	SQ FT	12000	\$ 3.50	\$ 42,000.00
11	PEDESTRIAN CURP RAMP	EA	1	\$ 2,000.00	\$ 2,000.00
12	GUARD RAIL	LIN FT	85	\$ 100.00	\$ 8,500.00
13	CM PIPE SEWER	LIN FT	140	\$ 100.00	\$ 14,000.00
14	TRAFFIC CONTROL	LS	1	\$ 2,000.00	\$ 2,000.00
15	STONE TOE	CU YD	308.00	\$ 180.00	\$ 55,440.00
16	FES LIFTS	LIN FT	1050.00	\$ 50.00	\$ 52,500.00
17	IMPORTED FES LIFT BACKFILL (TOPSOIL)	CU YD	147.00	\$ 30.00	\$ 4,410.00
18	SITE ACCESS AND RESTORATION	LS	1	\$ 18,000.00	\$ 18,000.00
19	WETLAND IMPACTS	SQ YD	630	\$ 15.00	\$ 9,450.00
SUBTOTAL					\$ 462,000.00
[30%] CONTINGENCY					\$ 138,600.00
TOTAL CONSTRUCTION COST					\$ 600,600.00
30% LEGAL, ENGINEERING, ADMIN, FINANCE					\$ 180,180.00
TOTAL PROJECT COSTS					\$ 780,780.00

NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL PRICE
ALTERNATE #1: ADDITIONAL BANK RESTORATION					
A.1	MOBILIZATION	LS	1	\$ 8,000.00	\$ 8,000.00
A.2	STONE TOE	CU YD	132.00	\$ 180.00	\$ 23,760.00
A.3	FES LIFTS	LIN FT	450.00	\$ 50.00	\$ 22,500.00
A.4	IMPORTED FES LIFT BACKFILL (TOPSOIL)	CU YD	63.00	\$ 30.00	\$ 1,890.00
A.5	SITE ACCESS AND RESTORATION	LS	1	\$ 5,000.00	\$ 5,000.00
SUBTOTAL					\$ 61,150.00
[30%] CONTINGENCY					\$ 18,345.00
TOTAL CONSTRUCTION COST					\$ 79,495.00
30% LEGAL, ENGINEERING, ADMIN, FINANCE					\$ 23,848.50
TOTAL ALTERNATE COSTS					\$ 103,343.50

TOTAL BASE + ALTERNATE BID					\$ 884,123.50
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NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL PRICE
12 MPH DESIGN					
1	MOBILIZATION	LS	1	\$ 46,000.00	\$ 46,000.00
2	DEWATERINGS & EROSION/SEDIMENT CONTROL	LS	1	\$ 31,000.00	\$ 31,000.00
3	CLEAR & GRUB TREE	EA	10	\$ 1,000.00	\$ 10,000.00
4	COMMON EXCAVATION - ONSITE	CU YD	800	\$ 20.00	\$ 16,000.00
5	COMMON EXCAVATION (FLOODPLAIN) - ONSITE	CU YD	1500	\$ 20.00	\$ 30,000.00
6	COMMON EXCAVATION - OFFSITE	CU YD	500	\$ 25.00	\$ 12,500.00
7	COMMON BORROW	CU YD	50	\$ 30.00	\$ 1,500.00
8	REMOVE RIPRAP	LS	1	\$ 15,000.00	\$ 15,000.00
9	AGGREGATE BASE CLASS 5	TON	850	\$ 22.00	\$ 18,700.00
10	3" BITUMINOUS WALK	SQ FT	12700	\$ 3.50	\$ 44,450.00
11	PEDESTRIAN CURP RAMP	EA	1	\$ 2,000.00	\$ 2,000.00
12	GUARD RAIL	LIN FT	65	\$ 100.00	\$ 6,500.00
13	CM PIPE SEWER	LIN FT	110	\$ 100.00	\$ 11,000.00
14	TRAFFIC CONTROL	LS	1	\$ 2,000.00	\$ 2,000.00
15	STONE TOE	CU YD	308.00	\$ 180.00	\$ 55,440.00
16	FES LIFTS	LIN FT	1050.00	\$ 50.00	\$ 52,500.00
17	IMPORTED FES LIFT BACKFILL (TOPSOIL)	CU YD	147.00	\$ 30.00	\$ 4,410.00
18	SITE ACCESS AND RESTORATION	LS	1	\$ 18,000.00	\$ 18,000.00
19	WETLAND IMPACTS	SQ YD	180	\$ 15.00	\$ 2,700.00
SUBTOTAL					\$ 379,700.00
[30%] CONTINGENCY					\$ 113,910.00
TOTAL CONSTRUCTION COST					\$ 493,610.00
30% LEGAL, ENGINEERING, ADMIN, FINANCE					\$ 148,083.00
TOTAL PROJECT COSTS					\$ 641,693.00

