

Faribault County, Minnesota

County Ditch #37

Staff Repair Report

June 2020

FARIBAULT COUNTY
Drainage Dept

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CD 37 Open Ditch Repair

BACKGROUND

Several landowners have raised concerns over the tile drainage of the open ditch channel, specifically related to the top end of the ditch. Furthermore, the Branch F tile is experiencing mass failure in the low area adjacent to the open ditch channel and the outlet of the Main Tile is beginning to suck holes near the outlet of the ditch. A site inspection of the open ditch channel was conducted in the Spring 2020 and it was noted that most tile outlets were under a considerable amount of pressure due to the water level in the ditch. Both sides of the ditch are heavily treed and beaver activity was observed. Several trees and branches have fallen into the ditch and are impacting flow.

DATA COLLECTION

A survey of the open ditch channel was conducted. A repair report completed by Bolton & Menk in 1970s showed a repair grade extrapolated from the outlet elevation of the Main Tile. This report converted the local datum of the original establishment plans to mean sea level. The Bolton & Menk legal grade shows an invert elevation of 1104.0 of the Main tile outlet. This is consistent with the Drainage Department survey, with an error of 0.17'. There are three crossings in the centerline of the ditch and one bridge. Two of the crossings are roadways and one is a field crossing. Extrapolating the grade downstream from the Main Tile outlet shows that the invert of the field crossing at station 127+00 is 2' higher than legal grade. The perched elevation of this crossing is likely the main cause of the sediment accumulation and high water in the upper reaches of the open ditch. Lowering this crossing to legal grade and cleaning the upper reaches of the open ditch will restore drainage to the tile drainage system.

PROPOSED REPAIR DETAILS

The high-water level in the open ditch has caused the Branch F tile to blowout in last 1,000 feet of the branch and has caused blowouts on the last 250' of the Main tile. Little cover over the Branch F tile was noted, with as little as 10" in some areas. This length of tile will need to be replaced. It is recommended that soil be placed over the new tile to a depth of no less than 24". It is suspected that the Main tile blowouts are caused by wide gaps in the tile, but the tile should be investigated to ensure its integrity. Wide gaps should receive fabric and bats where necessary.

Additional repairs needed on the system include removing brush and trees from the ditch slope and buffer strip, repairing tile outlets, and leveling old ditch spoils

Tree and Brush Removal: Trees and brush need to be removed from the ditch to excavate sediment from the channel and limit beaver activity. Some large cottonwoods exist in the removal area. Large cottonwoods will be bid separately.

- Station 133+00 to Station 160+00 on the north side of the ditch
- Station 96+00 to Station 123+00 on both sides of the ditch

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Open Ditch Cleaning: Approximately 7,500 feet of open ditch cleaning from Station 96+00 to 171+00 (see profiles).

Crossing Replacement: The existing CMP crossing at Station 127+50 will be removed and a new crossing installed near the property line at Station 123+00. Joe Lewis from HEI was hired to run a hydrologic analysis to determine the size of culvert needed to attain a 1" drainage coefficient. The analysis showed that a 66" culvert would give us that capacity.

Level Existing Spoils: Level 800 feet of existing ditch spoils from Station 150+00 to Station 158+00 on the north side of the ditch to a maximum grade of 5H:1V to allow for vehicle passage. Stumps in the spoil bank will need to be grubbed.

Replace Branch F Tile: Replace the last 1,000 feet of the 24" Branch F tile with 24" dual-wall tile at .08% grade. Soil must be mounded over the tile to ensure at least 24" of cover on the tile. Mound shall not exceed 8H:1V slope to ensure farmability. Fill material will be obtained from on-site sources determined by Drainage Department Staff.

Investigate Main Trunk Tile: Excavate around the last 250 linear feet of the 36" Main Tile to evaluate repair needs. Suspect soil is sucking into the tile through wide gaps.

