Building a Better World for All of Us®

MEMORANDUM

TO: City of Vadnais Heights, Minnesota

FROM: Emily Jennings, PE (Lic. MN)
Water Resources Engineer

DATE: July 20, 2020

RE: Lambert Lake Improvements Project - ACSIC Comparison
SEH No. VADLA 153931 14.00

Background
The Lambert Lake Improvements Project (Project) includes sheet pile removal and replacement and meandering of the existing Lambert Creek alignment (County Ditch 14), from the Lambert Lake Pond outlet to the convergence of the historic creek and the current creek path.

The existing vinyl sheet pile located on the north side of the Lambert Lake Pond is vital for regional flood control for the County Ditch 14 system and is beginning to heave upwards and outwards. A properly functioning Pond in this location is also important for storing sediment (where it can be more easily removed) and reduces sediment transport into City infrastructure downstream. VLAWMO consulted with an excavation company in 2018 on the condition of the sheet pile and at that time, it was recommended that the sheet pile be replaced by 2021 to avoid substantial failure. VLAWMO is proposing to replace the existing vinyl sheet pile with steel sheet pile, installed at an appropriate depth to avoid any future heave.

The proposed meander of Lambert Creek is designed to tie in to the existing channel downstream of the Pond and approximately 580 feet upstream of Branch Ditch 4, at the convergence of the historic creek and the current creek path. The proposed meander length is 2,020 feet and is designed to tie into the profile of the existing ditch. Due to an increase in length, the proposed profile is slightly flatter however the existing channel volume is conserved through the increase in length. The meander is designed to connect with the Lambert Lake floodplain, improving water quality and increasing usage of the surrounding wetland area.

In 2018, VLAWMO consulted with Houston Engineering, Inc to analyze the existing condition of the Ditch as compared to its As-Constructed and Subsequently Improved Condition (ACSIC). The definition of the ACSIC is intended to establish the condition to which the system can legally be repaired consistent with the definition in MS 103E.701. The information for this analysis is summarized within the 2018 VLAWMO County Ditch 14 Repair Report.

Proposed Meander Geometrics
The meander cross sectional area was designed per the Minnesota Department of Natural Resources (MnDNR) stream criteria for the project area and in respect to the existing hydraulics. As identified in the 2018 VLAWMO County Ditch 14 Repair Report, the existing profile for Lambert Creek within the project area is currently below the ACSIC profile. The proposed meander will generally match the existing profile by tying into the existing elevations of the current up and downstream profile, and will therefore be located entirely at or below the ACSIC elevation. Pursuant to MS 103E definition, excavation below the ACSIC elevation is considered a ditch “improvement” and would require a separate petition process which would be unlikely to be successful. Furthermore, the downstream culvert crossing at Edgerton Road, located approximately 3,260 feet downstream from the meander

project limits, has an upstream invert of 890.06, or 0.37 feet below the downstream invert of the meander, therefore additional depth would result in the loss of positive grade for drainage and a permanent pool within the Lambert Lake Area.

A drainage input channel is included to maintain the connection of Branch Ditch 3 to Lambert Creek. Similarly to the main channel, the drainage input channel will tie into the existing elevations and therefore be located entirely at or below the ACSIC elevation.

Attachment 1 includes plan sheets 1 and 2 from Appendix A of the 2018 VLAWMO County Ditch 14 Repair Report to support the Project Engineer's aforementioned conclusion. Attachment 2 from the Lambert Lake Improvements Project Plans show the proposed meander alignment and includes notes related to the Project's goals to generally match the existing Ditch profile by tying into the existing elevations of the current up and downstream profile.

Proposed 2021 Maintenance Project
As suggested within the 2018 VLAWMO County Ditch 14 Repair Report, VLAWMO Board has also approved as part of the 2021 VLAWMO budget a partnership project with the City of Vadnais Heights to maintain the portion of Lambert Creek (County Ditch 14) directly downstream of the Lambert Lake Improvements Project area. This Project was funded at 50% of the estimated construction cost within the 2021 approved VLAWMO Budget. This repair would maintain approximately 4,300 feet of Ditch 14 and include excavation along the open channel from station 31+00 to 74+00. This proposed project will be pending agency permit approvals and securing necessary remaining funds.