NO.	ITEM DESCRIPTION	UNIT	QUANTITY	UNIT PRICE	TOTAL PRICE
ALTERNATE #1: ADDITIONAL BANK RESTORATION					
A.1	MOBILIZATION	LS	1	\$ 8,000.00	\$ 8,000.00
A.2	STONE TOE	CU YD	132.00	\$ 180.00	\$ 23,760.00
A.3	FES LIFTS	LIN FT	450.00	\$ 50.00	\$ 22,500.00
A.4	IMPORTED FES LIFT BACKFILL (TOPSOIL)	CU YD	63.00	\$ 30.00	\$ 1,890.00
A.5	SITE ACCESS AND RESTORATION	LS	1	\$ 5,000.00	\$ 5,000.00
SUBTOTAL					\$ 61,150.00
[30%] CONTINGENCY					\$ 18,345.00
TOTAL CONSTRUCTION COST					\$ 79,495.00
30% LEGAL, ENGINEERING, ADMIN, FINANCE					\$ 23,848.50
TOTAL ALTERNATE COSTS					\$ 103,343.50

TOTAL BASE + ALTERNATE BID					\$ 745,036.50
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Tree Removal Tabulation

tag_id	condition	dbh	comment	common_name	16 MPH Removal	12 MPH Removal
34		22, 24	2 stems	Cottonwood	1	0
35		7		Boxelder	1	0
36		8, 5	two stems	Boxelder	1	0
37	Dead	7			1	0
39	Dying	14 (dead), 14		Boxelder	1	0
40	Dying	18		Boxelder	1	0
41		9		Boxelder	1	0
42		11		Boxelder	1	0
47		9		Boxelder	1	0
48	Dead	6		Boxelder	1	0
51		14		Boxelder	0	1
53		24, 28, 25, 24	quad stem	Cottonwood	0	1
74		6		American Elm	1	1
75		20		Boxelder	1	1
77		10		Boxelder	1	1
78		11, 10, 13		Boxelder	1	1
83		13, 12, 8		White Mulberry	1	1
84		6		White Mulberry	1	1
85		9		Black Cherry	1	1
87		7		White Mulberry	1	1
91		6		Boxelder	1	0
92		9		White Mulberry	1	0
93	Dead	14, 12 (both dead)	very dead		1	0
94		6		White Mulberry	1	0
96		9		Green Ash	1	0
97		7		White Mulberry	1	0
98		7		Boxelder	1	0
408		8		Boxelder	1	0
409		20		Boxelder	1	0
410		7		Boxelder	1	0
411		7, 6		Common Buckthorn	1	0
413		36		Cottonwood	1	0
414		7		Bur Oak	1	0
415		15		Green Ash	1	0
416		8		Green Ash	1	0
432		10		Boxelder	1	0
433		6		Boxelder	1	0
434		27		Bur Oak	1	0
437		12		Bur Oak	0	1
438		11		Bur Oak	0	1
439		20, 11		Green Ash	1	0
442		6		Common Buckthorn	1	0
443		28, 28		Cottonwood	1	0
456		7		Cottonwood	1	0
457		11		Bur Oak	1	0

*In each design alternate column, "1" indicates anticipated tree removal

MEMORANDUM



To: Rena Weis and Chris Meehan, PE; Stantec
From: Sean Morrison, Maren Hancock, PE, and Jonathon Kusa, PE; Inter-Fluve, Inc.
Date: March 1, 2023 Project: Greenway to Cedar Trail Connection Project
Re: Preliminary Reach Assessment Findings

Inter-Fluve staff completed a preliminary reach assessment of Minnehaha Creek between the downstream reach of the 325 Blake Road site and Meadowbrook Road, adjacent to the location of the planned Cedar Lake Trail connection project. The reach appeared vertically stable with some lateral erosion along the outside of meander bends, and infrastructure induced erosion as a result of hardened streambanks and stream crossings.

Due to the proximity of the proposed alternative trail alignments to the Creek, a structural and hydraulic analysis of bank treatment and stabilization alternatives will be necessary as a next step for the project to limit the risk of future erosion impacts to the proposed trail. Hydraulic modeling of this reach will be needed to identify the appropriate bank treatment type and any additional modifications necessary to avoid impacts to the floodplain and 100-year water surface elevation, if feasible.