Tile Outlet Repair: Tile outlets shall be replaced with 20 linear feet of non-perforated dual wall plastic tile with outlet protection:

1. Station 36+00 (S) Existing 10" CMP outlet. CD37 Branch 310 is 10" tile
2. Station 45+00 (N) Existing 12" CMP outlet and headwall. CD37 Branch 302 is 12" tile
3. Station 49+50 (S) Existing 8" CMP outlet and headwall. CD37 Branch 298 is 8" tile
4. Station 71+30 (N) Existing 12" CMP outlet
5. Station 85+30 (S) Existing 12" CMP outlet
6. Station 102+50 (N) Existing 15" CMP outlet
7. Station 105+00 (S) Existing 18" CMP outlet. CD37 Lateral 1 tile is 15" tile
8. Station 106+00 (S) Existing 12" CMP outlet on 12" concrete tile. Massive bank failure
9. Station 108+40 (N) Existing tile outlet buried under bank slough. Size unknown
10. Station 108+50 (S) Existing 12" CMP outlet. CD37 Branch 238 is 10" tile
11. Station 119+30 (N) Existing tile outlet buried under bank slough. Size unknown
12. Station 125+20 (N) Existing 8" CMP outlet
13. Station 129+50 (N) Existing 12" CMP outlet
14. Station 134+00 (N) Existing 12" CMP outlet. CD37 Branch D is 12" tile
15. Station 145+40 (N) Existing 8" CMP outlet
16. Station 162+20 (S) Existing 10" CMP outlet
17. Station 164+00 (S) Existing 10" CMP outlet

Timeline: The completion date for this project is December 31, 2020.

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ESTIMATED COST

Item	Unit	Quant	Unit Price	Amount
Mobilization	LS	1	\$5,000.00	\$5,000.00
Open Ditch Cleaning, 4' bottom width	LF	7,500	\$2.50	\$18,750.00
66" Corrugated Metal Pipe for Field Crossing	LF	62	\$150.00	\$9,300.00
Granular Pipe Bedding for Crossing and Branch F Tile	Ton	33	\$10.00	\$ 330.00
Granular Pipe Encasement for Crossing	Ton	75	\$10.00	\$ 750.00
Field Crossing Backfill	CY	113	\$13.00	\$1,469.00
Class III Riprap w/ MnDOT Type 4 Geotextile Fabric for Crossing	Ton	60	\$33.00	\$1,980.00
Level existing spoils, grub stumps	LF	800	\$2.00	\$1,600.00
F&I 24" Dual Wall Plastic Tile for Branch F	LF	1,000	\$32.00	\$32,000.00
Grading and Fill over Branch F Tile	CY	130	\$15.00	\$1,950.00
Investigate Main Trunk Tile	LS	1	\$500.00	\$ 500.00
Tile Outlet Repair, 20 LF Non-Perforated Dual Wall Tile (size varies, see scope for repair)	Ea	17	\$1,100.00	\$18,700.00
Tree and Brush Removal (not including large cottonwoods)	LS	1	\$30,000.00	\$30,000.00
Large Cottonwood Removal and Disposal	Ea	9	\$2,000.00	\$18,000.00
Buffer Strip Tilling and Seeding	AC	2.9	\$500.00	\$1,450.00
Total Estimated Cost				\$141,779.00