Attachment 1 shows the proposed location of the 2021 Maintenance Project.

Summary and Conclusions
The Lambert Lake Improvements project will maintain the existing ditch conveyance. A proposed downstream maintenance project will further benefit the capacity of the Lambert Creek system.

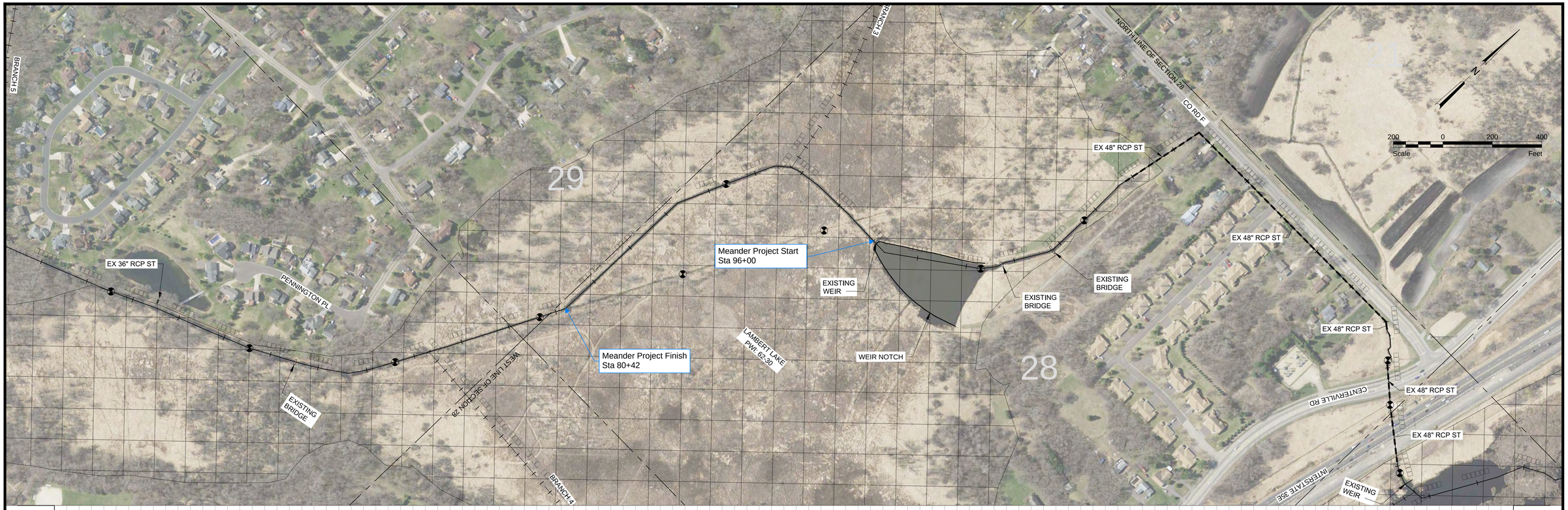
The Lambert Lake Improvements Project's proposed meander design will generally match the existing Ditch profile by tying into the existing elevations of the current up and downstream profile and will therefore be located entirely **at or below the ACSIC elevation as identified in the 2018 repair report.**

EKJ

c: Phil Belfiori, VLAWMO Administrator
Dawn Tanner, VLAWMO Program Development Coordinator

S:\UZ\V\VADLA\153931\5-final-dsgn\50-final-dsgn\50-Hydro\Memo\ACSIC Discussion w City

Attachments
Attachment 1 - Excerpts from Appendix A of the 2018 VLAWMO County Ditch 14 Repair Report
Attachment 2 – Excerpts from the Lambert Lake Improvements Draft Plan