Though we understand that due to funding limitations additional habitat and creek improvement projects will likely not be included in this phase, Inter-Fluve identified a “Future Opportunities Area” in which there are a number of projects that could be implemented to improve habitat availability, complexity, and stream function, as funding becomes available.

EXISTING CONDITIONS ASSESSMENT

A preliminary reach assessment was completed of the subject reach of the Minnehaha Creek in order to identify feasibility constraints associated with the proposed Cedar Trail connection and to identify stream restoration opportunities within the project area. The proposed trail project will connect the Cedar Lake Regional Trail from its crossing of the Minnehaha Creek parallel to the Southwest Light Rail Transit (SWLRT) bridge to Meadowbrook Road via a new trail segment on the south side of the creek extending underneath the series of bridges at the SWLRT crossing and along the creek bank and shoulder of Powell Road.

Inter-Fluve staff walked the reach starting from the downstream limit of the Blake Road development project to Meadowbrook Road on September 26, 2022. At the time of the assessment, discharge from the Grey’s Bay Dam was 0 cubic feet per second (cfs.) There was some flow in the assessment reach, which was likely a result of stormwater discharge from recent rains.

Overall, the reach was found to be vertically stable with a pool-riffle morphology. In general, streambank erosion was limited to areas where infrastructure impacts were noted (as shown in Figure 1 below), and floodplain connectivity was minimal. A representative cross-section

measured for this reach had a 51-foot bankfull width, and 1-foot bankfull depth (Figure 1). The cross-section also showed an inset floodplain bench approximately 2 feet below an elevated terrace located between the Cedar Lake Regional Trail and the creek. The terrace was dominated by a buckthorn (*Rhamnus cathartica*) understory. This two-stage cross-section characteristic has previously been noted by Inter-Fluve throughout the Minnehaha Creek corridor and is understood to be a function of the regulated hydraulic regime of the Creek.

Riffle material throughout the reach was dominated by rounded gravels and cobbles. There was a deep pool at Station 20+00, which was un-wadable at the time of the survey. This pool provided a refuge for aquatic species in the otherwise mostly dewatered creek. A canoe/kayak dock in disrepair was located on the river left margin of the pool (Figure 2).

At Station 17+00, a water main pipe extended over the creek. Based on topography, the pipe was buried, but not below the floodplain/floodplain terrace, resulting in a lateral mound bisecting the floodplain (Figure 1). The utility crossing appeared undersized (at approximately 35-feet-wide) and constricts the channel based on bank erosion noted downstream of the crossing. Downstream of the utility crossing, a privately owned cinder block wall replaced the natural bank on river left (Figure 3).

Bank erosion was present on either side of the creek upstream of the Cedar Trail/SWLRT/BNSF crossing, and downstream of the crossing on river right (Figure 4). Downstream of the crossing, several floodplain bars were present and colonized with reed canary grass. Granite slabs and wood piles were located on the right bank and in the channel at the location of an assumed previous crossing. Immediately upstream of the Meadowbrook Road crossing, concrete slabs were found on the right bank

Large and small debris (e.g., bikes, pieces of construction debris, road signs, trash, etc.) was noted throughout the corridor.

IMPROVEMENT OPPORTUNITIES

Inter-Fluve identified several creek improvement opportunities along this reach. These include improvements along the connection corridor that will be required for the Cedar Trail connection project to be implemented, as well as several improvements identified in a Future Opportunities Area that could be implemented to improve habitat availability and complexity, and stream function, if additional funding becomes available.

Creek Improvements Necessary for Cedar Trail Connection Project

Inter-Fluve noted bank erosion in the creek along the proposed trail connection corridor, specifically in the segment where the proposed trail alignments are nearest the creek immediately upstream and downstream of the Cedar Trail/SWLRT/BNSF bridge crossings. Due to the close proximity of the proposed connection-trail to the creek, bank stabilization will be necessary to prevent hydraulically-induced bank erosion impacting the trail. Two trail alignments were provided by Stantec (Figure 6). The bank stabilization treatment type will be a function of the proposed trail design and grades, and results of hydraulic modeling. Due to the close proximity of the trail and creek, there is the potential that the bank stabilization work may encroach on the

creek's channel, potentially necessitating bank shaping work on the opposite side of the creek (if feasible) to match existing regulatory flood elevations. It is anticipated that bank stabilization will be needed to support trail implementation both upstream and downstream of the Cedar Trail/SWLRT/BNSF crossing. Additional areas may be in need of bank stabilization and restoration depending on the proximity of the proposed trail to the creek and the desire to mediate existing stormwater outfalls.