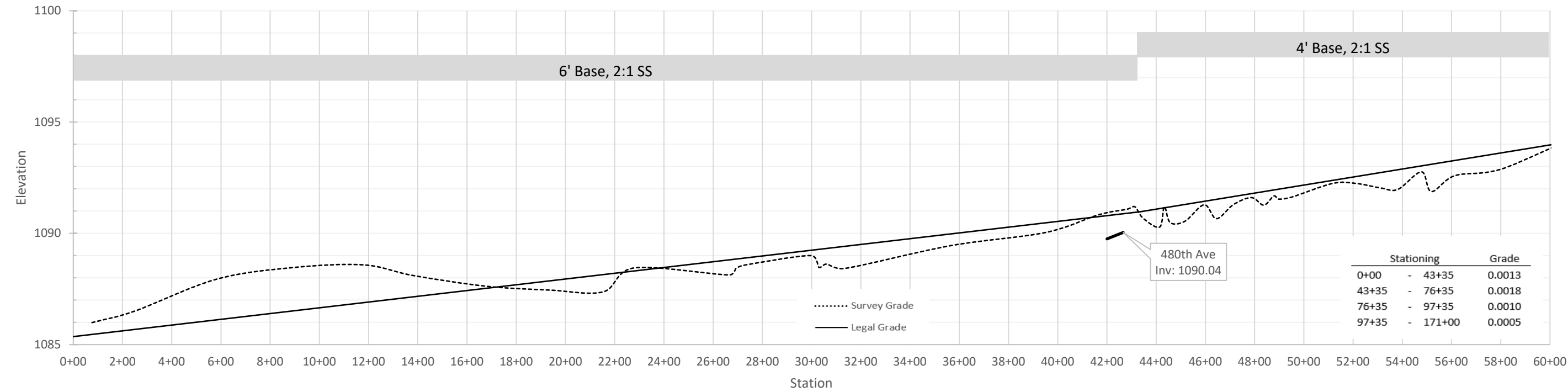
APPENDICES

Appendix A:	Repair Overview Map
Appendix B:	Plan Profiles
Appendix C:	Typical Field Crossing Drawing
Appendix D:	Typical Ditch Cleaning Drawing
Appendix E:	Tree and Brush Removal Standards and Specifications