NOTE: ACSIC FROM 80+50 TO 107+66 IS PER 2004 LAMBERT WEIR PLANS

MAIN TRUNK

LAMBERT LAKE
PWI: 62-30

LEGEND
- PARCEL LINE
- PUBLIC WATER
- SOIL PROBE

Starting Point for Budgeted 2021 VLAWMO Maintenance Project with City

1981 "IMPROVEMENT" PROFILE

1981 "IMPROVEMENT" PROFILE CONTINUES ALONG THE AS-DESIGNED ALIGNMENT AT 0.10% UNTIL THE STORMSEWER AT COUNTY ROAD F

BRANCH 4
STA. 74+63

BRANCH 3
STA. 93+52

Meander Project Start
Sta 96+00
Existing Elevation 892.45
Proposed Elevation 892.45

Meander Project Finish
Sta 80+42
Existing Elevation 891.13
Proposed Elevation 890.43

PVIS: 80+50.00
PVIE: 890.43

PVIS: 107+65.96
PVIE: 895.73

358L.F., 48" RCP @ 0.12%
STA 111+24 INV: 896.15 (US)
STA 107+66 INV: 895.73 (DS)

1075L.F., 48" RCP @ 0.12%
STA 121+99 INV: 897.41 (US)
STA 111+24 INV: 896.15 (DS)

STA=69+06
ELEV=893.75
LB

STA=71+22
ELEV=893.60
TOP ICE

BRIDGE

EXISTING CHANNEL BOTTOM

STA=96+20
ELEV=895.63
WEIR NOTCH
(SOUTH SIDE)

STA=103+62
ELEV=897.54
LB

BRIDGE

BRIDGE

STA=105+36
SB ELEV=894.88

STA=100+59
SB ELEV=891.48

0.01%

0.20%

0.12%

ACSIC PROFILE

Proposed Meander Profile

STA=61+06
SB ELEV=889.71

STA=67+11
SB ELEV=886.10
NO REFUSAL TO THIS DEPTH
(INCONCLUSIVE)

STA=73+19
SB ELEV=889.85

STA=79+32
SB ELEV=886.46
NO REFUSAL TO THIS DEPTH
(INCONCLUSIVE)

STA=88+75
SB ELEV=886.54
NO REFUSAL TO THIS DEPTH
(INCONCLUSIVE)

915 910 905 900 895 890 885 880 878

891.38	891.13	890.92	891.00	890.86	890.98	891.43	890.71	890.26	890.33	891.13	890.83	891.20	891.49	891.11	891.17	891.54	891.91	892.45	893.11	893.77	894.58	895.14	895.15	895.77	896.01	896.24	896.48	896.71

60+00 62+00 64+00 66+00 68+00 70+00 72+00 74+00 76+00 78+00 80+00 82+00 84+00 86+00 88+00 90+00 92+00 94+00 96+00 98+00 100+00 102+00 104+00 106+00 108+00 110+00 112+00 114+00 116+00