Next steps for the design of this project include hydraulic modeling to assess the impact on the creek, the type of stabilization treatment needed, and potential impacts requiring treatment on adjacent areas.

A budgetary Engineers Opinion of Probable Construction Costs (EOPCC) is included in Table 1. The EOPCC includes an estimate for a bioengineering bank stabilization treatment that is assumed to be sufficient to support the project needs. However, additional design analysis and hydraulic modeling will be needed to determine if the assumed treatment will be appropriate for this creek segment. Additionally, hydraulic modeling will be necessary to review flood flow impacts resulting from the work and assess if any potential impacts can be mitigated through adjustment on the opposite bank. The EOPCC assumes a volume of earthwork needed for this purpose, but that volume is only a high-level estimate at this time. Additional design and modeling for the trail construction may determine that geotechnical or structural solutions are needed for the bank to support the trail which are not included in the EOPCC. Additional potential improvement opportunities including aquatic and riparian habitat improvements, resetting of the stormwater outlet riprap with a focus on the outlet shown in Figure 5, and invasive species removal are not included in the EOPCC. Proposed items mentioned in the Future Opportunities Area section (below) are also not included in the EOPCC.

Future Opportunities Area

Inter-Fluve identified the portion of the reach including the utility crossing and buckthorn dominated terrace as a "Future Opportunities Area" (Figure 6) with a number of projects that could be implemented as funding allows. Potential projects in this area include:

- ▶ Address undersized utility crossing to restore creek function and minimize creek impacts. This could include replacing the crossing with wider crossing (potentially with a bridge and trail connection to Edgebrook Dr.), or burring the utility line below the floodplain and creek. Also address impacts to bisected floodplain.
- ▶ Create backwater wetland in floodplain terrace to improve floodplain connection and backwater habitat availability adjacent to refuge pool. This could include buckthorn removal and revegetation with native species.
- ▶ Remove man-made debris (including canoe/kayak dock)
- ▶ Invasive species removal
- ▶ Meet with the landowner to discuss acceptability/feasibility of coordinating on a project to replace the cinderblock wall and restore creek bank and floodplain connection



Figure 1: Existing conditions of the assessed reach.



Figure 2: Pool and unusable canoe/kayak dock.



Figure 3: Cinderblock wall downstream of utility crossing.



Figure 4: Bank erosion downstream of Cedar Lake Trail crossing.



Figure 5: Outfall along connection corridor.



Figure 6: Concept design for bank stabilization along Connection corridor.

Table 1: EOPCC for Cedar Trail to Minnehaha Preserve bank stabilization.

Cedar Trail to Minnehaha Preserve Trail Connection - Bank Toe Stabilization Budgetary Engineer's Opinion of Probable Construction Cost December 2022						
Item #	Item	Unit	Quantity	Unit Cost	Sub Total	Notes
1	MOBILIZATION AND DEMOBILIZATION	LUMP SUM	1	\$31,000	\$31,000	Assumes 15% of overall cost
2	DEWATERING & EROSION/SEDIMENT CONTROL	LUMP SUM	1	\$21,000	\$21,000	Assumes 10% of overall cost
3	STONE TOE	CY	440	\$180	\$79,200	Assumes subgrade excavation and filter gravel are incidental
4	FES LIFTS	FACE FT	1,500	\$50	\$75,000	Assumes three FES lift layers over stone toe
5	IMPORTED FES LIFT BACKFILL (Topsoil)	CY	210	\$30	\$6,300	
6	FLOODPLAIN BENCH CUT/EARTHWORK	CY	1,500	\$10	\$15,000	Assumes estimated volume for cut on opposite bank; 67% cut material reused onsite for fill
7	EXPORT CLEAN FILL	CY	500	\$20	\$10,000	Assumes 33% cut material exported, assumes clean fill
8	REVEGETATION AND RESTORATION	LUMP SUM	1	\$20,000	\$20,000	Assumes seeding and shrub planting in restored areas.
Rounded Subtotal					\$258,000	
				Contingency	40%	\$103,000
ESTIMATED TOTAL					\$361,000	
AACE Class 4 Low Range (-30%)					\$253,000	
AACE Class 4 High Range (+50%)					\$542,000	
Engineering, Design, and Permitting					\$110,000	
<p>Additional Assumptions - (1) Stone toe and FES lift bank design will be used (no structural bank solutions, walls, reinforcement, etc.) (2) A permittable design is achievable through floodplain bench cutting on opposite bank to achieve no-rise conditions. (3) No resetting of stormwater outlet riprap is included. (4) Structural and civil work for bank stabilization and trail are separate items not included in this EOPCC.</p>						