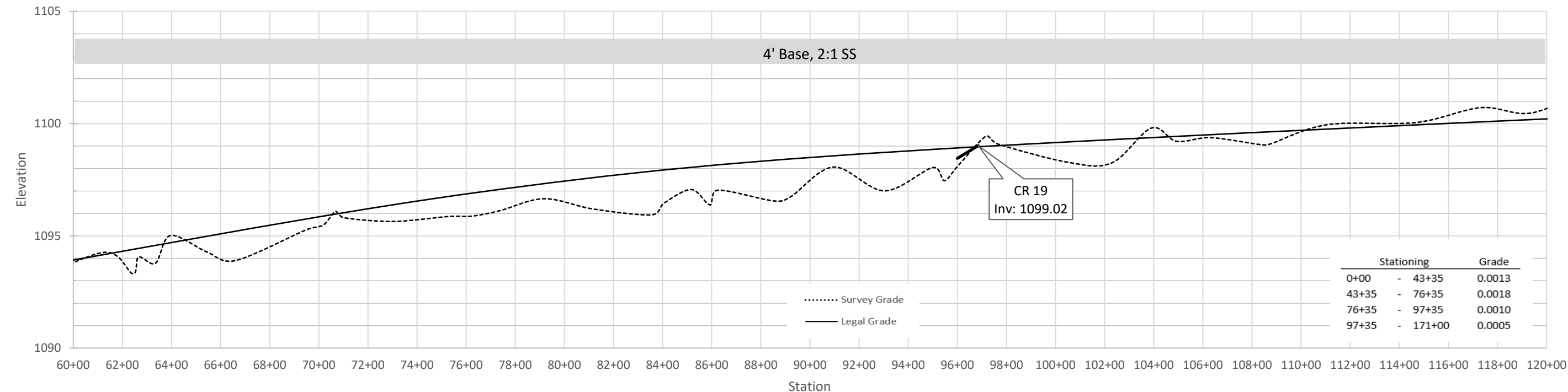


APPENDIX B: PLAN PROFILES

CD37 Main Trunk Profile

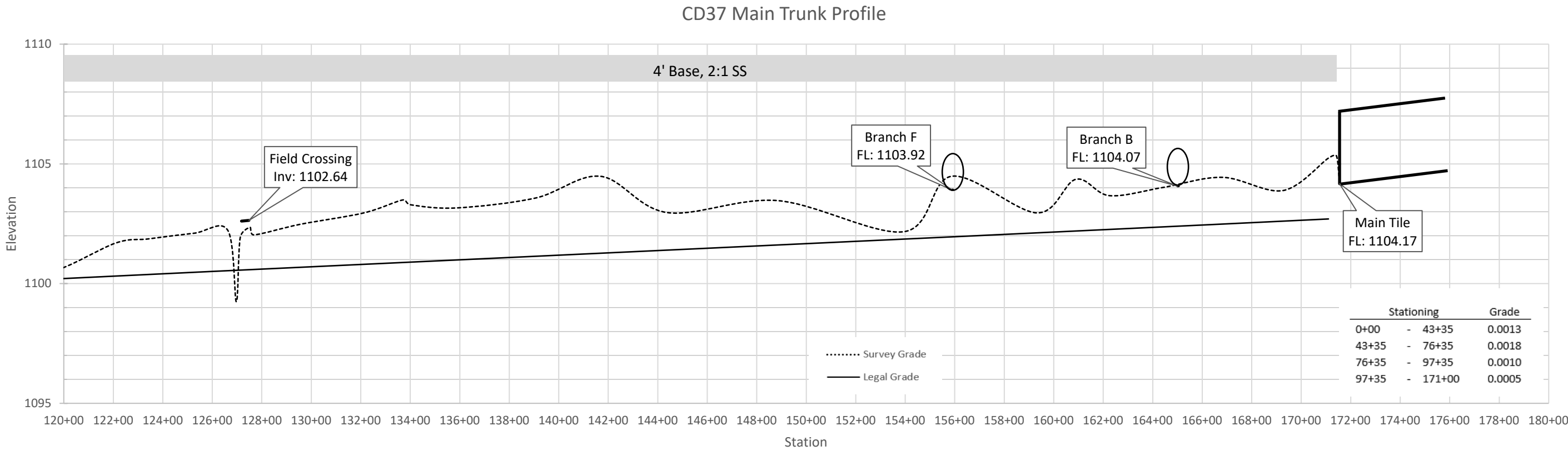


CD37 Main Trunk Profile





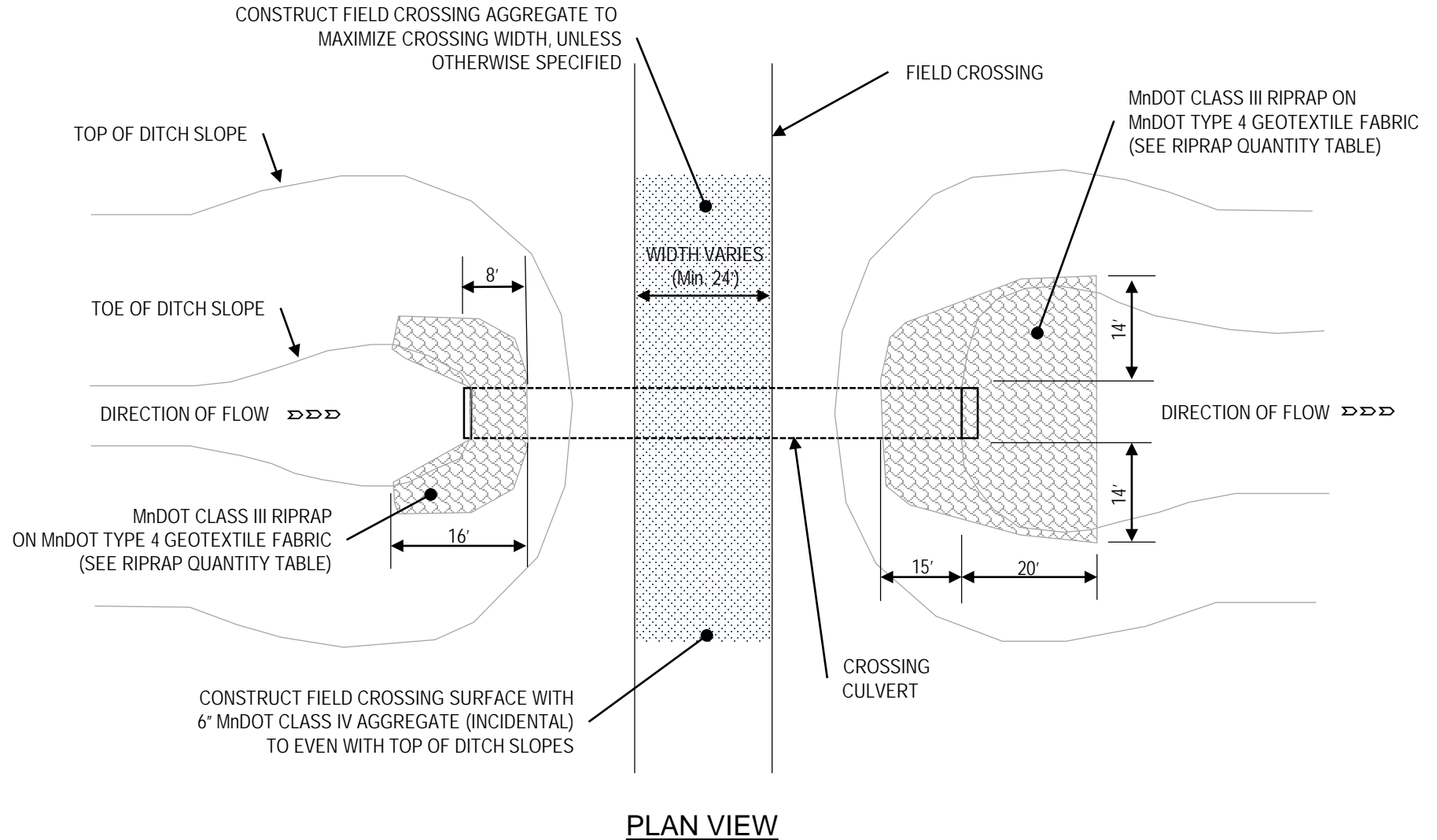
APPENDIX B: PLAN PROFILES