No.	Revision	Date	By

PRELIMINARY
Not for Construction

H□□□□□□ Engineering Inc.
Maple Grove
P: 763.493.4522
F: 763.493.5572

Drawn by: JEN
Checked by: NS
Date: 03/08/18
Scale: AS SHOWN

RAMSEY COUNTY DITCH 14
VADNAIS LAKE AREA
WATER MANAGEMENT ORGANIZATION

Appendix A

PLAN AND PROFILE
MAIN TRUNK

PROJECT NO. 7057-006

SHEET 2 of 5

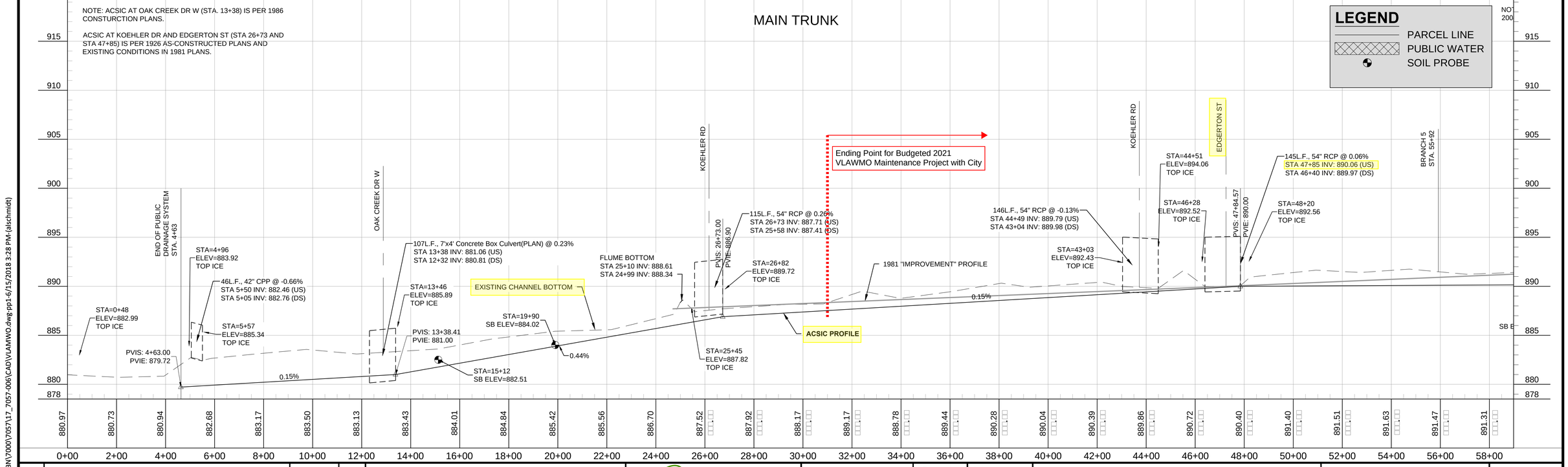
H:\Maple Grove\JBN\7000\7057\17_7057-006\CAD\VLAMWO.dwg-pp2-6/15/2018 3:29 PM-(alschmidt)

NOTE: ACSIC AT OAK CREEK DR W (STA. 13+38) IS PER 1986 CONSTURCTION PLANS.

ACSIC AT KOEHLER DR AND EDGERTON ST (STA 26+73 AND STA 47+85) IS PER 1926 AS-CONSTRUCTED PLANS AND EXISTING CONDITIONS IN 1981 PLANS.