APPENDIX C: TYPICAL FIELD CROSSING DRAWING

TYPICAL FIELD CROSSING

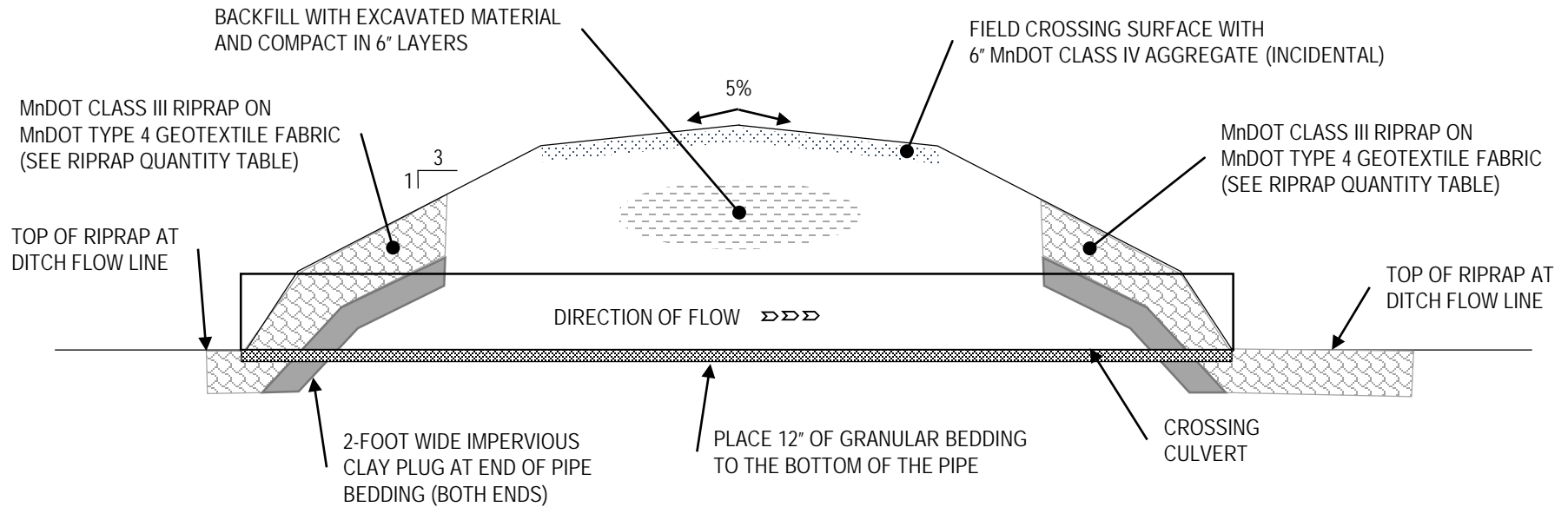
NOT TO SCALE



APPENDIX C: TYPICAL FIELD CROSSING DRAWING

TYPICAL FIELD CROSSING

NOT TO SCALE



SECTION VIEW

Notes:

All construction shall comply with Faribault County Requirements and MnDOT Standard Specifications for Construction (2018).

Contractor is responsible for all Gopher One calls for utility locations.

Common excavation and structure excavation is to be included in bid price for pipe. Additional fill material needed shall be furnished from sources selected by the contractor and approved by the Drainage Department.

MnDOT Class V aggregate surface is incidental to crossing restoration.

All disturbed areas shall be seeded with County Buffer Mix and erosion control blanket placed (incidental).

Excavate to 12" below bottom of culvert or bottom of unsuitable soil, whichever is greater, and backfill with granular foundation.

RIPRAP QUANTITY	
CULVERT SIZE	UPSTREAM - DOWNSTREAM
≤ 48"	10 CY – 20 CY
60"	15 CY – 25 CY
72"	20 CY – 30 CY



APPENDIX D: TYPICAL DITCH CLEANING DRAWING

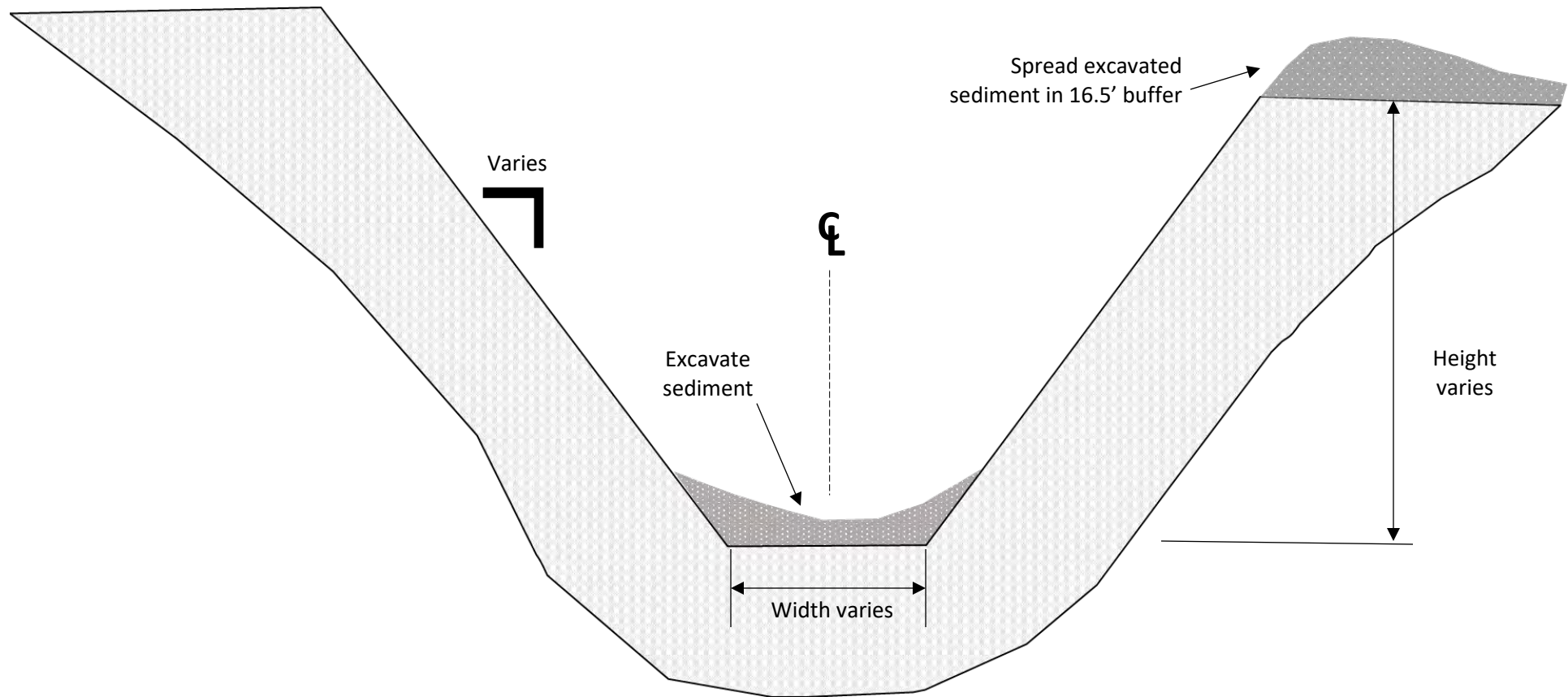
Notes:

Place all spoils from ditch cleaning on the lower side of the ditch (as feasible), no wider than 16.5' wide from the top of the slope.

Miscellaneous tree clearing shall be incidental to normal ditch cleaning as needed.

Do not place spoils in areas that may inhibit the function of drop intakes and side inlets.

Re-slope side slopes if needed (incidental)



TYPICAL DITCH CLEANING

NTS

APPENDIX E: TREE AND BRUSH REMOVAL STANDARDS AND SPECIFICATIONS

Faribault County Drainage Department



Tree Clearing and Grubbing Standards and Specifications

REQUIREMENTS

The Contractor agrees to provide all labor, materials, tools, and equipment necessary or incidental to clear, grub, and remove trees, brush, stumps, roots, and other vegetation including dead or decaying matter indicated in the Contract Documents, Scope for Work, or as directed by the Drainage Department. For additional standards, please refer to MnDOT Specification Section 2101 – Clearing and Grubbing

PAYMENT

Heavy and/or light vegetation removal shall be paid by linear foot OR at an agreed upon lump sum price.

SITE PREPARATION

Coordinate work with utility companies and obtain required permits from permitting authorities. Notify utility companies and the Drainage Department before starting work.

EXTENT OF WORK

Do not remove or damage vegetation beyond the limits of Easements held by the Drainage Department

1. All woody vegetation within 16.5 feet from top of bank shall be removed unless otherwise specified
2. Additional removal outside the 16.5-feet from top of bank may take place with approval from the Drainage Department or private landowner for safe construction practice at no additional cost to the landowner.

CLEARING AND GRUBBING OPERATIONS

In-Slope: All stumps (includes existing stumps) on the in-slope of the drainage ditch shall be removed to a maximum of 12 inches above the grade or as indicated by the Drainage Department.

Buffer Strip Area (16.5 feet from top of bank): All stumps (includes existing stumps) shall be removed or grubbed/grinded 18 inches below the ground surface. Fill holes left by removal of stumps and roots using a suitable fill material, with top surface neat in appearance and smooth.

DISPOSAL

The Contractor shall ensure the proper disposal of trees, brush, stumps, roots, and the debris or byproducts by (preference given to on-site uses):

- Chipping or grinding
 - Byproducts may be disposed of on site in a manner and location agreed upon by the Drainage Department

APPENDIX E: TREE AND BRUSH REMOVAL STANDARDS AND SPECIFICATIONS

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- Burning
 - Inert and unburned remnants may be buried on site to a depth so as not to interfere with farming operations (>30 inches below the field surface) and in a location agreed upon by the Drainage Department and/or private landowners.
- *Marketing. Contractor reserves the rights to all vegetation after removal
- *Removal from site.

*Refer to MnDOT Specification Section 2101 – Clearing and Grubbing for reference to disposal methods that prevent the spreading of insects and disease pests.

PROTECTION OF ITEMS TO REMAIN

For items designated to remain, the Contractor shall perform clearing and grubbing operations in a manner that will not damage or jeopardize the surrounding plant life, property, and drainage system components.

CLEAN UP

Leave site in a clean condition, ready for subsequent work. Clean up spillage and wind-blown debris from public and private lands.