MAIN TRUNK

LEGEND
- PARCEL LINE
- PUBLIC WATER
- SOIL PROBE



No.	Revision	Date	By

PRELIMINARY
Not for Construction

Houston Engineering Inc.
Maple Grove
P: 763.493.4522
F: 763.493.5572

Drawn by	Date
JEN	03/08/18
Checked by	Scale
NS	AS SHOWN

RAMSEY COUNTY DITCH 14
VADNAIS LAKE AREA
WATER MANAGEMENT ORGANIZATION

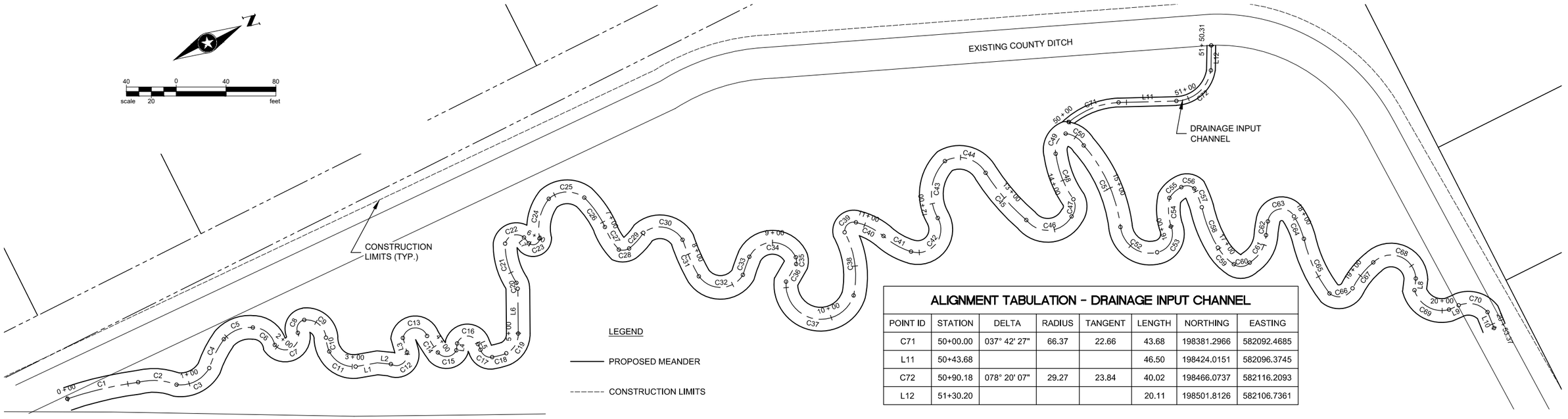
Appendix A

PLAN AND PROFILE
MAIN TRUNK

PROJECT NO. 7057-006

SHEET
1 of 5

H:\Maple Grove\JBN\7000\7057\17_7057-006\CAD\VLAMWO.dwg-pp1-6/15/2018 3:28 PM-(alschmidt)



ALIGNMENT TABULATION - DRAINAGE INPUT CHANNEL

POINT ID	STATION	DELTA	RADIUS	TANGENT	LENGTH	NORTHING	EASTING
C71	50+00.00	037° 42' 27"	66.37	22.66	43.68	198381.2966	582092.4685
L11	50+43.68				46.50	198424.0151	582096.3745
C72	50+90.18	078° 20' 07"	29.27	23.84	40.02	198466.0737	582116.2093
L12	51+30.20				20.11	198501.8126	582106.7361

NOTES:

1. LOCATIONS WHERE THE MEANDER AND DRAINAGE INPUT CHANNEL TIE IN TO EXISTING GROUND SHALL MATCH ELEVATIONS TO PRESERVE THE EXISTING DRAINAGE PROFILE.

ALIGNMENT TABULATION - PROPOSED MEANDER

POINT ID	STATION	DELTA	RADIUS	TANGENT	LENGTH	NORTHING	EASTING
C1	0+00.00	011° 37' 40"	287.85	29.31	58.42	197563.1586	581929.3191
C2	0+58.42	035° 10' 49"	51.14	16.21	31.40	197619.8572	581942.9583
C3	0+89.82	067° 12' 14"	26.52	17.62	31.11	197646.5723	581958.5070
C4	1+20.93	016° 59' 42"	88.26	13.19	26.18	197675.9302	581958.4497
C5	1+47.11	055° 07' 21"	27.12	14.15	26.09	197696.8986	581942.9371
C6	1+73.20	078° 09' 39"	17.91	14.55	24.44	197721.8973	581945.1225
C7	1+97.63	157° 09' 50"	10.66	52.79	29.25	197731.3443	581965.6371
C8	2+26.88	106° 16' 58"	7.23	9.64	13.41	197752.2424	581965.2063
C9	2+40.29	091° 37' 37"	15.72	16.18	25.15	197761.4750	581958.2352
C10	2+65.44	026° 09' 39"	25.21	5.86	11.51	197770.7518	581978.7908
C11	2+76.95	069° 04' 37"	21.49	14.79	25.91	197768.1278	581989.8962
L1	3+02.86				17.65	197781.5879	582010.2097
L2	3+20.51				10.87	197798.4660	582015.3732
C12	3+31.37	131° 57' 42"	8.79	19.73	20.25	197807.6669	582021.1565
L3	3+51.62				11.86	197823.4994	582018.4723
C13	3+63.48	147° 56' 38"	10.16	35.37	26.24	197825.7512	582006.8308
C14	3+89.72	006° 12' 12"	145.89	7.91	15.80	197843.8731	582014.1232
C15	4+05.51	114° 31' 40"	8.91	13.86	17.81	197845.5642	582029.8205
L4	4+23.32				5.53	197859.6666	582034.9009
C16	4+28.86	146° 10' 10"	8.79	28.90	22.42	197862.6742	582030.2568
L5	4+51.28				4.99	197877.4358	582038.3169
C17	4+56.27	081° 35' 46"	8.43	7.28	12.01	197877.1171	582043.3004
C18	4+68.29	011° 18' 55"	60.13	5.96	11.87	197882.8187	582052.7331
C19	4+80.16	065° 06' 51"	17.26	11.02	19.61	197894.4252	582055.1491
L6	4+99.77				36.00	197910.1273	582045.2285
C20	5+35.77	034° 51' 01"	8.03	2.52	4.88	197925.9739	582012.9078
C21	5+40.65	034° 05' 23"	55.73	17.09	33.16	197927.0224	582008.2151
C22	5+73.81	119° 22' 58"	9.23	15.78	19.22	197933.1479	581976.1247

ALIGNMENT TABULATION - PROPOSED MEANDER

POINT ID	STATION	DELTA	RADIUS	TANGENT	LENGTH	NORTHING	EASTING
L7	5+93.03				6.08	197948.8920	581978.5566
C23	5+99.11	122° 52' 03"	5.39	9.91	11.57	197950.2868	581984.4760
C24	6+10.68	049° 43' 58"	38.84	18.00	33.72	197959.7562	581984.8134
C25	6+44.40	078° 44' 50"	22.50	18.46	30.92	197980.5877	581959.6481
C26	6+75.32	021° 01' 57"	78.97	14.66	28.99	198006.4532	581971.7230
C27	7+04.31	022° 20' 40"	54.86	10.83	21.39	198010.6910	582000.2361
C28	7+25.70	046° 55' 36"	10.51	4.56	8.61	198012.5503	582021.4129
C29	7+34.32	018° 36' 41"	52.00	8.52	16.89	198020.4060	582024.3103
C30	7+51.21	099° 11' 52"	21.00	24.67	36.36	198036.0985	582018.2662
C31	7+87.56	011° 16' 34"	163.71	16.16	32.22	198061.7709	582037.3443
C32	8+19.78	111° 40' 13"	21.39	31.51	41.69	198060.3000	582069.4770
C33	8+61.47	006° 50' 04"	129.36	7.72	15.43	198092.4018	582084.3855
C34	8+76.90	129° 04' 58"	20.66	43.40	46.55	198103.5321	582073.7124
C35	9+23.45	031° 22' 40"	10.12	2.84	5.54	198136.6973	582090.8086
C36	9+28.99	000° 35' 15"	1588.66	8.15	16.29	198134.4926	582095.8178
C37	9+45.28	166° 20' 39"	27.87	232.79	80.92	198120.8849	582104.7730
C38	10+26.21	040° 03' 34"	74.83	27.28	52.32	198164.3322	582139.0686
C39	10+78.52	112° 38' 59"	7.25	10.87	14.25	198180.7456	582090.5110
C40	10+92.77	026° 49' 33"	53.18	12.68	24.90	198192.4194	582087.4838
C41	11+17.67	025° 45' 07"	56.99	13.03	25.61	198207.2354	582107.2122
C42	11+43.28	136° 16' 34"	18.55	46.25	44.13	198221.3787	582128.3082
C43	11+87.41	075° 39' 53"	37.57	29.18	49.62	198252.7175	582114.0231
C44	12+37.03	089° 45' 39"	24.07	23.97	37.71	198278.3525	582075.7178
C45	12+74.75	016° 34' 48"	173.66	25.30	50.25	198303.2696	582098.8136
C46	13+25.00	111° 55' 57"	22.00	32.58	42.98	198315.4406	582147.3891
C47	13+67.98	066° 02' 48"	12.58	8.18	14.50	198349.2680	582161.0118
C48	13+82.48	027° 19' 11"	82.98	20.17	39.57	198356.7193	582149.5048
C49	14+22.05	078° 30' 38"	14.25	11.64	19.53	198360.4646	582110.4908

ALIGNMENT TABULATION - PROPOSED MEANDER

POINT ID	STATION	DELTA	RADIUS	TANGENT	LENGTH	NORTHING	EASTING
C50	14+41.58	055° 58' 03"	18.54	9.85	18.11	198374.8071	582099.5582
C51	14+59.69	034° 03' 57"	122.68	37.58	72.94	198383.5865	582114.5829
C52	15+32.63	097° 14' 04"	23.78	26.99	40.35	198380.4973	582186.3877
C53	15+72.98	102° 10' 53"	15.11	18.71	26.94	198397.6223	582217.6882
C54	15+99.92	028° 34' 35"	46.57	11.86	23.23	198416.8885	582204.2166
C55	16+23.15	033° 16' 04"	22.54	6.73	13.09	198426.1177	582183.1628
C56	16+36.24	072° 26' 38"	8.85	6.48	11.18	198438.5460	582179.6844
C57	16+47.42	008° 52' 35"	104.43	8.11	16.18	198447.2967	582185.4045
C58	16+63.60	019° 14' 49"	104.22	17.67	35.01	198445.9653	582201.5116
C59	16+98.61	026° 08' 40"	40.88	9.49	18.65	198442.9693	582236.2272
C60	17+17.26	083° 47' 13"	9.62	8.63	14.07	198448.3375	582253.9231
C61	17+31.33	053° 45' 08"	28.26	14.32	26.51	198460.3503	582258.4846
C62	17+57.84	009° 42' 18"	66.65	5.66	11.29	198481.8860	582244.7372
C63	17+69.13	147° 56' 28"	11.08	38.57	28.61	198488.3115	582235.4703
C64	17+97.75	016° 37' 53"	67.98	9.94	19.73	198508.7790	582241.3737
C65	18+17.48	024° 27' 47"	114.25	24.77	48.78	198507.7305	582261.0105
C66	18+66.26	102° 30' 51"	12.14	15.13	21.72	198506.4387	582309.4025
C67	18+87.98	024° 11' 10"	63.86	13.68	26.96	198524.7961	582314.0653
C68	19+14.94	132° 37' 39"	19.94	45.46	46.16	198549.1359	582302.9476
L8	19+61.10				9.39	198573.7538	582329.9268
C69	19+70.50	088° 20' 00"	22.79	22.14	35.13	198568.5802	582337.7673
L9	20+05.63				8.49	198586.3265	582364.1022
C70	20+14.12	072° 21' 02"	20.13	14.72	25.42	198594.8042	582364.5588
L10	20+39.54				13.83	198613.0699	582379.7634

Save: 4/15/2020 4:56 PM hcunningham Plot: 5/6/2020 6:40 PM s:\UZV\VADLA\153931\5-final-dsgn\51-drawings\10-Civil\cad\dwg\sheet\VADLA150210STREAM.dwg

DRAWN BY: HRC
DESIGNER: EKJ
CHECKED BY: EKJ
DESIGN TEAM

NO.	BY	DATE	REVISIONS

SEH
PHONE: 651.490.2000
3535 VADNAIS CENTER DRIVE
ST. PAUL, MN 55110-5196
www.sehinc.com

I HEREBY CERTIFY THAT THIS PLAN 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.

Emily K. Jennings, PE
Date: 04.15.2020 Lic. No. 56622

VADNAIS HEIGHTS, MINNESOTA

MEANDER PLAN

LAMBERT LAKE POND IMPROVEMENTS

FILE NO. 153931

5/10